BIOLOGY

GASEOUS EXCHANGE IN MAMMALS e.g. man

The respiratory organs in man are lungs and the respiratory surfaces are the sac like structures called alveoli.

The respiratory tract (air passage)

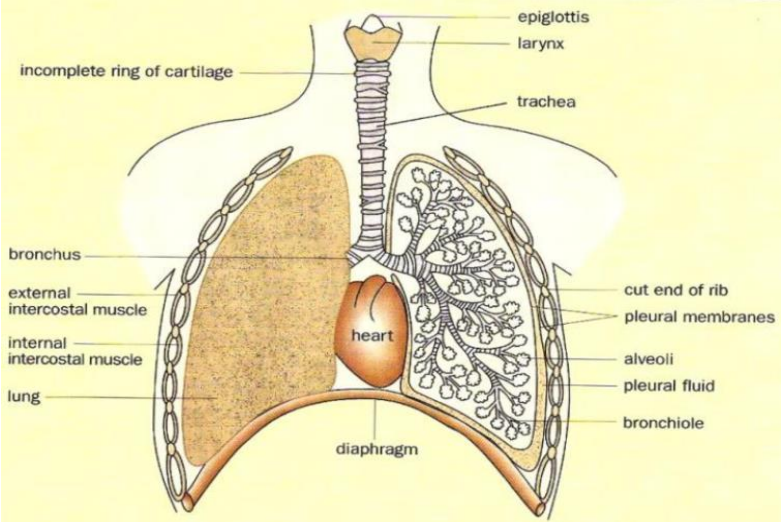
Air enters through the nostrils into the nasal cavity where it is warmed to body temperature.
It begins from the nostrils into the back of the mouth, then into the pharynx from which it goes into the larynx and then to the trachea. From here, it travels through the bronchus, bronchioles and lastly to the alveolus.
The membrane of the nasal cavity is covered with cilia between which are goblet cells, which produce mucus.
Dust and germs inhaled from the atmosphere are trapped in mucus and are carried by the beating action of cilia towards the back of the mouth where they are swallowed.
This helps to prevent dust and germs from entering the lungs. Therefore, by the time air reaches the lungs it is dust and germ free, warm and moist. It is drawn from the nasal cavity into the trachea (wind pipe).

The trachea

This is a tube running from the pharynx to the lungs. It is always kept open by the circular rings of cartilage within it. The cartilage prevents the trachea from collapsing in case there is no air.
Cilia and goblet cells extend into the trachea to draw germs and dust out of trachea into the mouth where they are lost.
At the lower end, the trachea divides into sub tubes called bronchi, which penetrate further into the lungs and divide repeatedly to form small tubes called bronchioles.
The bronchioles divide into many small tubes called alveolar ducts, which end in air sacs called alveoli.
The alveoli are the respiratory surfaces of mammals. There are about 300 million alveoli in a human lung. This increases the surface area over which gaseous exchange takes place.

Location of the lungs in the body

They are located in the thoracic cavity, enclosed by thorax wall and diaphragm.



The alveoli

An alveolus is a sac-like structure. The outer surface of the alveolus is covered with a network of blood capillaries. The alveolus is moist and thin walled. The oxygen in the alveolus diffuses into blood in the capillaries and it is carried around the body. At the same time, Carbon dioxide diffuses from blood into the alveolus and travels through the alveolar duct to the bronchioles then to the bronchi and trachea and out through the nostrils.

The mammalian lung

These are two elastic spongy-like structures located within the thoracic cavity and protected by the rib cage. Between the ribs are intercostal muscles, which move the rib cage. Below the lungs is a muscular sheet of tissue called the diaphragm.

Breathing mechanism in mammals/ lung ventilation

The breathing mechanism in mammals involves two sub-processes that are inspiration and expiration.

Inspiration:

This is the process by which air is allowed into the respiratory organs (lungs).

- The external intercostal muscles contract while the internal intercostal ones relax.
- This makes the rib cage to move outwards and upwards. The diaphragm contracts and flattens.
- This increases the volume of the thoracic cavity and reduces the pressure in it below that of the atmosphere.
- This causes air to enter from the atmosphere through the nostril, trachea, bronchi, and bronchioles until it reaches the alveoli.

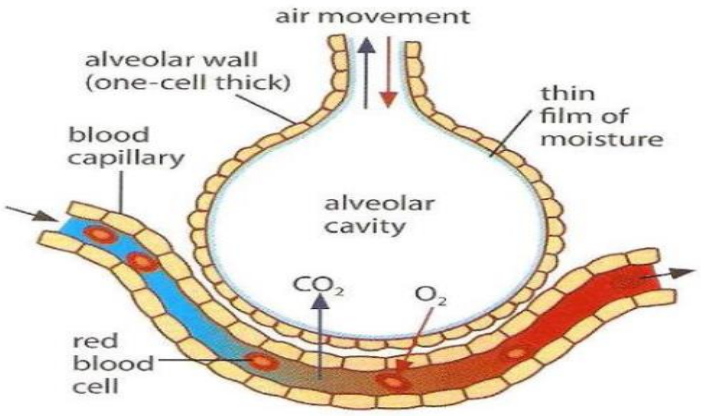
Expiration:

- The internal intercostal muscles contract and the external ones relax.
- This makes the rib cage to move downwards and inwards and the diaphragm becomes dome-shaped.

- This reduces the volume of the thoracic cavity and increases its pressure beyond that of the atmosphere.
- This forces the lungs to contract and release Carbon dioxide through the bronchi, trachea and out through the nostrils.

Gaseous exchange in the alveolus

This take place across walls of alveoli and blood capillaries by diffusion.
During inspiration, air is taken into the lungs filling the alveoli. This air contains more oxygen and low CO_2 concentration. Oxygen in inspired air dissolves in the moisture of the alveolar epithelium and diffuses across this and capillary walls into the red blood cells of blood. Inside the red blood cell, oxygen combines with haemoglobin to form oxyhaemoglobin and carried in this form. At the same time, CO_2 which was carried as bicarbonate ion in blood diffuses from it through the capillary walls into the alveoli. It leaves the lungs in expired air.



Changes in the composition of gases in blood across the alveolus

Volume of gas carried by 100cc of blood

Gas	Entering lungs	Leaving lungs
Nitrogen	0.9cc	0.9cc
Oxygen	10.6cc	19.0cc
Carbon dioxide	58.0cc	50.0cc

The blood that flows towards the lungs contains a larger volume of carbon dioxide and less oxygen. But as it leaves the lungs, oxygen is added into it and some CO_2 is given off in the lungs. This indicates exchange of gases within the lungs.

Changes in approximate air composition during breathing

Component	Inhaled	Exhaled
Nitrogen	79%	79%
Oxygen	21%	17%
Carbon dioxide	0.03%	4%
Water vapour	Less saturated (variable)	Saturated
Temperature	Atmospheric temperature	Body temperature

Although nitrogen is exchanged within the lungs and blood plasma, it plays no part in chemical reactions of the body hence its composition remains the same in inspired and expired air.
Inhaled air has more oxygen compared to exhaled air because it is taken up for the process of respiration, which produces out CO_2. Hence exhaled air contains more CO_2 than inhaled air. However the process of gaseous exchange in alveoli does not remove all the carbon dioxide and oxygen in air.

Experiment to demonstrate breathing in mammals

Materials

- Glass tubing,
- Cork,
- Rubber tubing,
- Y tube,
- Bell jar,
- Two balloons,
- Rubber sheet and
- Thread.

Procedure

- Get a bell jar and fix a cork with glass tubing in its mouth.
- Use a rubber tubing to connect a Y tube to the glass tubing inside the bell jar.

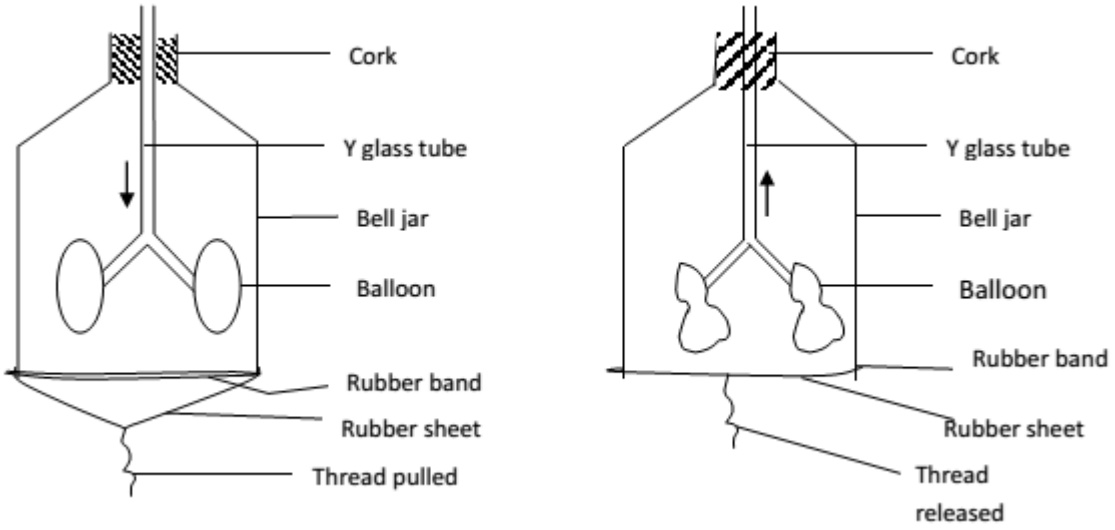
- Tie balloons on each end of the Y tube to act as lungs.
- Tie a rubber sheet using a rubber band at the open end of the bell jar to act as a diaphragm.
- Tie the end of a rubber sheet using a piece of thread.

Note

The bell jar acts as the thoracic cavity and its walls as the rib cage. The glass tubing acts as the trachea and the ends of the Y tube act as the bronchi.

- Pull the end of the rubber sheet using the thread to represent inhalation and release it to represent exhalation.

Setup



Observation

- When the thread is pulled, the rubber sheet stretches. This increases the volume in the bell jar and reduces the pressure. Air enters from out through the glass tube to the Y tube and inflates the balloons.
- When the thread is released, the rubber sheet returns to its normal flat shape. This reduces the volume in the bell jar and increases the pressure. Air is forced out of the balloons through the Y tube and glass tubing. This deflates the balloons.

Conclusion: Pulling of the thread represents inspiration and its release represents expiration.

Important terms related with breathing.

Lung capacity: This refers to the total volume of the lungs when fully inflated. In an adult man, this is about 5 liters. When breathing at rest only a small volume of the lung is used. This is called the **tidal volume**. Tidal volume is the volume of air breathed in and out at rest. When the body is very active, a larger volume of air is taken into the lungs. This volume is called the **vital lung capacity.** However, even at maximum expiration some air remains inside the lungs to prevent the lungs from collapsing. This air makes up the **residual volume**.

Experiment to show that expired air contains more Carbon dioxide than inspired air

.

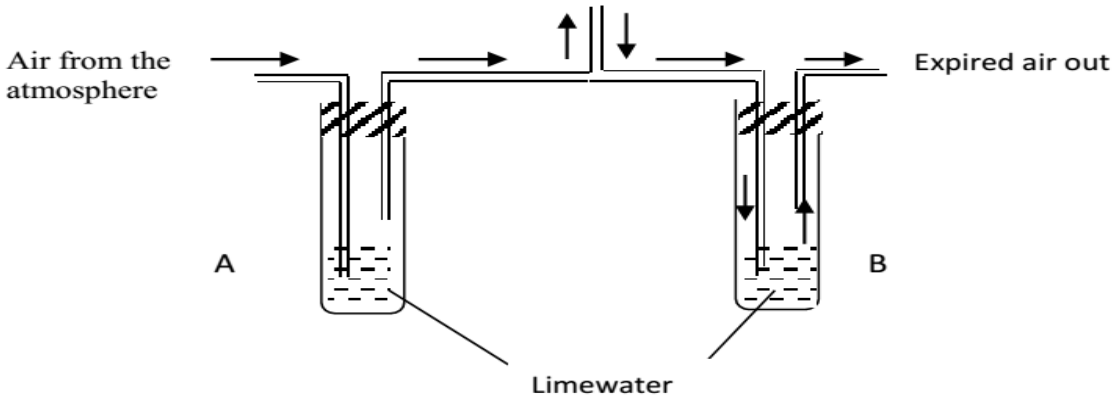
Materials

- Two test tubes,
- Two corks,
- T- Tube,
- Two right angled capillary tubes and
- Lime water

Procedure

- Place the T tube in the mouth and breathe in and out normally.
- Air is made to pass into the lungs from test tube A and out through test tube B. inhalation air is got from the atmosphere through the capillary tube and lime water in tube A.
- Exhaled air passes through lime water and capillary tube at the B end.

Set up of the experiment



Observation

Lime water in tube B turns milky while that in A remains clear.

Conclusion

Expired air contains Carbon dioxide.

Explanation
It is only Carbon dioxide, which can change the colourless limewater to milky. Therefore since B had expired air, it proves it.

Experiment to measure the volume of expired air/depth of breathing

Materials:

- Trough
- Calibrated Bell jar
- Cork
- Glass tube
- Rubber tube
- Water

Procedure:

- A bell jar calibrated in liters is completely filled with water and placed in a trough.
- One end of the rubber tube is then inserted in the bell jar while the other end is connected to a glass tube.
- The demonstrator (person) then breathes out once into the bell jar via the glass tube.
- This is done at 2 different occasions namely, at rest and immediately after an exercise.

Observation:

- Some amount of water is displaced from the bell jar when the person breathes out.
- However, the volume of water displaced at rest is lower than the volume of water displaced after an exercise.
- The volume of water displaced is recorded and equal to the volume of air expired.

Conclusion:
The volume of expired air is greater immediately after an exercise than at rest, this shows that exercise increases the depth of breathing.

TOPIC: EXCRETION AND OSMOREGULATION

Excretion is the removal of waste products of metabolism from the body. Most of the waste products are toxic when allowed to accumulate in the body.

Importance of excretion

- ❖ To remove toxic waste products whose accumulation in the body poisons/harms the organisms
- ❖ To remove excess materials in the body which when left to accumulate affects the body metabolism.

Excretory products are divided into two groups:

1. Nitrogenous excretory products.
These are excretory products, which contain the element nitrogen. They include ammonia, urea and uric acid.

Ammonia:

This is a highly toxic nitrogenous waste and it requires a lot of water for its elimination. It is very soluble in water and due to this it requires less energy to be excreted. Ammonia is excreted by organisms which live in fresh water and therefore have a lot of water in their bodies. Such organisms include bony fish, protozoans, and amphibians when in water,

Urea:

This is a less toxic nitrogenous waste. It requires less water for its excretion. It however requires a lot of energy for its excretion because of its low solubility in water compared to ammonia. Urea is excreted by terrestrial organisms, which have easy access to water, and marine organisms. Such organisms include terrestrial mammals, amphibians when on land, cartilaginous fish, etc.

Uric acid:

This is less toxic than urea and requires no water for its elimination from the body. It is insoluble in water. The demerit of excreting uric acid is that it requires a lot of energy for its excretion. Uric acid is excreted by birds, reptiles and insects and also common in desert animals.

2. Non nitrogenous excretory products.

These are excretory substances that do not contain the element nitrogen. Such products include Carbondioxide, water, excess salts and excess water.

A table showing examples of organisms, their excretory products, their excretory organs and their habitats

Example of organism	Excretory product	Excretory organ	Habitat
Bony fish	Ammonia	Kidney	Flesh water
Cartilaginous fish	Urea	Kidney	Marine water
Reptiles	Uric acid	Kidney	Terrestrial
Birds	Uric acid	Kidney	Terrestrial
Tadpoles	Ammonia	Gills	Flesh water
Adult amphibians	Ammonia	Kidney	Flesh water
	Urea		Terrestrial
Mammals	Urea	Kidney	Terrestrial
Insects	Uric acid	Malpighian tubules	Terrestrial

Animals producing nitrogenous compounds in form of urea are those living on land but have easy access to water. This is because though urea is less toxic than ammonia, it needs a relatively high amount of water to reduce its toxicity to the body during excretion. Urea is excreted in form of urine, which is a mixture of urea, salts and water. Urea is excreted by mammals, amphibians when on land and marine vertebrates.

Animals producing nitrogenous wastes in form of uric acid are those living on land with little access to water. Uric acid is the least toxic and needs the least amount of water for its excretion. Such animals conserve their water because it is not lost during excretion. These animals include, bird, reptiles and insects.

Excretory organs

These are organs that release excretory products. They include the following.

Table showing excretory organs and their corresponding excretory products

Excretory organ	Excretory product
Lungs	Carbondioxide and water
Liver	Bile pigments
Kidney	Urea, excess salts and excess water
Malpighian tubules	Uric acid
Skin	Excess water, excess salts and some urea

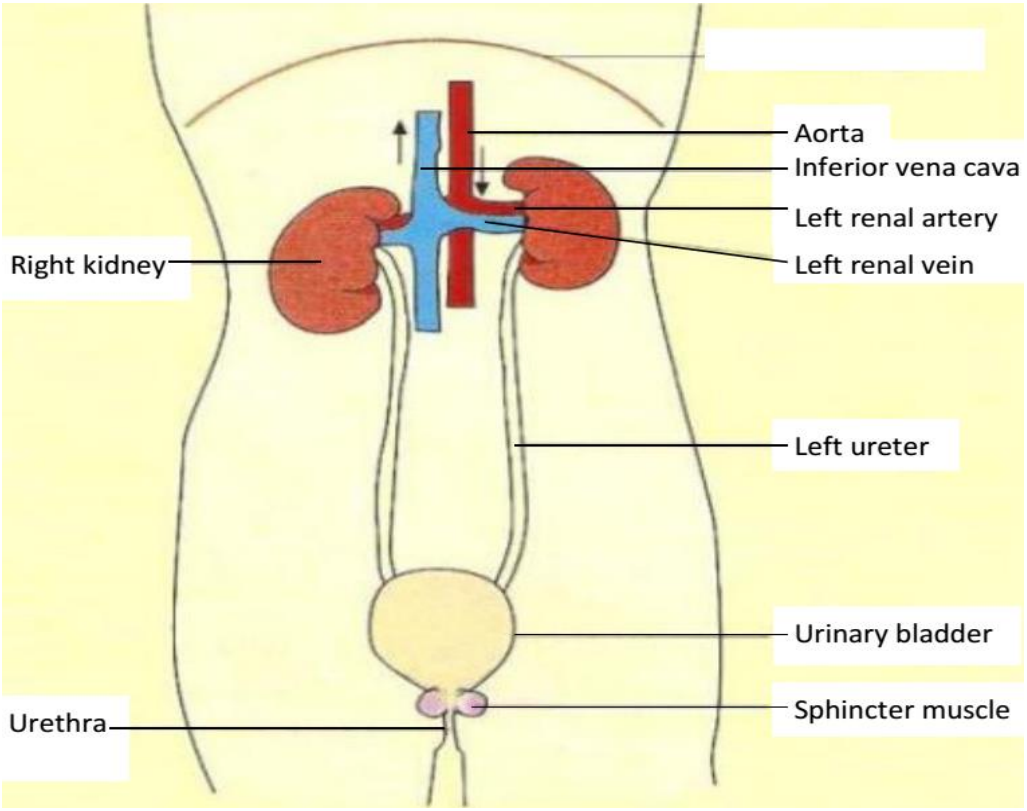
EXCRETION IN MAN

In man the excretory organs are the kidneys, skin and lungs. Their excretory waste products are as shown in the table below.

Excretory organ	Excretory product	Excretory substance
Skin	Sweat	Urea, excess salts and excess water
Lungs	Exhaled air	Carbondioxide and water
Kidney	Urine	Urea, excess salts and excess water.

THE KIDNEY AND THE EXCRETORY SYSTEM

Structure of urinary system



Parts and functions of the urinary system

1) Aorta

It carries oxygenated blood with all food nutrients to the kidney.

2) Renal artery:

This arises from dorsal aorta. It brings blood containing excretory products to the kidney.

3) Renal vein:

It carries filtered blood from the kidney to the posterior vena cava.

4) Ureter:

These are two narrow tubes arising from hilum of each kidney. They connect the kidneys to the urinary bladder. They transport urine to the urinary bladder.

5) Urinary bladder:

It is a thick walled elastic sac-like structure which stores urine.

6) Sphincter muscle:

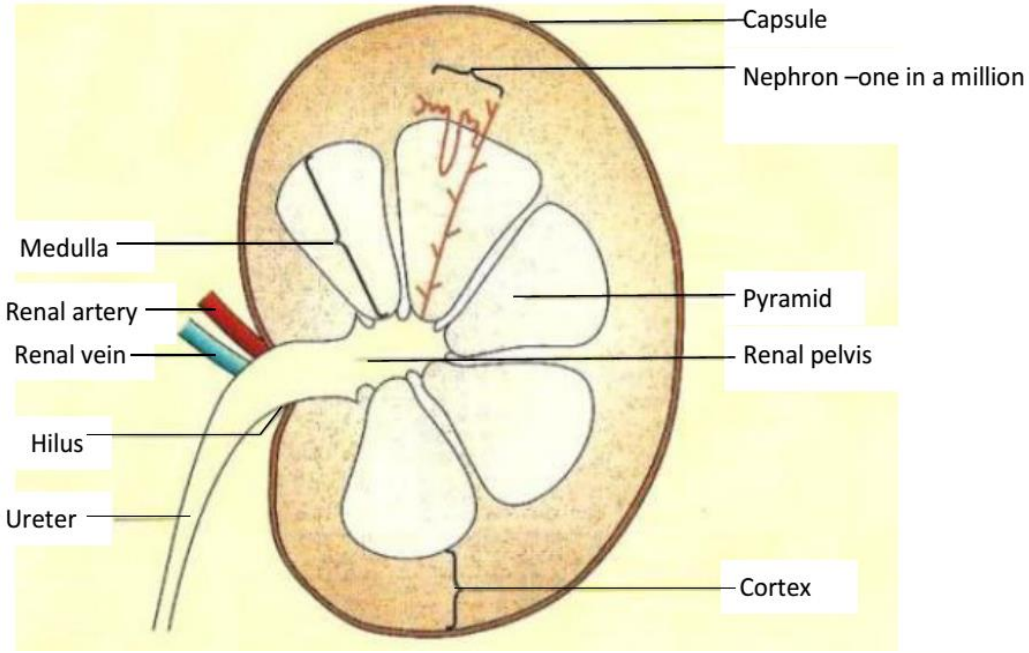
These muscles are elastic thus can contract and relax to control urine flow.

7) Urethra:

It is a passage for urine to the outside of the body.

THE KIDNEY

Structure of the kidney



The kidneys are solid bean-shaped structures and they occur in pairs in mammals. They are reddish-brown in colour enclosed in a transparent membrane and attached to the back of the abdominal cavity.

The kidney tissue consists of many capillaries and renal tubules connected together by connective tissue.

The kidney has two major parts.

1. The **cortex** which is a dark outer part. It consists of the Bowman's capsule which is responsible for ultra-filtration of blood passing across it.
2. The **medulla**, which is a lighter inner, part. It is made up of many cone-shaped portions called pyramids.

The pelvis is the area where the ureter leaves the kidney.

The kidney performs three major functions in the body.

1. It carries out excretion.
2. It carries out the function of osmoregulation.
3. It contains endocrine glands, which secrete hormones.

The kidney is made up of several microscopic structures (functional units) called nephrons where the actual excretion and osmoregulation takes place.

THE NEPHRONE

This is the functional unit of the kidney. It carries out the function of excretion and osmoregulation in the kidney.

The nephron consists of a cup-shaped structure known as the ***bowmans' capsule***. Blood comes to the nephrone through the ***afferent vessel,*** which is a branch of the renal artery, and it leaves through the ***efferent vessel****.*

The efferent vessel joins many other efferent vessels from other nephrones to form the ***renal vein****.*

In the bowmans' capsule the afferent vessel divides to form capillaries.

The capillaries are highly coiled and they form a knot called ***glomerulus****.*

Leading from the bowman's' capsule is a highly coiled tube known as ***proximal convoluted tubule****.* This is continuous with a U shaped tubule called ***loop on Henle****.*

The loop is divided into the descending loop and ascending loop.

From the loop of Henle the tube becomes highly coiled to form the ***distal convoluted tubule*** which leads to the ***collecting duct****.*

Structure of the nephron

Parts of nephron

1. Bowman's capsule:

It contains a dense-network of capillaries called glomerulus. **The glomerulus is formed from the wider arteriole of renal artery called afferent arteriole. It is located in the cortex.**
The Bowman's capsule serves the function of filtering small molecules in blood such as urea glucose, etc. through a process called ultra-filtration.

Adaptations of the glomerulus to ultra-filtration

i) **Having high blood pressure that forces small molecules out of the glomerulus. This is due to the afferent arteriole being wider than the efferent.**
ii) **Having many capillaries that give it a large surface area for ultra-filtration.**
iii) **Having a semi permeable membrane that can allow any small molecule to pass through.**

Adaptations of the Bowman's capsule to collect the filtrate

i) **Possession of cup-shaped structure which enables it to collect the filtrate.**
ii) **Having a porous upper membrane that easily allows filtration.**
iii) **Having a large volume that can accommodate more filtrate.**

2. Proximal convoluted tubule:

This is a site where re-absorption of useful materials such as glucose and some small amino acids and water from glomerular filtrate back to blood takes place.

3. Loop of Henle:

It's made up of a descending (going down) limb and an ascending (going up) limb. The *main function of the loop of Henle is to make the tissue fluid in the medulla more concentrated than the glomerular filtrate in the nephron so that water needed in the body is reabsorbed***.** ***It's known to cause the retention of water*****.** *This is one way of conserving water in camel because of its extremely long loop of Henle.*

4. Distal convoluted tubule:

It chiefly re-absorbs salts like chloride ions together with water, leaving a concentrated liquid now called urine which passes down to collecting ducts.

5. Collecting duct:

This duct carries urine from the distal tubule to the pelvis of kidney. It allows outward movement of water thus conserving it.

Adaptations of the nephron to re absorption

i) **Having a thin membrane (one cell thick) for easy diffusion of materials.**
ii) **Having micro villi to increase the surface area for re absorption.**
iii) **Having numerous mitochondria to provide energy for active reabsorption.**

URINE FORMATION

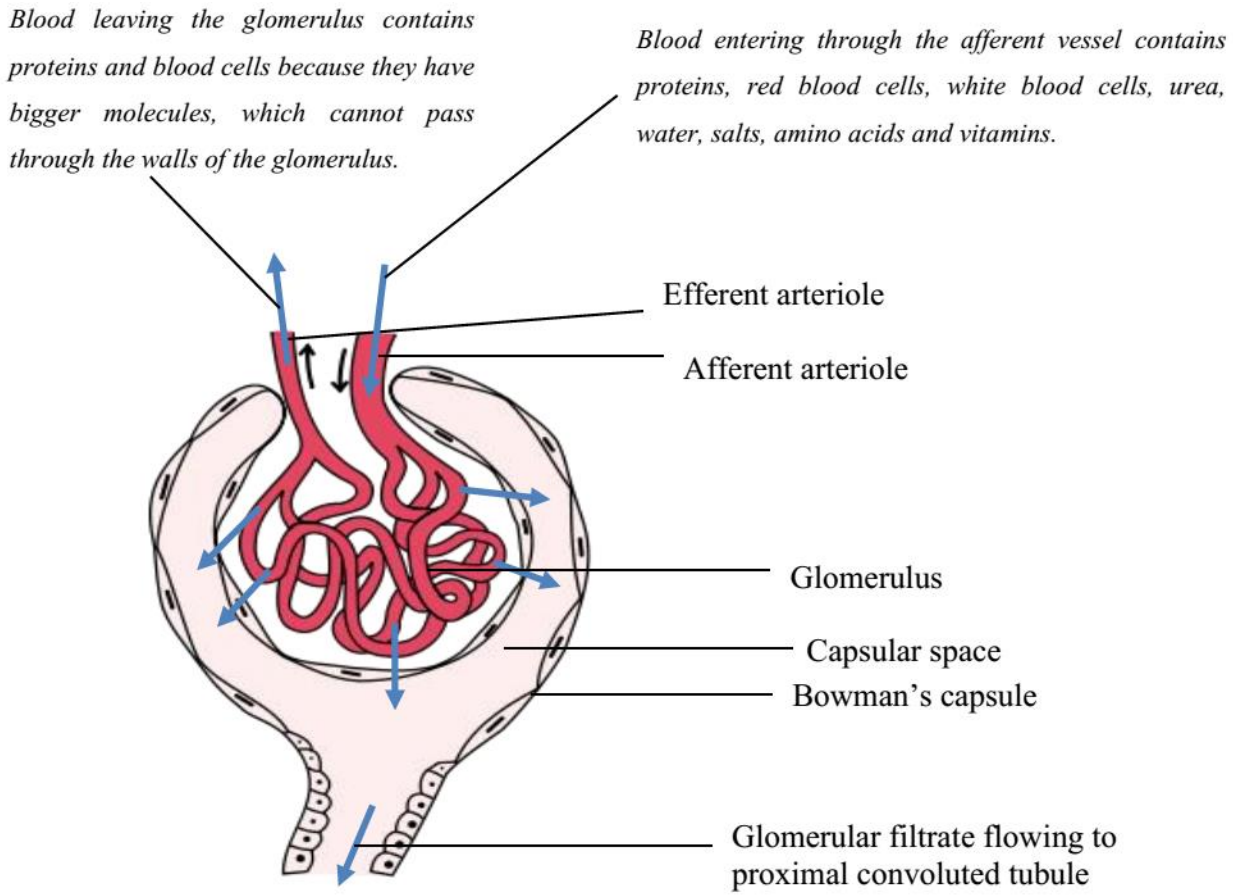
The process of urine formation takes place in the nephrone. It occurs in two phases.

1. Ultra-filtration.
2. Selective re-absorption.

Ultra filtration

- ✓ Much blood comes from the **afferent vessel** into the glomerulus than that which leaves through **efferent** because the afferent vessel is larger than the efferent vessel.
- ✓ This generates pressure in the blood capillaries of the glomerulus forcing small molecules to filter out of the blood capillaries to form the glomerular filtrate.
- ✓ Blood in the renal artery contains proteins, red blood cells, white blood cells, urea, water, salts, amino acids and vitamins.
- ✓ In the glomerulus, small molecules filter out by *ultra filtration* to form the glomerular filtrate. *This filtrate contains glucose, urea, water, salts and vitamins.*
- ✓ *Proteins and blood cells do not filter out* because they have bigger molecules, which cannot pass through the walls of the glomerulus.
- ✓ The filtrate formed moves from the Bowman's capsule through the capsular space to ***proximal convoluted tubule*** where selective reabsorption starts to occur.

Diagrammatic illustration of ultrafiltration



Selective reabsorption

In the proximal convoluted tubule:

- ✓ Most of the food materials are re absorbed into the blood capillaries by active transport e.g. all the glucose, vitamins, some salts like sodium chloride and even some water is re absorbed by diffusion.

In the loop of Henle:

- ✓ *As the filtrate flows down the descending limb*, *water is re absorbed* back into the capillaries *by osmosis* leading to increased concentration of the filtrate down the descending limb.
- ✓ *As the filtrate ascends, the thick ascending limb of loop of Henle, salts like Na and K are reabsorbed by active transport*. This leads to a decrease in concentration of the glomerular filtrate in the ascending limb.

In the distal convoluted tubule:

- ✓ Selective re absorption of salts by diffusion occurs.

In the collecting duct:

- ✓ Water is lost to the highly concentrated medulla tissues by osmosis from which later the remaining filtrate is ***urine*** which goes via the ureter and temporarily stored in the urinary bladder.

Summary of the steps involved in formation of urine in the kidneys

Name	Process	Examples of molecules
Ultra-filtration (pressure filtration)	High blood pressure forces small molecules from the glomerulus into bowman's capsule.	Water, glucose, amino acids, salts, urea, uric acid, creatinine.
Selective reabsorption	Diffusion and active transport return molecules to blood at the proximal convoluted tubule.	Glucose, water, salts and amino acids.
Tubular secretion	Active transport moves molecules from blood into the distal convoluted tubules.	Uric acid, creatinine, ammonia and hydrogen ions.
Reabsorption	Along the length of the nephron and notably at the loop of Henle and collecting duct, water returns by osmosis following active reabsorption of salts.	Water and salts.
Excretion	Urine formation rids body of metabolic wastes	Water, salts, urea, uric acid, ammonia.

Comparison of substances in blood and urine

Nitrogenous waste	In blood	In urine
Urea	0.03	2.0
Proteins	7-9	0
Glucose	0.1	0
Chloride ions	0.37	0.6
Sodium ions	0.32	0.35
Water	93	95

- ✓ There are proteins in blood and there is none in urine because proteins are not filtered out of the blood vessels into the glomerulus due to the large size of their molecules.
- ✓ Urea is more in urine than in blood because it is filtered out of blood and it is not reabsorbed back in the blood.
- ✓ Water is more in urine than in blood because it is used to dissolve urea.

- ✓ However the relative amounts of water in urine and in blood varies depending on the amount of water in the body, amount of solutes in the body, temperature and body activity.
- ✓ There is glucose in blood and no glucose in urine because glucose is reabsorbed from the glomerular filtrate back into the blood.
- ✓ Salts like chlorides and sodium ions are more in urine than in blood. This is because they are in excess and they are not reabsorbed back into the blood. Because of this they tend to concentrate in urine.

EXCRETION IN PLANTS

Plants excrete less poisonous waste products like CO_2 through the stomata and acids through dropping leaves and fruits. Plants do not require specialized excretory organs due to;

i) Plants can store excess proteins unlike in mammals.
ii) They accumulate less metabolic wastes due to their low metabolic rate.
iii) Plants synthesize their organic food substances according to their requirements. This ensures that no excess is made.
iv) Plants do not produce nitrogenous waste products. They produce non-nitrogenous wastes, which are less toxic to their bodies.
v) Some wastes accumulate in particular parts of the plant and they are eliminated when this part of the plant falls off.
vi) Some of the wastes are useful in other processes within the plants body. For example Carbon dioxide produced from respiration can be used in photosynthesis.
vii) They do not locomote and they are less metabolically active than animals.

HOMEOSTASIS

This is the maintenance of a constant internal environment of the body. The internal environment of the body is composed of tissue fluids, which surround cells. Homeostasis involves controlling the blood sugar level, salt level, water level, temperature and Carbon dioxide concentration.

WATER BALANCE AND OSMOREGULATION IN MAN

It is the maintenance of blood concentration constant.
This is the control of the amount of water in the body.
The water level is kept neither high nor low but within a limit according to the demands of the body.
The level is maintained by loss of excess and gain if more is required.
Water is lost from the body through urine, sweat, expiration, and feaces during egestion and it can be gained through; drinking eating and water from metabolism.
The loss and gain of water brings about changes in blood concentration.
These changes are detected in the brain by the hypothalamus. If the blood passing through the brain is too concentrated, the hypothalamus stimulates the anterior lobe of the pituitary gland to secrete a hormone called ***antidiuretic hormone (ADH)*** into the blood stream. When the hormone reaches the kidneys, it causes the walls of the nephrones (distal convoluted tubules and collecting ducts) ***to become permeable to water*** and water is reabsorbed from the glomerular filtrate back into the blood. The urine that is secreted becomes more concentrated and yellowish in colour. This reduces the loss of water in urine.
If blood passing through the hypothalamus is too dilute, the production of ADH from the pituitary gland stops and the nephrones become less permeable to water. Less water is therefore reabsorbed from the

glomerular filtrate resulting into production of colourless urine in big volumes. This mostly happens during cold conditions where water loss through sweating is minimal.

When conditions are hot, sweating increases, lowering the water level in blood. This causes more re-absorption of water in the nephrones resulting in production of concentrated pale yellow urine.

Because of the high concentration, when urine is poured on grass or any plant, they get scotched because the cells lose water to the surrounding concentrated urine and the plant cells become flaccid. This brings about wilting and drying of the plant.

When the level of water in blood is too low the hormone causes a feeling of thirst, which makes one to drink water in order to bring back the normal water level in blood.

Failure of organisms to secrete ADH leads to constant urination of large amounts of dilute urine thus increases the blood concentration, a condition known as ***diabetes inspidus.***

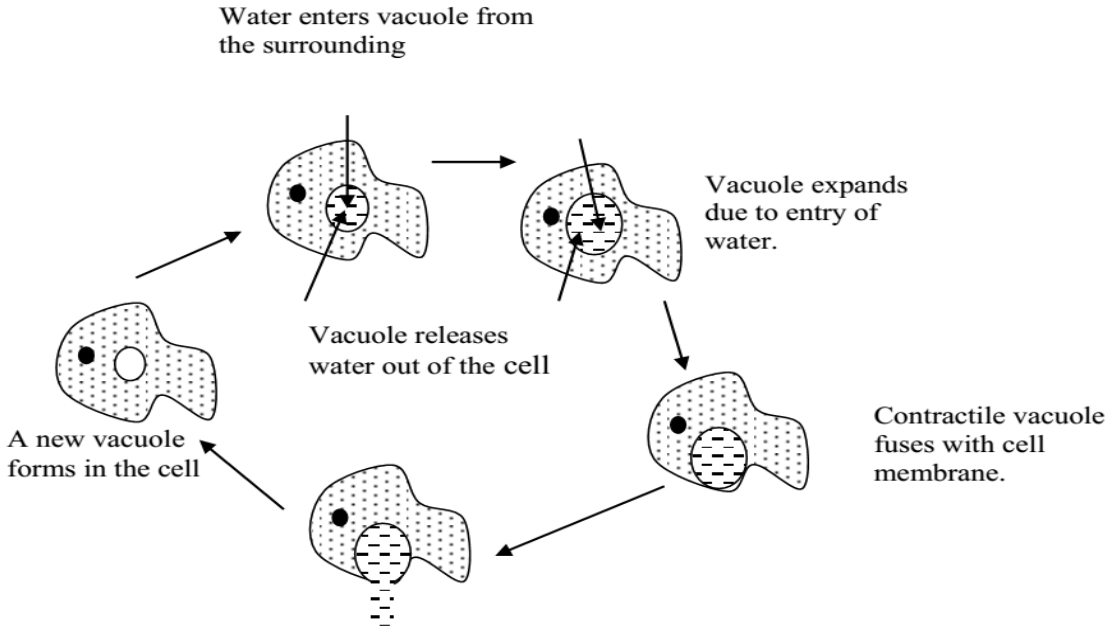
EXCRETION AND OSMOREGULATION IN OTHER ANIMALS

THE AMOEBA

Amoeba excretes excess water by use of a contractile vacuole. The contractile vacuole is a small sac-like structure lying inside the cytoplasm.

The cell membrane surrounding amoeba is semi-permeable and since the concentration of the cytoplasm is higher than that in the environment surrounding amoeba, water molecules move by osmosis from out into the cytoplasm of amoeba. The organism uses some of the water and excess is secreted into the contractile vacuole, which is formed in the process. As the vacuole enlarges, it moves towards the cell membrane and finally fuses with it. It then bursts to release the excess water out. A new vacuole is formed when the organism is excreting more water.

Illustration

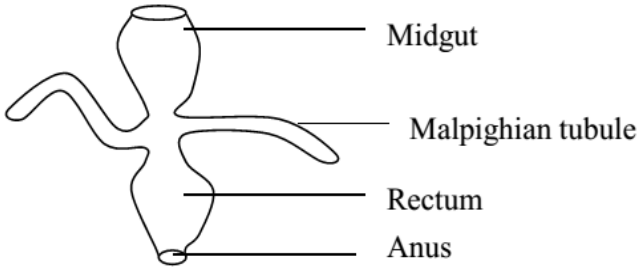


INSECTS

Excretion in insects is carried out by structures called Malpighian tubules, which are found between the mid gut and the rectum of the insect's alimentally canal.

Insect tissues produce nitrogenous wastes in form of potassium urate, which is liberated into the blood stream and taken to the malpighian tubules. In the tubules, urate reacts with Carbondioxide and water to form uric acid, which is released out of the body along with feaces.

Diagram showing the position of the malpighian tubules



CONTROL OF SALT LEVELS IN BLOOD

If the salt levels are high in blood, the blood concentration increases, this is detected by the hypothalamus as blood flows through it. It then instructs the pituitary gland which then instructs the adrenal gland to stop the production of ***aldosterone*** thus little or no salts get reabsorbed back into the blood with in the nephrons.

If the salt levels are low in blood, the pituitary gland instructs the adrenal gland to release ***aldosterone*** hormone which increases salt re absorption during urine formation leading to dilute urine.

HOMEOSTATIC CONTROL OF BLOOD SUGAR IN HUMANS

Blood sugar is called glucose. Its concentration is controlled by a section of the pancreas called islets of Langerhans. This gland regulates responding organs mainly the liver and muscles through its secretions.

Importance of blood sugar regulation

1. It prevents cells running short of glucose in case its level drops. Blood sugar (glucose) is the main source of energy.
2. Any slight increase in glucose level alters the concentration of blood's osmotic pressure, which results in alteration of the rate at which water moves in and out of the body cells by osmosis.

Blood glucose concentration is controlled by the pancreas. The pancreas has glucose receptor cells which monitor the concentration of glucose in the blood, and it also has ***endocrine cells*** (called *the* ***islets of Langerhans***), which secrete two hormones. The alpha cells (α cells) secrete a hormone called ***glucagon***, while the beta cells (β cells) secrete a hormone called ***insulin***. These two hormones are antagonistic, and have opposite effects on blood glucose.

Mechanism of blood sugar regulation

After a meal of carbohydrates, glucose is absorbed from the gut into the ***hepatic portal vein,*** increasing the blood glucose concentration. This is detected by the pancreas, which secretes insulin from its beta cells in response.

Insulin causes glucose;

- To be taken up by the liver and converted to glycogen and stored there.
- To be converted into fats. Fats are stored in adipose tissue.
- To be broken down to release energy at higher rate. This energy is stored in a form of high energy compound called ATP. This reduces blood glucose in excess.

Once the concentration of blood glucose is lowered to a normal level, the pancreas stops secreting insulin.

If the glucose level falls too far for example during starvation of fasting, the pancreas detects this and releases glucagon from its alpha cells.

Glucagon causes;

- Liver cells to convert stored glycogen into glucose.
- Fats in adipose tissue to be converted to glucose.
- The rate of oxidation of glucose to slow down.

This raises the blood glucose concentration to approximately normal level. Once this happens, the pancreas stops producing glucagon.

Failure to produce insulin causes the presence of much glucose in urine a condition known as ***diabetes mellitus.***

THE LIVER

The liver is the largest organ in the body of a mammal. It performs several functions, which include the following.

1. **Regulation of blood sugar level.**
   This is done with the help of a hormone called **insulin** from the β- cells of the islets of langerhans, in the pancreas. When the blood sugar level is high, the pancreas produces insulin, which moves to the liver cells through blood. It then stimulates the liver cells to convert some of the glucose into glycogen for storage in the body. When the level of glucose drops in blood, it inhibits the secretion of insulin and stimulates the α- cell of the islets of langerhans in the pancreas to secrete a hormone called **glucagon**. Glucagon stimulates the liver to convert glycogen and fats to glucose. This raises the level of glucose in the blood.
2. **Regulation of lipids.**
   The liver removes lipids from the blood stream by either breaking them down to release energy or storing them in fat deposits.
3. **Regulation of amino acids and proteins**
   The body cannot store excess proteins and amino acids therefore excess is sent to the liver where the amino group (NH_2) is removed from them and converted into ammonia or urea to be excreted. This occurs in a process called deamination. The remaining part is broken down to release energy or it is converted into fats for storage.
4. **Detoxification.**

This is the removal of toxic products from the body. All toxic products from any part of the body are taken to the liver where their toxicity is neutralized.

5. **Production of heat**
   When the body temperature falls, metabolic processes take place in the liver to produce heat, which restores the temperature back to normal.
6. **Production of bile.**
   Bile is manufactured in the liver and stored in the gall bladder.
7. **Formation of cholesterol.**
   Cholesterol is a lipid part used in formation of cell membranes.
8. **Elimination of sex hormones.**
   After their role is over, the sex hormones are modified and sent to the kidney or expelled into bile by the liver.
9. **Storage of blood.**
   The liver has a good network of blood capillaries and most of the blood is stored in these capillaries. It holds more blood than any other body organ.
10. **Storage of vitamins.**
    The liver stores most of the fat-soluble vitamins suck as vitamin E, vitamin D and vitamin K
11. **Formation of red blood cells.**
    In adults the red blood cells are produced from the red bone marrows but in the foetus they are made in the liver.
12. Elimination of heamoglobin from red blood cells.

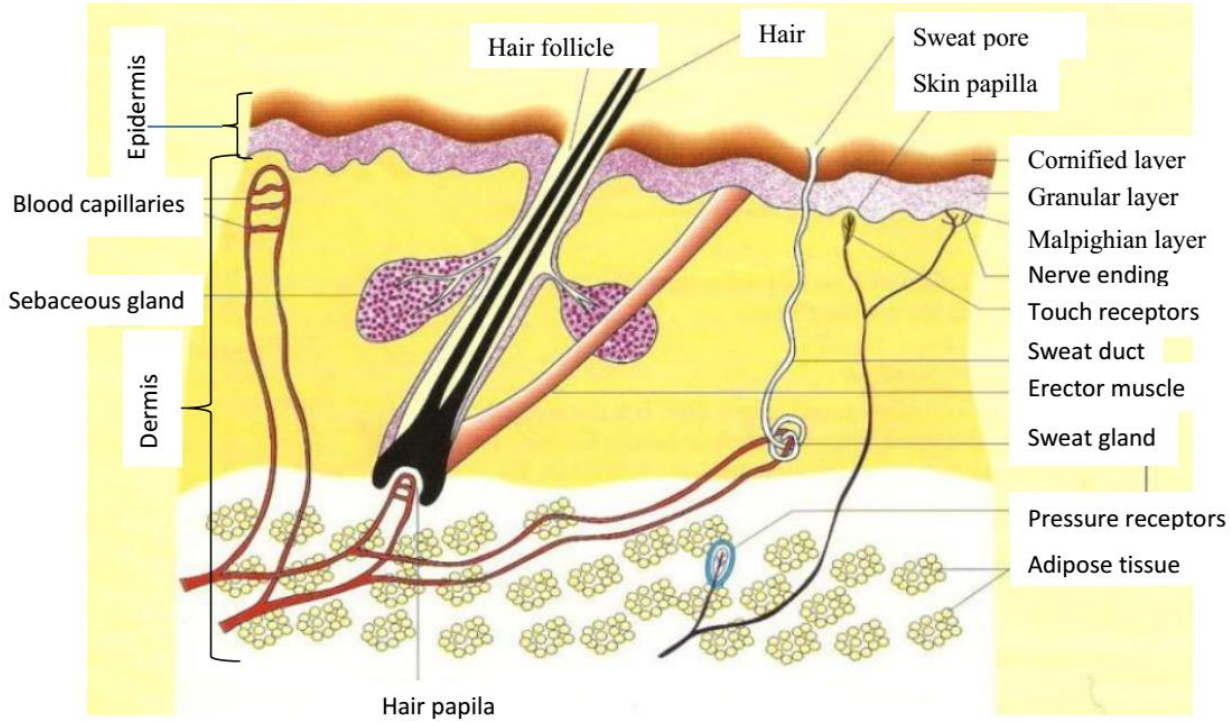
THE SKIN

This is the most extensively distributed tissue found all over the body of mammals. It is a continuous protective layer over the body.

Functions of the skin

i) To protect the tissue below it from mechanical damage, bacterial and viral infections.
ii) It also prevents excess loss of water from the body.
iii) It acts as a sense organ and it is sensitive to pain, touch and heat. This helps the organism to be aware of its environment.
iv) It helps to keep the body temperature of endothermic organisms constant.
v) It synthesizes vitamin D in presence of sunlight.
vi) It acts as an excretory organ. It excretes sweat, which contains urea, water and excess salts.

Structure of the skin



The skin consists of two main layers.

1. The epidermis (outer layer)
2. The dermis (inner layer)

THE EPIDERMIS:

This is made up of three sub layers.

a) The Malpighian layer.
b) The granular layer.
c) The cornified layer.

1) The Malpighian layer

This is the inner most sub layer in the epidermis. It consists of dividing cells which give rise to cells of the granular layer. It secretes a pigment called melanin, which gives the skin its colour and protects the skin from ultraviolent rays. Albinos do not produce melanin in their skins.

2) The granular layer

This contains living cells arising from the malphigian layer. It is the biggest layer of the epidermis. It gives rise to cells of the cornified layer.

3) The cornified layer.

This is the outermost layer of the skin. It is made up of dead cells, which are keratinized. Cells of this layer continuously ware away and are replaced by cells from the granular layer. Its function is to protect the inner parts of the body from mechanical injury and entry of bacteria and other germs. It also offers water proofing to the skin.

THE DERMIS:

This is the inner layer of the skin. It is below the Malpighian layer. It is thicker than the epidermis. It contains the sweat glands, nerve fibers, fat cells and blood capillaries.

Other parts of the skin

1) Hairs.

The hairs extend from the dermis through the epidermis. They arise from hair follicles in the dermis. They protect the body and trap a layer of air on the skin, which insulates the body against heat loss.

2) Sebaceous gland

This secretes an oily substance called sebum. This oil softens the cornified layer and prevents it from cracking. The oil also provides water proofing to the skin.

3) Nerve endings.

These perceive external stimuli and transport impulses to the central nervous system.

4) Sweat glands.

These are coiled tubular glands located in the dermis. They excrete sweat, which is released out of the skin through the sweat duct.

CONTROL OF BODY TEMPERATURE (Temperature regulation).

This is the process of maintaining the temperature of the organism within narrow ranges, which favour body activity, and ensures optimum activity of body enzymes.

To maintain the body temperature constant, there must be a balance between heat loss and heat gain.

The body loses heat by;

a) **Radiation:** Heat diffuses from the warm body to the cold environment.
b) Conduction: The body loses heat to the cold object in contact with it.
c) Convection: Where cold air or wind carries heat from the warm body.
d) Evaporation: e.g. sweating leading to loss of heat

The body gains heat by;

a) Radiation: e.g. from the sun's heat and reflection from the ground.
b) Conduction: e.g. from the ground via the feet.
c) Convection: e.g. from the wind bringing hot air to the body.
d) Metabolism: e.g. since many of the body's chemical reactions release heat e.g. in respiration.

The rate of heat loss and gain depends on;

a) Surface area to volume ratio i.e.
   Small organisms having a large surface area to volume ration tend to lose more heat than the large ones with small surface area to volume ratio.

b) Temperature of surrounding environment:
   Organisms tend to lose more heat in cold environment and gain more in hot environment.
c) Rate of respiration
   The higher the rate of respiration, the more heat energy gained by the body.
d) Humidity of the environment
   Heat loss increases in humid conditions because high humidity makes the environment colder.

Endothermic/Homoithermic animals:
Endothermic organisms are those that are able to maintain a constant body temperature irrespective of the surrounding environmental temperature.
They depend mainly on heat generated within their bodies. They are also called warm blooded animals e.g. mammals.

Ectothermic/poiklothermic animals:
These are animals that cannot maintain a constant body temperature but their temperature changes with that of the environment. They are also called cold blooded animals e.g. reptiles and amphibians.

A graph showing how body temperature varies with environmental temperature

The body temperature of endotherms remains constant despite the increase in surrounding temperature.
The body temperature of ectotherms varies with environmental temperature.

Control of body temperature in endotherms

When temperature is high, organisms respond in a way that lowers down the temperature and when the temperature is low, organisms respond in a way that raises their body temperature. These responses are categorized into two types.

1. **Physiological responses**. These are involuntary actions and they occur in body organs in response to temperature changes.

2. **Behavioral responses**. These are voluntary responses from the organism. The organism consciously decides what to do when external and internal temperatures change.

Response to cold weather in endothermic animals

Physiological means.

1. The erector pill muscles of the hair contract to make the hairs stand upright to the skin. The hairs trap a layer of air, which insulates the skin.
2. The rate of sweating reduces in order to reduce on the amount of heat lost through it.
3. The metabolic activity of the liver increases to produce energy in form of heat.
4. Blood vessels near the skin constrict in the process called vasoconstriction to reduce on the blood reaching the skin. This reduces heat loss through radiation.
5. Small animals like the mouse undergo hibernation where they dig holes and live deep in them to reduce heat loss
6. Shivering. This is the rhythmic contractions of the skeletal muscles. It results into production of heat energy.

Behavioral means.

Endotherms may raise their body temperature behaviorally through;

1. Sitting near hot bodied to raise their body temperature by conduction or radiation.
2. Humans take hot drinks.
3. They do physical exercises to raise the metabolic activity of the body.
4. They can take a hot bath
5. They put on thick clothes, which insulate their bodies.

In hot weather

In hot environment, animals control the body temperature by increasing heat loss and lowering heat production through the following ways:

Physiological means.

1. The erecter pilli muscle of the skin relaxes making the hairs to fall on the skin. This allows heat loss by radiation.
2. The metabolic rate of the body reduces to reduce on the amount of heat produced.
3. Sweating increases. In this process excessive heat is lost as latent heat of vaporization to evaporate the sweat from the body hence losing heat.
4. Vasodilatation. Vessels dilate and allow more blood to reach the skin surface in order to lose heat to the surroundings by radiation.
5. Animals living in hot environments have a thin fat layer to reduce on the insulation.

Behavioral means.

1. Some rest on cold bodies like rocks to lose heat by conduction.
2. Humans sit near fans.
3. Some take cold drinks.
4. They put on light clothes

5. Panting. This involves hanging out of the tongue for example in dogs. This results into evaporation from the mouth, which eventually cools the animal.
6. Swimming.

Adaptations of mammals to cold conditions

1. They have a lot of hairs over their bodies to trap a layer of air
2. They have a thick fat layer to act as an insulator.
3. Some are very big and thus have a small surface area to volume ratio. This reduces the rate of heat loss.
4. They have few sweat glands to reduce of the heat lost during sweating
5. They have fewer blood vessels on the skin surface to avoid heat loss through radiation.

Behavioral:

1. Putting on thick clothes like in humans
2. Doing physical exercises
3. Hibernation. This is a state of long rest by burrowing into crevices and holes during extreme coldness.
4. Sun bathing

Adaptations to hot conditions

1. Having little hairs on the body to allow easy loss of heat.
2. Having less fat to reduce on the insulation effect of fats.
3. Having a large surface area to volume ratio. To allow a faster rate of heat loss.
4. Having a lot of sweat glands to increase heat loss.
5. Having many blood vessels near the skin for easy loss of heat by radiation.

Behavioral:

1. Resting under shade.
2. Bathing cold water.
3. Aestivation. This is a state of long rest by burrowing in crevices and holes during extreme hotness.
4. Putting on lighter clothes.
5. Sitting near cold things.

TEMPERATURE CONTROL IN ECTOTHERMIC ANIMALS

Ectothermic animals are animals whose body temperature changes with that of the environment. Examples of ectotherms are fish, reptiles and amphibians. Their body temperature is controlled by only behavioral means.

During hot conditions, they lose heat by.

1. They rest on cold rocks to lose heat by conduction.
2. They rest on cold stones and in shades to lose heat.
3. They burrow in cracks and lose heat by radiation.
4. Aestivation. This is a state of long rest by burrowing underground or under rocks during high temperatures.

5. Thermal gaping. This is the opening of the mouth to lose water by evaporation. This results into cooling. Thermal gaping occurs in crocodiles and a few other reptiles.

During cold conditions, they gain heat by;

1. Resting on hot rocks to gain heat by conduction.
2. They rest under the sun to gain heat by radiation.
3. They rest near hot bodies to gain heat by radiation.
4. They burrow in hot sand to gain heat by conduction.
5. Basking in the sun to gain heat.
6. Hibernation. This is a state of long rest by burrowing into crevices and holes during extreme coldness.

Merits of being endothermic

1. They are always active because their temperature is maintained at an optimum temperature for enzyme activity.
2. They can live in a wide range of environments i.e. both hot and cold.
3. Their metabolic rate is maintained at a high rate due to the ability to maintain a constant body temperature.

Disadvantages of being endothermic

1. Having a high rate of food consumption due to high rate of metabolism.
2. Maintaining the body temperature constant requires much energy.

Advantages of being ectothermic

1. Low food consumption due to low metabolic rate.
2. Easy to control body temperature by only behavioral means.

Disadvantages of being ectothermic

1. They have limited body activity in cold environments.
2. Show response to stimuli due to low metabolic rate.

GEOGRAPHY

(THE REST OF AFRICA)
RELIEF OF AFRICA

Major relief features of Africa include; Basins, Highlands, Rift valley, Plateau.

(a) Draw a sketch map of Africa and on it mark and name;
   (i) Highlands; Atlas and Drakensburg, Ethiopian and Cape ranges
   (ii) Plateaux; Jos and Bie and Fouta Djalon,

(iii) The rift valley,

(b) Describe the processes which were responsible for the formation of any **one** highland marked in (a)(i) above.

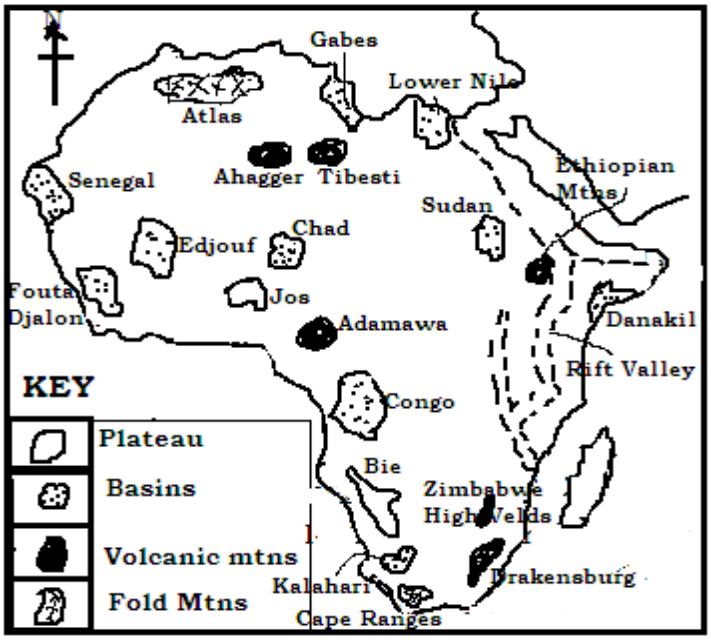
(c) Explain the influence of the highland chosen in (b) above on rainfall distribution in the area.

(d) Outline the;

(i) Problems faced by people living in the highland areas of Africa.

(ii) Steps being taken to solve the problems in (d)(ii) above.

(a) <u>A sketch map of Africa showing selected relief features;</u>



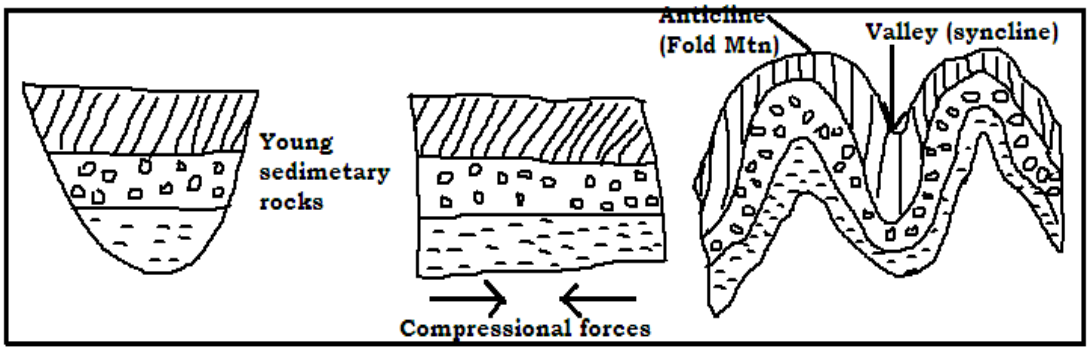
(b) Tabulation of relief features, mode of formation and location;

S/n	Relief feature	Mode of formation	Location
1.	Ethiopian Highlands	Volcanicity	Ethiopia
2.	Drakensburg Mtns	Volcanicity	Rep. of S. Africa
3.	Zimbabwe High Velds	Volcanicity	Zimbabwe
4.	Congo Basin	Crustal warping	DRC
5.	Kalahari Basin	Crustal warping	Namibia
6.	Chad Basin	Crustal warping	Chad
7.	Atlas Mtns	Folding	Tunisia, Algeria, Morocco.
8.	Cape Ranges	Folding	Rep. of S. Africa

<u>HIGHLANDS OF AFRICA</u>

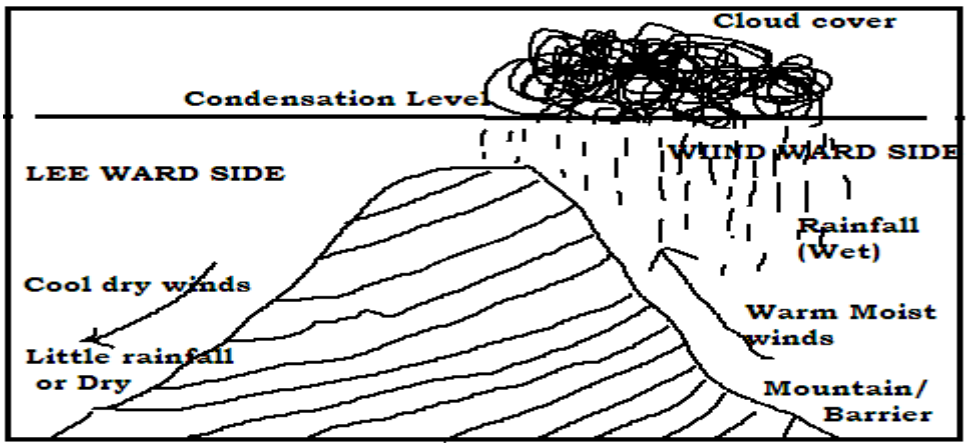
- The Atlas Mountains are Fold Mountains and so they were formed by the process of **<u>folding.</u>**

- Fold Mountains are formed as a result of <u>Compressional forces</u> acting on large young sedimentary rocks. The sedimentary rocks results from <u>successive periods of erosion and deposition</u> in depressions or geosynclines.
- The Compressional forces which push together masses of the landscape from either sides cause the young sedimentary rocks to develop <u>anticlines</u> and <u>synclines</u>.



(c) <u>Influence of the Atlas highlands on rainfall and temperature distribution (climate) in the area</u>;

- The mountain influences rainfall formation on the windward side. Warm winds are forced to ascend the highland. With increasing altitude. These winds cool and the moisture condenses to form clouds and finally results into rainfall.
- On the lee-ward side of the mountain, the descending winds are dry and so do not lead to rainfall but instead result into dry conditions/aridity.
- Has influenced temperature where low lands remain hotter than raised areas.(Environmental lapse rate)
- Has also led to temperature inversion in the morning hours.



(d) (i) **Problems faced by people living in the highland areas of Africa;**

- High costs are incurred in developing transport/communication lines hence remoteness
- The steep slopes limit land use e.g. transport, settlement and agriculture hence food shortage.
- Landslides are common that destroy property and lives.
- Temperature inversion (very cold temperatures in the valley than in raised areas) discourages settlement.

- They are densely settled hence causing land fragmentation.
- Soil erosion is common that limits crop farming.
- Wild animals that attack people and destroy their crops.
- The lee-ward sides of the highland areas of Africa are dry which limit food production.
- Highlands limit agricultural mechanization.
- Hot temperatures and shortage of rainfall on the leeward sides which limits settlement and agriculture.
- Steep slopes accelerate soil erosion.
- Highland areas are very cold for human settlement on the upper slopes due to high altitude.
- Highland areas have dangerous wild animals.

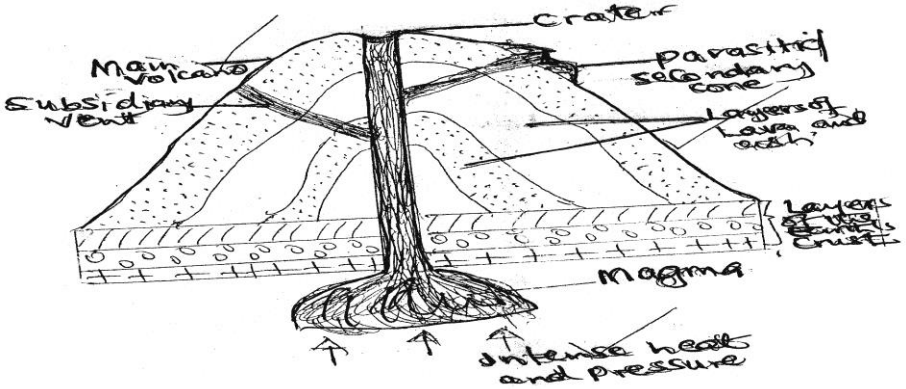
Steps/Measures being taken to solve the problems above;

- Practicing terracing to reduce on the rate of soil erosion.
- Carrying out land consolidation to solve the problem of land fragmentation.
- Growing of drought resistant crops on the lee-ward side to increase food supply.
- Using of irrigation farming to reduce dependence on rain water.
- Gazetting of lee-ward side for tourism and wildlife conservation.
- Early warning of people to reduce the effects of landslides.
- Constructing of winding roads to avoid the steep slopes.
- Spraying with pesticides to control pests and diseases.
- Afforestation to control the occurrence of landsides and soil erosion.

Formation of Volcanic Mountains: E.g. Drakensburg and Ethiopian;

- The process is volcanicity.
- The rocks underneath the earth's surface are subjected to intense heat and pressure.
- Consequently, they are turned into a semi -solid state called magma.
- This magma then erupts through a line of weakness called vent/pipe/fissure.
- The movement or eruption of magma is caused by intense heat and pressure from underneath.
- It is poured or ejected in either a violent or effusive/calm/quiet eruption.
- When the materials reach the earth's surface, they accumulate, cool down around the vent to form lava.
- The repeated/successive eruptions of magma over time leads to accumulation and building up of lava and ash to form a volcanic mountain.
- When the main vent blocks, magma escapes through the subsidiary vents to form a secondary cone/parasitic cone.
- After the eruption has stopped, magma solidifies within the vent and a depression within the vent and a depression called a crater or caldera is formed.

Diagrammatic illustration.



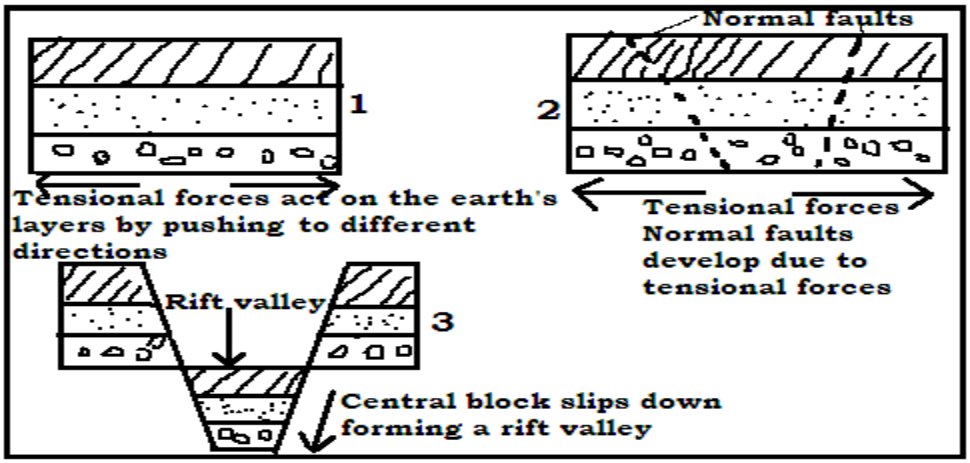
Importance of Volcanic Mountains to the people living nearby;

- Formation of fertile volcanic soils supports agriculture.
- Formation/occurrence of precious minerals like phosphates, limestone, vermiculite offer employment, raw material to industry, sold to get income.
- Induce formation of heavy orographic rainfall on the windward side to support agriculture.
- Source of permanent rivers and streams supplying water for domestic, industrial and agricultural use.
- Rivers flowing from volcanic mountains are potential sites for HEP generation for domestic and industrial use.
- Have a scenic beauty which attracts tourists who are a source of local income to the people, revenue to government is earned.
- Gentle slopes support growth of forests which provide wood fuel and encourage lumbering industry.
- Volcanic mountains encourage construction of communication masts to improve on communication.
- Volcanic rocks are mined/quarried and used as building and construction industry.
- Volcanic mountains are habitats for wildlife thus promoting tourism.

RIFT VALLEY

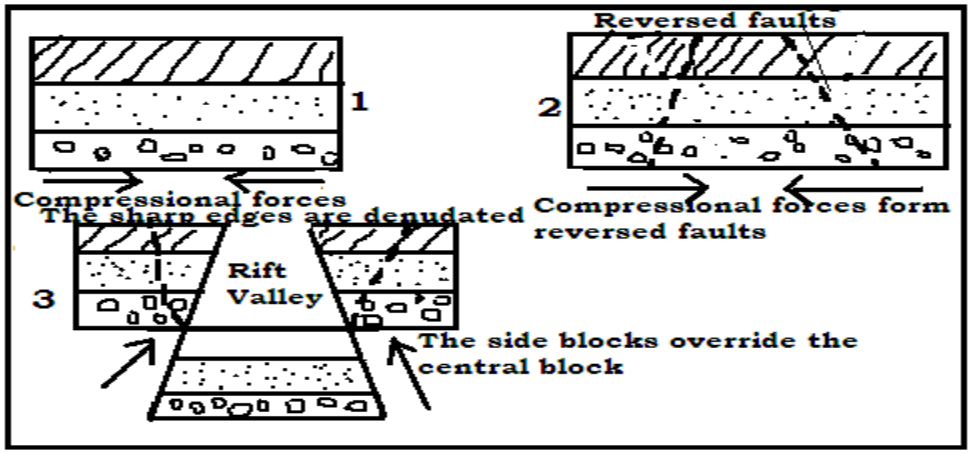
Describe the processes that led to formation of the Great Rift Valley;

- The Rift valley was formed as a result of faulting. This through tensional and Compressional theories.
- According to tensional theory, tensional forces pulled to different directions leading to formation of normal faults, according to J.W. Gregory.
- The middle block was forced to sink under its weight and replace the underground rocks deeper in the core. The side blocks remained in the same position, forming a depression between them.
- **Illustration of the formation of the rift valley according to tensional theory**;



- According to Compressional theory, Compressional forces pushed towards each other leading to formation of reversed faults.
- Continuous compression made the side blocks override the central block to form a rift valley.
- The steep fault scarps were later modified by denudational forces to from a V-shaped rift valley.

Illustration of the formation of the rift valley according to tensional theory;



Explain the importance of the Rift valley to the people living nearby;

- They are habitat for wild life which generates foreign exchange through tourism.
- Have got lakes that provide fish rich in proteins.
- The floor has fertile soils that facilitate crop farming thus increasing food supply.
- Has got beautiful scenery like escarpments that attracts many tourists.
- Have got minerals that employ many people through mining.
- Facilitates livestock farming due to abundant pasture on the rift valley floor.
- The Rift valley lakes facilitate water transport thus encouraging trade and commerce.

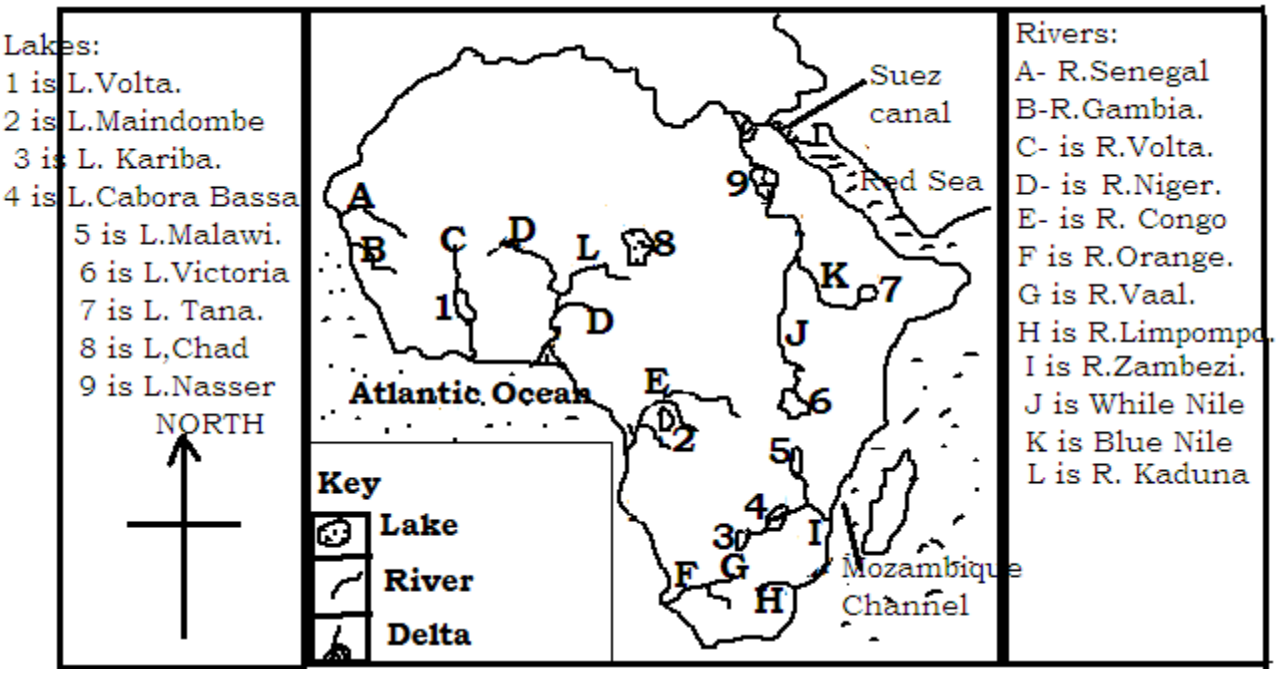
Problems associated with Rift valley areas of Africa (Negative importances);

- Low rainfall amounts in the rain shadow areas limits agricultural practices.
- The steep escarpments limit transport and communication causing remoteness.
- They are prone to volcanicity and earthquake that destroy property and lives.
- The lakes have violent storm that destroys property and lives.
- They are tsetse fly infested that spread sleeping sickness to man.

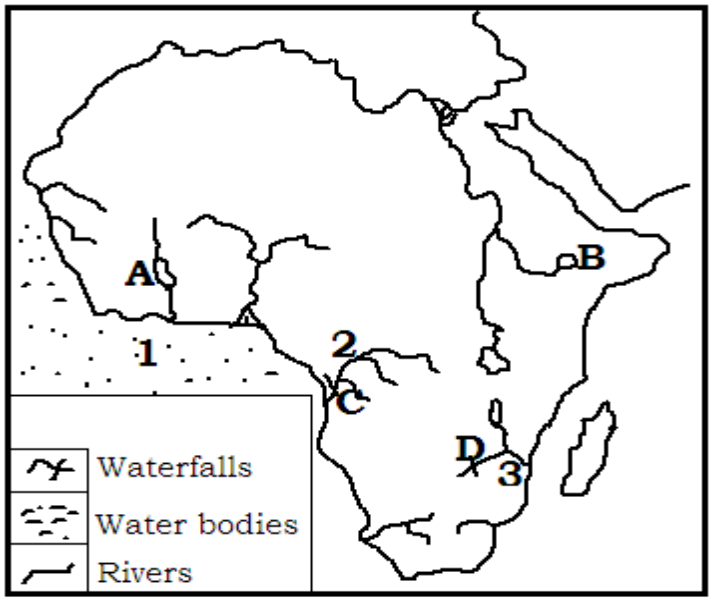
DRAINAGE OF AFRICA

RIVERS AND LAKES

A sketch map of Africa showing major lakes and rivers



Study the map of Africa provided and answer the questions that follow;



(a) (i)Lakes: A is Lake Volta, B is Lake Nasser,
(ii)Ocean 1 is Atlantic, (iii) Rivers; 2 is Congo, 3 is Zambezi,

(iv) Waterfalls; C is Inga falls, D is Victoria Falls.

(b) Formation of Victoria falls;

- A water fall is a sharp break in the channel bed over which a river flows. They were formed as a result of change in rock resistance of hard to soft. The hydraulic action of water hugely erodes away the softer rocks at a higher rate causing a change in gradient resulting into a waterfall.
- Other waterfalls originate where a fault uplifts a mountain range or part of a range, creating a fault scarp over which streams drop steeply. Continued undercutting and erosion of the edge and the rock bed above the falls move many waterfalls upstream. These diminish in size, dwindle to rapids then disappear.

Benefits of Victoria falls to the people living in the area/General importance of waterfalls in Africa.

- They are tourist attractions that fetch a lot of foreign exchange.
- They are dammed to generate Hydro Electric Power used for domestic and industrial purpose.
- They are source of income through taxing people who work around the area.
- They provide employment opportunities to people who maintain the place and the tourist guides.
- The narrow river sections/gorges provide a good site for bridge construction to improve transport and communication.
- Plunge pool/waterfalls/rapids are sites for water sports/ Recreation

Problems faced by the people living near rivers in Africa;

- Rise is water levels during the wet season results into flooding hence loss of life and property.
- Rivers hinder the development of transport routes because it is expensive thus causing remoteness.
- Waterfalls and rapids interfere with navigation.
- Accidents by drowning leading to deaths.
- In the arid areas, river valleys are congested due to access to water and fertile soils.
- River valley areas accommodate dangerous animals like crocodiles and hippopotamus which are dangerous to human life.
- Conflicts occur along river boundaries limiting development.
- Water weeds/floating vegetations make navigation and fishing almost impossible.
- River valleys harbour disease carrying vectors like Mosquitoes, snails spreading malaria and Bilharzia respectively.

Measures/ steps being taken to solve the above problems;

- Constructing of dams to control the flow of water,
- Building of bridges and culverts across rivers and swamps to allow roads pass through them.
- Spraying with pesticides to control pests and diseases.
- Carrying out biological and mechanical control of weeds to check the floating vegetation.

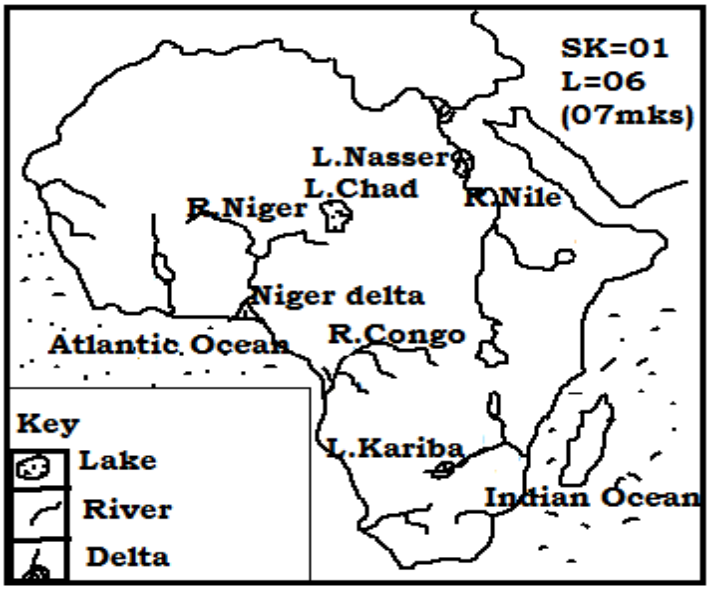
- Constructing of drainage channels to control flooding of rivers.
- Resettling of people from congested areas.
- Restraining of people from settling in swampy areas.
- Evacuating of people during floods by international organs like Red Cross.

(a) Draw a sketch map of Africa and on it mark and name;

(ii) Lakes; Chad and Kariba, (iii) Any two rivers with a delta,

(ii) Oceans; Indian and Atlantic,

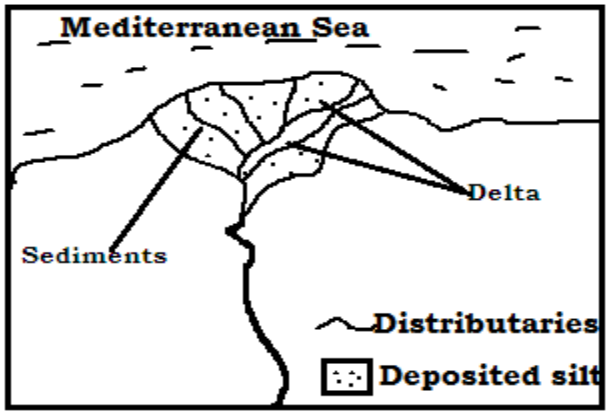
(a) **A sketch map of Africa showing selected features;**



<u>Processes responsible for the formation of the delta on any one river named in (a)(iii) above; (Nile delta)</u>

- A delta is a <u>triangular deposit of sediments</u> that forms at the mouth of a river.
- For the Nile delta, it forms as it enters Mediterranean Sea. The material carried <u>gradually builds</u> up until the river's path is blocked and divided into distributaries.

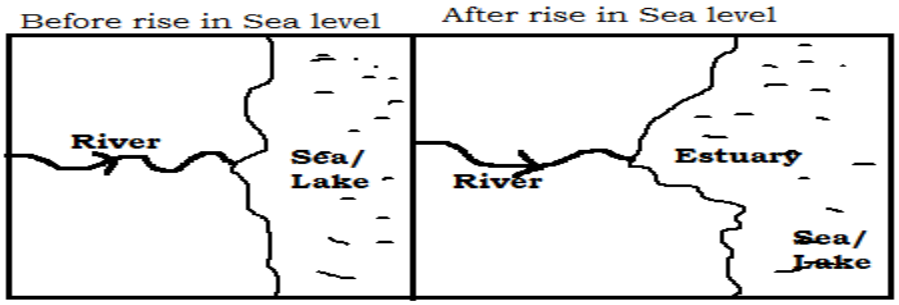
Illustrations for the formation of a delta;



Formation of an Estuary

- An Estuary for example on River Zambezi is a drowned river valley in lowland area. It forms when the level of the sea rises and floods the lower parts of the land along the river valley.

Illustration for the formation of an Estuary



Contributions of the rivers to the development of Africa;

- Rivers and lakes are tourist attractions that earn African countries foreign exchange for example River Nile, R. Zambezi.
- Lakes and rivers are source of valuable proteins (fish) which enriches the diet of Africans.
- Lakes and rivers are sources of water for both domestic and industrial consumption.
- Waterfalls on Africa Rivers provide potential sites for production of hydro Electric power e.g. Vitoria falls for Kariba dam along river Zambezi.
- Rivers with wetlands control floods that would destroy property and farmlands.
- Lakes and rivers act as recreational grounds for example swimming and sun bathing on beaches.
- Lakes and rivers influence the formation of convectional rainfall in the areas around them.
- Lakes and rivers are sources of water for irrigation e.g. the Gezira irrigation Scheme, Richard toll scheme.
- Lakes and Rivers provide cheap means of transport to the people around them.
- Lakes and rivers are source of minerals like salt and Petroleum.
- Lakes and rivers are source of raw materials for industries e.g. fish and water.

Importance of gorges and flood plains;

- Gorges are tourist attraction, earning foreign exchange.
- Gorges offer suitable sites for construction of dams to produce HEP for domestic & industrial use.
- Gorges/narrow valleys are ideal for the construction of bridges thus facilitating transport hence trade and commerce.
- Floodplains contain fertile soils for arable crop growing for food and money.
- Flood plains provide pasture for livestock farming.
- Floodplains are flat landscape ideal for settlement.
- Flood plains are areas construction of roads and railways for transport.
- Flood plains contain vegetation/trees used for building and construction.
- Flood plains contain swamps/papyrus for the art and craft industry earning people income.
- Sand is extracted for building and construction industry.
- Clay for pottery and brick making.
- Ox-bow lakes encourage fishing, a source of fish proteins
- Sites for research/study purpose hence promoting education
- Ox-bow lakes provide water for domestic and industrial use.

Problems affecting the use of rivers as waterways;

- Remoteness as they are located in low populated areas like River Nile and River Congo.
- Presence of waterfalls and rapids interrupt navigation./ Fast flowing rivers causes accidents.
- Shortage of skilled manpower to support water ways, leading to accidents.
- Fluctuating of river water volumes - difficult to use these rivers during the dry season when some of them have very low water volumes.
- Existence of water weeds/Floating vegetation destruct sailing water vessels.
- Presence of inland deltas e.g. on river Niger making some areas impassable.
- Meandering of some rivers hinders navigation.
- Wild animals like hippos/predators kill sailors
- Pests and diseases like Bilharzia threaten navigators.
- Pollution of water discourages navigation.
- Political instability/insecurity/lack of cooperation between countries discourage the use some rivers like Nile.
- Competition with other forms of transport limits traffic along water ways.
- Limited capital to develop inland water transport.
- Under developed technology like use of canoes causes accidents.
- Rock outcrops cause accidents.
- Braiding of river channels.
- Seasonal flooding of rivers discourages the use of rivers.
- Accidents due to strong storms.

MAJOR COASTAL LANDS IN AFRICA:

- **They include; Estuaries, Rias, deltas and flood plains.**
- Aria is drowned river valley in a highland area. Its funnel shaped and reduces in width and depth inland.
- It forms on coasts where hills and river valleys meet the sea at right angle. When the sea level rises, the stream which formed the river valley is covered to form a ria.
- Examples of rivers with Rias are; R. Gambia at Banjul.

Importance of coastal lands to the people living nearby;

- Have got mangrove forests/ vegetation that support lumbering activities and craft industry hence generating income.
- The coastal lagoons are important fishing grounds thus proving people with fish proteins that improve their diet.
- Have got beautiful scenery that attracts tourists to generate foreign exchange.
- Deltas have fertile soils that support agriculture like the growing of sugarcanes and water melons.
- Rias and estuaries provide natural harbour favouring the development of ports thus facilitating trade and commerce.
- Coastal lands attract settlement due to fishing, agriculture and trade opportunities.
- Some have oil deposits hence encouraging mining like at the Niger delta of Nigeria.

Problems/challenges faced by the people living in coastal lands of Africa;

- Flooding due to a rise in sea level destroys settlements.
- Boggy conditions limit transport and communication thus discouraging trade.
- Siltation of river valleys along the coasts discourages navigation.
- Tourism and associated evils like moral decay destroys the national ethics and integrity.
- Urbanization and associated problems like congestion and slum development.
- Easy spread of pests and diseases like malaria and Bilharzia that leads to poor health.
- Associated with hot temperatures that hinder the growth of certain crops hence food shortage.

Measures/steps being taken to solve the above problems;

- Carrying out afforestation to reduce the water in the ground/boggy conditions.
- Constructing channels to drain away the excess water and control flooding.
- Carrying out proper urban planning to reduce congestion and slum development.

- Constant dredging of river valleys to reduce siltation and improve navigation.
- Constructing of embankments to control flooding.
- Spraying with pesticides to control pest and diseases.

(a)Describe the processes responsible for the formation of the following features along a river valley ; - Gorge, - Flood plain.

(b) Mention any **two** rivers in Africa which have a;
(i) Gorge, (ii) Flood plain.

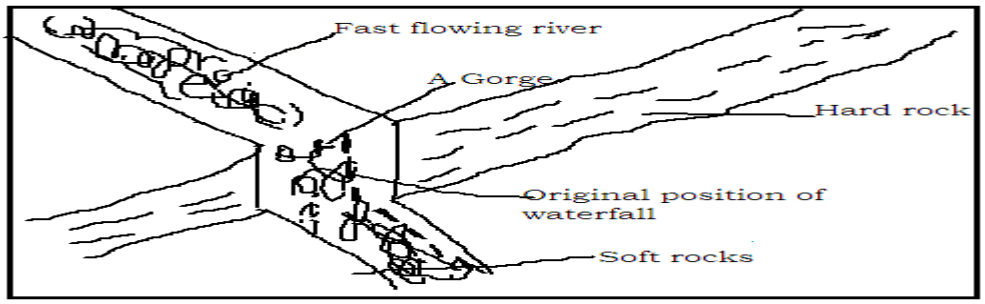
(c) Explain the importance of the drainage features in (a) above to the people living in the area.

Formation of a Gorge;

(a)(i) **A gorge** is a deep narrow steep sided valley in the youthful stage of a river due to mainly vertical erosion.

- It forms when a river flows across a landscape made up of alternating hard and soft rocks. There is cutting/eroding of the soft rocks deeper and leaving the hard rocks on either sides.
- Or the continued uplift of land with rejuvenated river erosion for a river to maintain its former course/base level also leads to the formation of a gorge.
- Or formed when water continues to erode rocks upstream. This leads to retreat of former waterfall and rapids. Such continued undercutting and retreat of the waterfall leads to the formation of a deep gorge.

Illustration of a gorge:

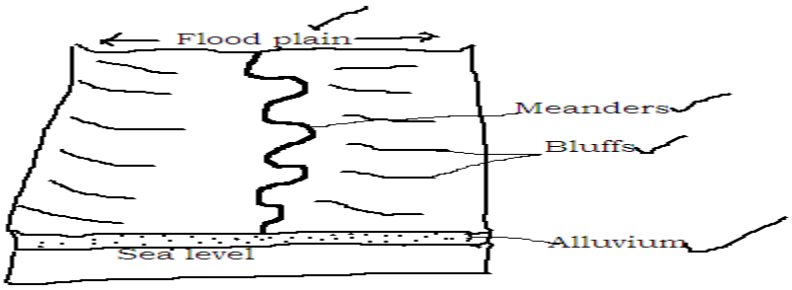


(ii) **Formation of a flood plain;**

A Flood plain is a wide flat area of river deposits formed by widening of river valley through lateral erosion in the lower/old/senile stage.

- It is formed due to continued lateral river erosion that widens the river valley.
- Subsequently, deposition takes place on the entire valley floor during periods of floods.
- With time, more and more depositions of finer silt and mud are deposited on the valley floor to form a flood plain.
- The flood plain occurs between lines of bluffs.
- The river continues to flow in the middle of the flood plain with raised levees on the either sides.

Illustration of a flood plain:



(b)(i) **Rivers in Africa with Gorges:**

- Nile, - Limpopo, - Congo, - Orange,
- Volta, - Zambezi.
- River Zambezi, River Turkwel in Kenya, - River Kaduna in Nigeria
- River Niger, River Volta.

(ii) **Rivers in Africa with Flood plain;**

- Niger in Nigeria. – Zambezi, - River Nile in Egypt,
- River Volta, - River Congo.

Importance of the drainage features (Gorges and floodplain) to the people living in the area;

- Gorges and floodplains are good tourist attractions leading to generation of foreign exchange.
- Gorges offer ideal sites for construction of hydro electrify power stations for domestic and industrial use.
- Flood plain offer fertile alluvial soils for crop cultivation/arable farming.
- Sand and boulders deposited on the floodplain are used for building and construction.
- The flat relief of the flood plain is ideal for locating settlement, industries and communication routes.
- Gorges promote recreation activities for example leisure and relaxation.
- Flood plains are associated with abundant pasture that supports animal rearing.
- Swampy vegetation in the flood plains supports the hand craft industry that earns income to the people.
- Narrowness of the gorges provides ideal sites for the construction of bridges.
- Mining of minerals like gold, clay and sand in the flood plain earns income to the people.
- Seasonal flooding provides fish which is food rich in proteins to the people around.
- Gorges and flood plain are used for research in form of fieldwork studies thus promoting education

Problems affecting the use of rivers as waterways in Africa;

- Presence of waterfalls/rapids/cataracts which interrupt navigation.
- Existence of floating vegetation/waterweed hinders the easy movement of water vessels.

- Siltation of some sections of the rivers limits navigation.
- Rocky bed in some rivers making it difficult for some bigger boats to sail through.
- Shallowness of some sections of rivers as a result of braiding.
- Variations in the river regimes making it difficult for some rivers to be used for navigation during prolonged drought.
- Strong winds that cause capsizing of boats leading to death.
- Narrowness of some rivers making it difficult to be used by bigger boats.
- Limited capital to buy modern boats.
- Presence of sharp meanders which increase travel distances along the waterways.
- Dangerous aquatic animals like crocodiles scare away people from using some rivers.
- Rudimentary technology limits widening and dredging of rivers.
- Limited skilled labour to operate water vessels.
- Seasonal floods disrupt water transport.

Problems faced by people living along river valleys in Africa;

- River valley harbour disease carrying vectors like Mosquitoes and Water snails. This leads to loss of life.
- Water weeds make navigation and fishing almost impossible.
- Conflicts always occur along river boundaries.
- They accommodate dangerous animals like crocodiles and hippopotamus which are dangerous to human life.
- In arid areas rivers are congested due to access to water and fertile soils.
- The hinder development of transport routes because it is expensive to construct them.
- Rise in water levels during the rainy season leads to floods that destroy property and farmlands.

Measures being taken to solve the Problems faced by people living along river valleys in Africa;

- Evacuating of people during flooding by international Organization like Red Cross.
- Stopping people from settling in swampy areas.
- Constructing of drainage channels to control floods.
- Eradicating of water weeds by mechanical or biological means.
- Spraying of disease vectors with chemicals to control outbreak of diseases.
- Constructing of bridges and culverts across rivers and swamps to reduce remoteness.
- Constructing of dams to control the flow of water.

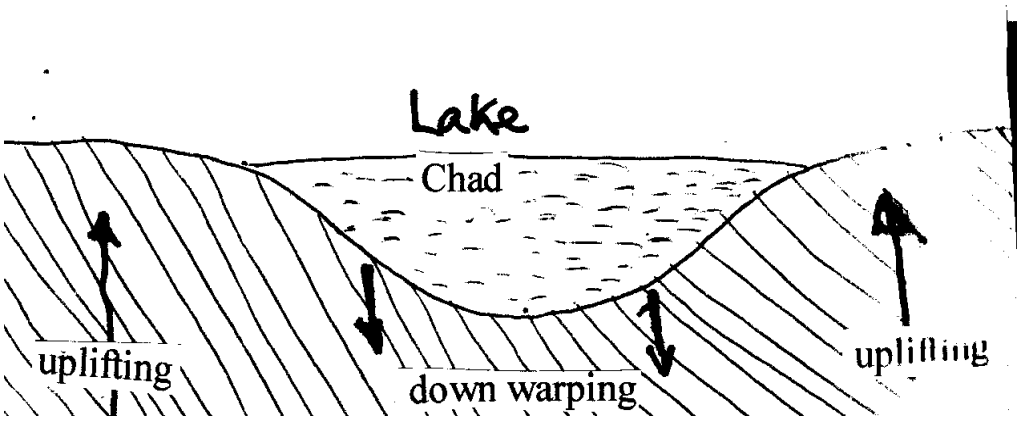
LAKES OF AFRICA

Process of formation of Lake Chad;

- The process known as Quaternary down warping formed Lake Chad.
- Down warping is caused by converging convective currents in the earth's mantle.

- The downward movements within the earth's interior pull the earth's surface towards the earth's centre causing some areas to sag.
- Sagging resulted into saucer-shaped shallow depression.
- The depression or basin was later filled by water to form a lake (Chad).

Diagram showing formation of Lake Chad



Contributions of lakes to the development of Africa;

- Sources of fish for human consumption thus improving people's health. Fishing is a major occupation for people who live near lakes. For example those around lakes Tanganyika, Victoria and Malawi.
- Provision of fish for export to foreign European countries to earn foreign currency.
- Lakes are used for transport and communication. Steam and ferry services are operated on Lake Tanganyika and Victoria thus facilitating trade and commerce.
- Water transport is cheaper than any other form of transport.
- Provision of territorial and international boundaries thus minimizing border conflicts.
- Sources of water for domestic, industrial use. Water serves as a raw material for some industries like those manufacturing soft drinks.
- Modifies the microclimate of the surrounding areas through sea and land breeze this facilitating agriculture.
- Sources of raw materials like soda ash, salt and building materials for example sand thus promoting the construction and building industry.
- Some lakes attract tourists and local visitors. Craters, glacial and ox-bow lakes create an impressive scenery to attract tourists. They also provide good recreational grounds. This provides income to the government.
- Lakes are sources of important rivers. For example Lake Tana in Ethiopia is a source of Blue Nile; Lake Victoria is a source of river Nile which is useful to Egypt thus facilitating agriculture.
- Water from lakes is used for irrigation of arable land. For Example water from Lake Chad has been used to irrigate 22,000 ha of land where cotton and rice are grown thus encouraging food production
- Promotes generation of hydroelectric power used to power/run industrial machines.

Problems hindering the effective use of lakes in Africa;

- Remoteness of some lakes, which are located in poor areas for example Rift Valley lakes.
- Presence of water hyacinth, which limits transport on lakes.
- Limited fishing instruments/gears.
- Negative attitude towards fishing due to peoples' local beliefs.
- International conflicts as different countries share the lakes.
- Some lakes are salty.
- Poor storage and marketing facilities for fish.
- Storms in the lakes, which cause accidents for example on Lake Albert in 2014.
- Presence of predators such as crocodiles and hippos which terrorize man.
- Shallowness of some lakes which makes navigation difficult.
- Seasonality of some lakes limits fishing.
- Swampy vegetation (lacustrine) hinders coastal settlement.

CLIMATE OF AFRICA

IMPORTANT CLIMATIC INFORMATION:

MEAN ANNUAL RAIN FALL (mm pa) Amount	**DESCRIPTION**	**POSSIBLE TYPE OF CLIMATE**
Above 1500 mm p.a	Very heavy	Equatorial , Modified Equatorial
1000 – 1500 mm p.a	heavy	Equatorial climate
500 – 1000 mm p.a	moderate	Tropical savannah
Below 500 mm p.a	Little/light/Low MAR	Desert climate
MONTHLY RAINFALL (mm) - Always given in the table		
Above 100	Very wet	Equatorial climate
50 - 100	Wet	Tropical Savannah
Below 50 mm	Dry	Desert and semi desert climate
MEAN ANNUAL TEMPERATURE		
Above 30^0C	Very hot	Desert and semi desert
20 – 30^0C	Hot	Equatorial, Tropical Savannah
10 – 19^0C	Warm	Mediterranean
0 – 10^0C	Mild/cool	Temperate world
Below 0^0C	Vey cold	Temperate world
HUMIDITY		
Above 50%	High humidity	Equatorial, Tropical savannah (During summer)
Below 50%	Low humidity	Desert , semi desert, tropical savannah during winter
ANNUAL TEMPERATURE RANGE		
0 – 5^0C	low	Equatorial
6 – 9^0C	moderate	Savannah

10^0C and above	High	Mediterranean

EQUATORIAL CLIMATE:

Table 1

Station A	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	30	31	31	31	30	29	28	28	29	29	29	30
Rainfall (mm)	250	250	325	300	213	25	25	25	100	275	380	200

Source: Minns, A Geography of Africa pg 37

(a) Draw a suitable graph to show the information in the table above.
(Use your graph book)

(b) Calculate the;
(i) Mean annual temperature,
(ii) Man annual rainfall for the station. (iii) Annual temperature range

(c) Describe the climatic conditions experienced at the station.

(d) Explain the ;
(i) Factors responsible for the climactic conditions of the station.
(ii) Effects of climate on economic activities being carried out in the area around the station.

Study the table below showing the climate for station A and B and answer the questions that follow;

Table 2

Station A	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	23	23	23	22	22	22	21	22	22	22	22	23
Rainfall (mm)	40	70	150	230	205	115	65	80	195	225	150	50

Source: Jarrett, H.R. Africa p 27;

Table 3

Station B	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	24	24	23	22	21	20	18	17	18	20	23	24
Rainfall (mm)	200	175	100	25	20	-	-	-	-	50	100	175

Source: Minns, A Geography of Africa pg 36.

(a) For Station A,
State the hottest Months,
(i) State the coolest months, (ii) Calculate the annual temperature range.

(b) For Station B:
(i) State the wettest month,
(ii) Calculate the total annual rainfall.

(c) Describe the climatic characteristics of;

(i) Station A, (ii) Station B,

(d)Describe the characteristics of the vegetation associated with the climate at; (i) Station A, (ii) Station B, (To be seen when handling vegetation)

(d) Giving reasons suggest three economic activities carried out in the area around station A.

(e) If you were a planner, suggest the steps you would take to improve the economic activities in the area around Station A.

Characteristics of Equatorial type of climate;

- Receives a heavy mean annual rainfall of over 1500 mm pa.
- It's wet throughout the year/Rainfall is received throughout the year.
- Has two rainfall peaks that coincide with the overhead sun/has marked double rainfall maxima.
- Has hot mean annual temperature of over 25^0C
- The Annual temperature range is small that is about 3^0C.
- Has small diurnal temperature range of less than 7^0C.
- Has relatively high humidity of above 50% throughout the year.
- Has a dense/thick cloud cover.
- It is associated with sunny conditions.
- Has a low atmospheric pressure due to hot temperatures.
- Rainfall is mainly convectional resulting from heating of the earth's surface and usually falls in the afternoon.

Conditions which have led to the occurrence of Equatorial climate;

- Location along the Equator which leads to low pressure zone/inter-tropical convergence zone.
- Low altitude of below 2000 metres a.s.l. leading to hot temperatures throughout the year.
- Nearness to water bodies leading to formation of convectional rainfall.
- Influence of warm moist winds like the south East and Westerlies resulting to heavy rainfall.
- Low altitude of less than 500m a.s.l leading to hot temperatures throughout the year.
- Thick forest cover provided by the rainforest hence high humidity and heavy rainfall.
- Proximity to water bodies leads to formation of heavy rainfall.
- The apparent movement of the sun leading to double maxima of rainfall in March and September.
- Influence of warm ocean currents like the Guinea currents leading to heavy rainfall and high humidity.
- Influence of human activities like manmade lakes, afforestation, agro-forestry, manmade lakes leading to heavy rainfall.

Influence of Equatorial climate on human activities in Africa/the area;

Positive influence;

- The two rainfall peaks in the year enables double cropping in the year.

- Heavy rainfall and hot temperatures encourage plantation farming/perennial crops like oil palm in Nigeria, Rubber in Liberia.
- Heavy rainfall encourages subsistence agriculture like the growing of yams, cassava.
- Heavy rainfall results to dense vegetation which promotes wildlife conservation and tourism.
- Heavy rainfall and hot temperatures support agriculture and forestry which are source of raw materials leading to industrialization and trade.
- Heavy rainfall leads to permanent large water bodies allowing fishing activities.
- Heavy fall and hot temperatures allow tourism and research due to dense forests.
- Heavy rainfall leads helps in sand deposition and exposing of minerals which encourage quarrying/mining.
- Hot temperatures encourage the growing of flowering plants leading to bee keeping.
- Heavy rainfall leads to permanent large water bodies leading to development of water transport/sport activities.
- Heavy rainfall and hot temperatures encourage the growth of forests leading to hunting and food gathering.
- Heavy rainfall increases the volume of water in rivers leading to generation of HEP.
- The heavy rainfall and hot temperatures are ideal or the growth of thick forests thus allowing lumbering in Gabon and DRC.

Negative influence;

- Heavy rainfall makes roads slippery hence hindering transport services.
- Heavy rainfall leads to leaching of soils resulting into low crop production.
- Heavy rainfall destroys settlement and roads.
- Heavy rains cause humid conditions which encourage the breeding of pests and diseases leading to low crop production/discourage settlement.
- Heavy rains encourage rapid growth of weeds that compete with crops.
- The runoffs from the heavy rainfall cause silting/pollutants limiting fishing activities.
- The runoffs from the heavy rainfall cause silting of water bodies hindering water transport.
- Heavy storms lead to destruction of vegetation thus discouraging tourism and lumbering.
- Heavy rainfall/storms delay and disrupt economic activities such as crop farming and animal rearing.

(a) Draw a sketch map of Africa and on it mark and name the following vegetation types;

(i) Desert, (iii) Tropical Savannah,

(ii) Equatorial (iv) Mediterranean,

(b) Describe the characteristics of Mediterranean types of;

(i) Climate, **(check on the Mediterranean climate)**

(ii) Vegetation. **(Check on the Mediterranean vegetation)**

(c) (i) For any **one** Country, located within the equatorial region of Africa, State the economic activities carried out. (Check on equatorial climate)

(ii) Explain the influence of climate on any one economic activity stated in (c)(i) above.

TROPICAL SAVANNAH CLIMATE

Table 4

Harare-Zimbabwe	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	24	23	22	21	20	18	17	18	20	23	24	24
Rainfall (mm)	200	175	100	25	20	-	-	-	-	50	100	175

Source: Minns, A Geography of Africa pg 36.

Table 5

Kano-Nigeria	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	24	24	27	32	31	27	26	25	26	26	25	23
Rainfall (mm)	-	-	-	25	75	125	200	325	150	25	-	-

Source: Minns, A Geography of Africa pg 36.

For each of the tables above;

(a) Draw a suitable graph to the climate of the station. **(Use your graph book)**

(b) Calculate the;

(i) Mean annual rainfall,

(ii) Annual temperature range,

(iii) Mean annual temperature.

(c) Describe the climatic characteristics for each station.

Characteristics of Tropical savannah climate experienced at the station;

- High humidity is experienced during summer season and low humidity in winter.
- Temperatures are hot in summer and warm in winter.
- Has a moderate annual temperature range
- Experiences alternate wet and dry seasons.
- Has a moderate mean annual rainfall.
- Rainfall is received in summer while winters are dry.

Factors influencing the occurrence of Tropical savannah climate

- Altitude; Temperatures decrease with increase in altitude and increase with decrease in altitude in Altitude. That is 6.5^0 C for every 1000 meters above sea level.
- Water bodies through Sea breeze and land breeze.
- Wind system like the South East trade winds cause rainfall in the area.
- Warm ocean currents for example the Mozambique currents which also lead to rainfall.

- Relief; Hilly regions tends to be wetter than the surrounding areas since they help in rainfall formation

Influence of climate on agricultural activities/famer's calendar in the region around the station;

- The moderate rainfall favours growth of seasonal crops.
- The hot temperatures received help in the ripening of fruits.
- The hot temperatures and reliable rainfall favour growth of pasture which enables livestock rearing.
- The marked dry season between June and September facilitates harvesting and preparing of the garden for next season.

DESERT CLIMATE

STATISTICAL TABLES FOR DESERT CLIMATE:

Table 6

Walvis Bay (Namibia)	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	18	19	19	18	17	16	16	14	15	17	18	17
Rainfall (mm)	3	3	7	3	-	-	-	-	-	-	-	3

Table 7

Windhoek (Namibia)	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	27	27	26	25	22	20	20	23	26	27	29	30
Rainfall (mm)	125	75	50	10	7	5	3	3	-	7	3	35

Source: A geography of Africa; WJ Minns. Pg 32.

Table 8

Capejuby (Moroccan Coast)	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	16	16	17	18	18	20	20	20	21	20	18	16
Rainfall (mm)	13	13	13	-	-	-	-	13	13	13	13	25

Table 9

Timbuktu (Mali)	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	12	15	20	25	30	35	37	36	33	26	20	16
Rainfall (mm)	-	-	3	10	10	35	85	50	13	12	-	-

Source: A geography of Africa; WJ Minns. Pg 34

For each of the tables above;

(a) Draw a suitable graph to the climate of the station. **(Use your graph book)**

(b) Calculate the;

(i) Mean annual rainfall,

(ii) Annual temperature range,

(iii) Mean annual temperature.

(iv) Describe the climatic characteristics for each station.

1. (a) Draw a sketch map of Africa and on it mark and name;

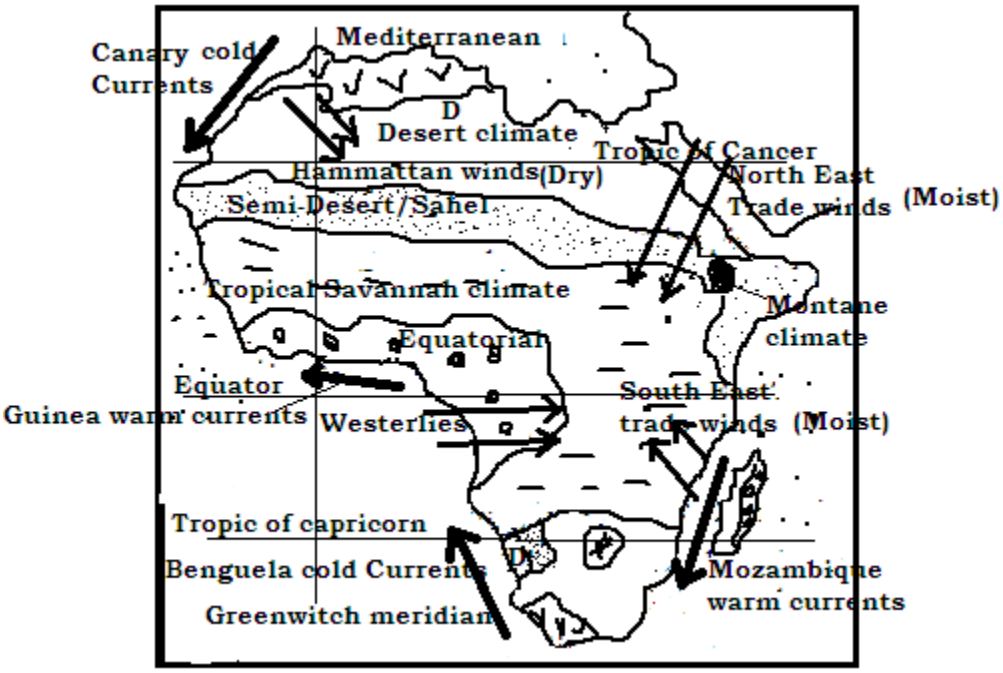
(i) Ocean Currents; Canary and Benguela,

(ii) Latitudes; Tropic of Capricorn and the Equator,

(iii) South East Trade winds,

(iv) Any **two** areas in Africa with Desert type of climate.

(a) **A sketch map of Africa showing selected Ocean Currents and Latitudes;**



Characteristics of desert type of climate include the following;

- Little/low/light rainfall of less than 500mm p.a
- Experiences very hot temperatures during day through the year of an average of 30^0C.
- Has a high rate of evaporation.
- Rainfall is unreliable.
- Associated with torrential rainfall.
- Experiences strong winds/wind storms which are generally dry.
- Large diurnal/daily temperature range of over $25^{0C.}$
- High annual temperature range of between 13^0C on the desert margins up to 30^0C in the interior of the desert.
- Low humidity throughout the year.
- Very cold nights are experienced
- Low/Little or no cloud cover throughout the year /clear blue sky.

Factors which have led to occurrence of desert type of climate;

- Latitudinal location along the horse latitudes/high pressures belts where winds blow away creating dry conditions.
- Location on the Western side of the continent where winds are offshore leading to aridity in the desert areas/Continental location/continentality leads to dry conditions.
- Absence of large water bodies/continentality that is within the interior of the continent where there are no large water bodies leading to low rainfall totals e.g. in Sahara desert.
- Natural disasters like Locusts invasion which destroy vegetation.
- The rain shadow effect due to the presence of Ethiopian highlands and Drakensburg Mountains. /location on the lee ward sides of highlands like Drakensburg, Ethiopian, Mt Atlas leading to low rainfall and humidity.
- Influence of human activities like bush burning/deforestation destroys vegetation leading to dry conditions.
- Limited cloud cover leads to hot temperatures during g day cold temperatures at night hence a large diurnal range of temperature.
- The presence of scanty vegetation which limits the evapo-transpiration process leads to low rainfall totals.
- The presence of offshore winds which blow parallel to the coast diverting the moisture bearing winds from the masses.

Influence of climate on human activities in Desert and semi-desert areas:

- Scanty rains encourage the growth of some pasture leading to animal rearing/nomadic Pastoralism.
- Strong winds lead to accumulation of sand (sand dunes) encouraging tourism activities.
- Very hot temperatures lead to high evaporation rates encouraging salt mining like in Namibia.
- Dry and hot conditions promote Pastoralism leading to development livestock related industries like Leather tanning industry.
- Hot and sunny conditions encourage generation of solar power in Chad, Mali and others.
- Hot and dry conditions promote the growing of drought resistant crops like millet, sorghum, cassava.
- Dry sunny conditions encourage the growth of a variety of semi – desert vegetation leading to bee keeping activities.

Negative influence;

- Hot and dry conditions limit the growing of crops.
- Windy and dusty conditions encourage the spared of air born diseases thus limiting settlement.
- Hot conditions encourage salination of the water making it unsuitable for consumption and irrigation.
- Strong winds lead to accumulation of sand hindering transport and communication.
- Unreliable rainfall and hot temperatures limit human settlement.

- Hot and dry conditions encourage wild fires that destroy grazing land hence limiting animal rearing.

Problems faced by people living on the margins of desert lands in Africa;

- Occasional floods that destroy property.
- Inadequate/Limited supply of surface water for livestock and human consumption.
- Shortage of pasture for livestock rearing leading to nomadic Pastoralism.
- Infertile soils/Sandy soils which do not support crop cultivation.
- Low and unreliable rainfall which limits growth of crops and dense vegetation.
- Excessively hot temperatures during the day make man and animals uncomfortable.
- Pests and diseases that attack crops and man.
- Very cold nights due absence of cloud cover at night threat man.
- Some deserts are remote due to underdeveloped road network.
- Limited food supply leads to famine.
- There is scanty population which makes it difficult to provide social – economic services.
- Sandstorms are very common leading to loss of lives due to poor visibility.

DROUGHT IN AFRICA

Study the table below showing occurrence of drought in Africa between 1991 and 2004 and answer the questions that follow;

Table 10

Country	Total years of drought
Ethiopia	10
Zambia	08
Namibia	02
Mauritania	04
Malawi	07

Adapted: 2005 African Development Indicators. The World Bank, Washington, Dc pg235.

(a) Draw a bar graph to show the information contained in the table above.

(b) Name the country with the;

(i) Highest, (ii) lowest, occurrence of drought.

(c) Explain the causes of drought in the Country named in (b)(i) above.

(a) A bar graph showing the occurrence of drought in Africa (1991-2004)

(Use your graph book)

(b) (i) Country with the highest occurrence of drought is Ethiopia.

(ii) Country with lowest occurrence of drought is Namibia.

(c) Causes of drought in Ethiopia include the following;

- Absence of large inland water bodies reduces moisture/rainfall.
- Distance from the sea/Interior location leading to continentality/high temperatures and low rainfall amounts.
- Dry trade winds which carry no moisture.
- Destruction of vegetation cover which reduces evapotranspiration.
- Global warming because of increased carbondioxide in the atmosphere.
- Poor farming methods like overgrazing which has reduced vegetation and evapotranspiration leading to high loss of moisture.
- Location on the lee-ward side of the Ethiopian highlands leads to low rainfall amounts.

(d) (i) **<u>Effects of drought on human activities in Africa;</u>**

- Reduces the productivity of land due to soil erosion.
- Loss of livestock due to shortage of pasture and water.
- Loss of crops due to limited soil water and surface drainage.
- Has led to acute famine/starvation/increased dependence on imported food.
- Migration of people/Environmental refugees due to water and food shortage.
- Has reduced hunting and tourism due to too migration of wild animals.
- Reduced water supply for domestic and industrial use due to too much evaporation in water bodies.
- Reduced HEP generation due to reduced water volume in lakes and rivers.
- Has led to reduced fish catch due to reduced in water volumes in lakes and rivers.
- Has an increased conflict over resources due to their shortage.
- Difficult in water transport due to reduced water levels.

(ii) <u>Steps being taken to address the problems of drought in Africa;</u>

- Carrying out afforestation to allow rainfall formation.
- Emphasizing afforestation to reduce the carbondioxide levels.
- Gazetting forest reserve to reduce human encroachment.
- Imposing strict laws on wetlands to reduce encroachment on such marginal lands.
- Sending relief to the affected people.
- Importing of food in case of food shortage.
- Improving food security by planting fast maturing crops and drought resultant crops/pasture.
- Reducing on the number of livestock to avoid overgrazing.
- Constructing of valley dams/boreholes/reservoirs to duce the death of cattle.
- Carrying out water harvesting to store water for use during the dry season.
- Carrying out family planning to reduce pressure on land in form of settlement and agriculture.

- Regional cooperation to protect the environment jointly.

MEDITERRANEAN CLIMATE

2. Study **Table11** below showing the climate of station **A** and answer the questions that follow;

Table11: Climatic statistics for Station A. **Table 11**

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temperature (^{0}C)	12	13	14	16	19	22	25	26	24	21	17	13
Rainfall (mm)	110	90	90	60	35	15	3	10	30	80	115	135

Adapted: Africa by H.R Jarrett (1979), Macdonald and Evans Pp31.

(a) Draw a suitable graph to show the information in the table above.

(b) Calculate the;

(i) Mean annual temperature, (ii) Annual range of temperature,

(c) Mean annual rainfall, for station **A**.

(d) (i) Describe the characteristics of the climate of station **A**.

(ii) State the hemisphere in which station **A** is located.

(a) A combined bar and Line graph showing climate statistics for station A. (Use your graph book)

(b)(i) Mean annual Temperature $= \frac{\text{Sum the temperatures for the 12 months in the year}}{\text{12 months}}$

$$= \frac{12 + 13 + 14 + 16 + 19 + 22 + 25 + 26 + 24 + 21 + 17 + 13}{12}$$

$$\frac{222}{12} = 18.5^0\text{C} \cong 19^0\text{C}$$

(ii) Annual range of temperature = Highest temperature – Lowest temperature

$(26 - 12)^0\text{C} = 14^0\text{C}$

(i) Mean annual rainfall $= \frac{\textit{Rainfall for 12 months}}{\text{1 year}}$

$$\frac{110 + 90 + 90 + 60 + 35 + 15 + 3 + 10 + 30 + 80 + 115 + 135}{1}$$

773 mm p.a

(c)(i) **The characteristics of the climate at station A;**

- The area has a hot (sunny) and dry summers (June –October) and summers are relatively short lasing for 4 months.
- It experiences a cool and wet season between October to May. The cool/wet season is relatively long.
- Heavy rainfall is received in winter (between October – March).
- There is a moderate annual rainfall of 773 mm pa.
- The station has a large annual range of temperature of 14^0C.
- The station receives a mono modal rainfall (single maxima rainfall regime).
- The hottest month is August.
- Winters are cool and cloudy with damp air and rain.

- There are alternate wet and dry seasons.
- Rainfall totals during the rainy season are relatively uniform.
- Heaviest rainfall is received in December.
- The coolest month is January with 12^0C.

(ii)The station is in the Northern hemisphere in a Mediterranean zone.

Influence of climate on human activities in the Mediterranean region;

Positive influence;

- Moderate rainfall received supports the growing of citrus fruits and vegetables.
- Moderate rainfall and warm sunny conditions encourage tourism activities.
- Warm sunny conditions encourage the ripening and harvesting of fruits.
- Moderate rainfall and sunny conditions encourage trade in agricultural products.
- Moderate rainfall encourages the growth of pasture which supports animal rearing like sheep.
- Moderate rainfall received encourages the growth of forests leading to lumbering.
- Moderate rainfall encourages the growth of variety of flowering plants for the chemical industry.

Negative influence;

- Cold temperatures discourage the growth of crops during winter.
- Hot and dry conditions during summer encourage fires that cause destruction of forests hence limiting lumbering.

(d)(i) **Economic activities that can be carried out in areas around station A;**

- Extraction of cork back to make bottle tops/cork.
- Collecting of scented plants like rosemary to make perfumes.
- Lumbering to make furniture from big trees like eucalyptus and oak tree.
- Charcoal burning to get fuel wood for domestic use.
- Wild life conservation for tourism and ecological purpose.
- Collection of wild herbs for medicinal use.

(ii)**Problems facing land use around station A;**

- There is unreliable /little rainfall/ Drought.
- There is costly irrigation farming.
- There are high evaporation rates due to hot temperatures leading to low water balance in the soil.
- There are drought conditions leading to shortage of food/famine, water and pastures.
- There is soil erosion/ soil exhaustion.
- There are transport difficulties during wettest months.
- Pests and diseases that attack crops.

- Flooding during the wettest month.
- Wild animals that destroy crops
- Wild fire outbreak that destroys valuable timber.

OTHER STATISTICAL TABLES FOR MEDITERRANEAN CLIMATE:

Table 12

Algiers (NW Africa)	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	12	13	15	16	19	22	25	26	24	20	17	15
Rainfall (mm)	150	87	87	60	30	12	-	-	25	75	110	140

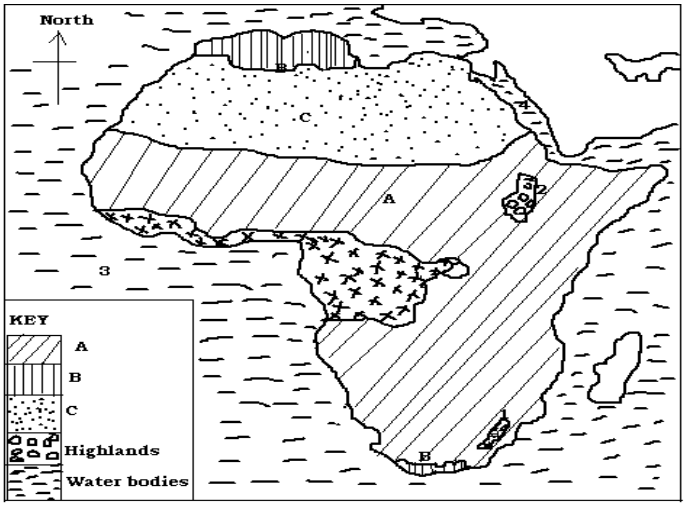
Table 13

Cape Town (SW Tip of Africa)	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{0}C)	21	20	20	17	15	13	12	13	15	16	18	20
Rainfall (mm)	12	12	15	50	90	110	87	87	50	35	20	15

Source: A geography of Africa; WJ Minns. Pg 27.

VEGETATION OF AFRICA

1. Study the figure below: map of Africa showing natural vegetation cover and answer the questions that follow;



(a) Name the; (i) Vegetation types marked A, B and C,
(iii) Highlands marked 1 and 2, (iii) Water bodies 3 and 4.

(b) Describe the characteristics of any **one** type of vegetation named in (a) (i) above.

(a)(i) **Vegetation types are;**

A is Savannah vegetation, **B** is Mediterranean vegetation **C** is Desert vegetation

(ii) **Highlands;**

1 is Drankensberg, 2 is Ethiopian highlands.

(iii) **Water bodies;**

3 is Atlantic Ocean 4 is Red Sea.

Conditions which have influenced vegetation distribution in Africa;

- Soils; the thin skeletal soils support the growth of xerophytic plants.
- Very fertile/rich loam soils support the growth of thick/luxuriant vegetation.
- Climate; Areas of cool temperature support temperate woodlands and grasslands.
- Very cold environment support heath and moorland.
- Areas which have warm temperature and receive reliable rainfall support tall trees.
- Areas of heavy rainfall of over 1500mm p.a support tropical rainforest.
- Areas which receive low and unreliable rainfall of below 500 mm p.a support semi-desert vegetation cover.
- Altitude; Altitudinal differences lead to vegetation zonation due to changes in soil and climatic conditions.
- The lower altitudinal areas have savannah grasslands.
- Mid slopes support deciduous forests and Bamboo.
- High altitudinal areas allow the growth of heath and moorland.
- Latitude; Areas of low latitude in Africa support different types of vegetation.
- The effect of dry winds which lead to growth of scanty vegetation.
- Areas adjacent the cold currents like canary currents and Benguela lead to scanty vegetation.
- Drainage; Marshy soils support water logged plants e.g. mangrove swamps and papyrus vegetation.
- Well drained areas support growth of luxuriant vegetation cover/tropical rainforests.
- Relief affects the distribution of vegetation. Windward side has luxuriant vegetation while lee ward side has scanty vegetation.
- Human activities like industrialization, agriculture have reduced vegetation cover leading to scanty vegetation.
- Government policy to determine the location of vegetation.

(b) **Characteristics of any one vegetation type;**

SAVANNAH VEGETATION;

- It is divided into **Savannah woodland** and savannah grassland.
- Savannah woodland has tall grass.
- The grassland has scattered trees.
- Trees are umbrella shaped.
- Trees are deciduous.
- There is thick undergrowth.
- Trees are deep rooted.
- Hardwood tree species are common.

- Has got drought resistant trees species.
- Has high water retention plants like baobab/some trees store water for use during the dry season/succulent (thick and juicy).
- Some trees are thorny.
- Trees have thick barks.
- Scattered thickets.
- Tall grass towards the equatorial region and short grass towards the desert.
- Green vegetation during wet season, brown vegetation during the dry season.

Characteristics of Savannah Grass land;

- Predominantly tall grass of over 2 metres like elephant grass.
- Trees are medium in height.
- The grassland reduces in height towards the fringes of the desert/Sahel.
- Has scattered trees.
- Trees have umbrella shaped appearance.
- Trees are deciduous that is shed off their leaves at the beginning of the dry season,
- The grassland also dries up (withers) turn yellow or brown during the dry season and turn green during the wet season
- Trees store water (have succulent stems) e.g. the Baobab tree which thrives closer to the desert.
- Trees the desert are scrubs and the common species are Acacia.
- Trees have thick barks to reduce water loss.
- Mainly have hard wood trees.

Factors for the growth of Savannah vegetation;

- Seasonal rainfall/wet and dry seasons lead to growth of deciduous trees.
- Moderate rainfall that is higher near the equator but low towards the north and the South towards the desert.
- Hot temperatures throughout the year between 25 – 30^0C
- Fairly fertile soils allow growth of umbrella shaped scattered trees.
- Flat altitude but directed by river valleys.
- High humidity during rainy season but low during dry season.
- Human activities like bush burning bush clearing, farming, deforestation, animal grazing and settlement reduces the rainforests to grassland.

Economic activities taking place in Savannah vegetation;

- Livestock rearing due to abundant pasture.
- Arable farming especially seasonal crops due to seasonal rainfall.
- Wild life conservation due to abundant pastureland.
- Charcoal burning due scattered umbrella shaped trees.
- Fishing due to permanent water bodies.
- Controlled hunting for food due to varied edible animals.
- Bee keeping for honey due to open woodlands.
- Collection of herbs due to varied trees for medicinal purpose.

Problem facing landuse in Savannah vegetation;

- Shortage of underground water limits cattle rearing.
- Pests and diseases lead to death of cattle.
- Shortage of pasture discourages cattle rearing.
- Low and unreliable rainfall limits crop farming hence food shortage.
- Remote of the area due to under developed roads limits arable farming, trade and commerce.
- Poaching of elephant for ivory and lions for skins limits wild life conservation.
- Political instability discourages farming.

Measures being taken to solve the above problems;

- Sensitizing against the misuse of savannah through decampaigning bush burning and deforestation.
- Diversifying economic activities other than faming to reduce pressure on savannah vegetation.
- Carrying out afforestation to reduce increase of arid conditions.
- Spraying cattle with pesticides to reduce on pests and diseases.
- Carrying out irrigation farming to facilitate crop farming during dry season.
- Carrying out ranching to reduce overstocking and overgrazing.
- Constructing valley dams to provide water for both livestock and people during dry season.

OR <u>MEDITERRANEAN VEGETATION;</u>

- Consists of evergreen woodlands and shrubs.
- Trees have adapted themselves to summer drought. They store water for use during summer.
- Trees have a deep root system to reach water deep down.
- Trees have shinny and waxy leaves to reduce transpiration and conserve the little water.
- They have thick barks to reduce water loss through transpiration.
- Some plants have fleshy bulbous roots to store water for use during summer.
- There are sweet and smelly scent trees.
- Some trees are cone shaped.
- Have needle like shaped leaves to minimize loss of water through transpiration.
- Some trees produce soft wood.
- Trees have deep tap roots to reach the moist rocks.
- The Mediterranean oak forms open woodland with ever green trees.
- The wetter parts are covered by coniferous trees.
- Short vegetation in the dry areas.

(b) <u>Conditions which have led to the growth of Mediterranean vegetation</u>;

- Summers are hot and dry leading to growth of shrubs.
- Moderate rainfall favours the growth of coniferous trees.
- Cool and wet (moist) winters favour the growth of evergreen trees and woodlands.

- Soils are red and brown favouring the growth of bunchy and wiry grass.
- The capacity of Mediterranean trees to conserve soils enables it to grow during summer because winter is too cold to support growth.
- Location in the mid latitude areas leading to growth of coniferous trees/woodlands.
- High altitude on the Atlas allows growth of medium sized trees.
- Variation in climate leading to the growth mixed species.
- Government policy of conserving vegetation ensures continuous growth of forests.
- Human activities such as mining, agriculture have led to growth of secondary vegetation type.

Economic activities that can be carried out in areas around the region

- Extraction of cork back to make bottle tops/cork.
- Collecting of scented plants like rosemary to make perfumes.
- Lumbering to make furniture from big trees like eucalyptus and oak tree.
- Charcoal burning to get fuel wood for domestic use.
- Wild life conservation for tourism and ecological purpose.
- Collection of wild herbs for medicinal use.

Problems facing land use around the region;

- There is unreliable /little rainfall/ Drought discourages collection of scented plants.
- There is costly irrigation farming due to prolonged drought.
- There are high evaporation rates due to hot temperatures leading to low water balance in the soil.
- There are drought conditions leading to shortage of food/famine, water and pastures leading to death of wild game.
- There is soil erosion/ soil exhaustion.
- There are transport difficulties during wettest months.
- Pests and diseases that attack crops.
- Flooding during the wettest month.
- Wild animals.
- Wild fire outbreak.

Characteristics of High Velds/Temperate grassland;

- Sub tropical/temperate grassland.
- Has a few scattered trees.
- Grass grows to medium size that is 2 metres.
- Grass withers in dry winters.
- There are temperate forests in low altitude areas.

Factors for the growth of High Velds vegetation;

- High altitudes lead to heavy rainfall and cool winters.
- Intensive farming like crop farming and animal rearing/livestock.

DESERT AND SAHEL (SEMI-DESERT) VEGETATION;

Characteristics;

- Very scanty vegetation cover.
- Plants have thick barks.
- Plants have waxy leaves and barks.
- Deep root system which reaches underground water.
- Leaves are spiny and thorny which reduces transpiration/water loss.
- Have hard seeds which can lay dormant for a long time.
- Plants are fast maturing and complete their life cycle in a short time e.g. Shrubs.
- Some plants are succulent.

Characteristics of (Semi desert) Sahel vegetation;

- The vegetation consists of thorny bushes.
- Plants have deep penetrating roots that pierce deep underground to reach the water.
- Plants are tiny with thorny leaves to reduce transpiration.
- The leaves are waxy and hairy to reduce water loss.
- Plants have swollen trunks in which they store water for use during the long dry season like the Baobab tree.
- Plants produce seeds which lie dormant for years until a little rainy season to germinate.

Countries in Sahel region include;

- Somalia, Ethiopia, South Sudan, Chad, Nigeria, Mali, Burkina Faso, Senegal, Gambia.

Economic activities done in Sahel region;

- Nomadic Pastoralism due to presence of pastureland.
- Growing of Seasonal drought resistant crops like millet, maize, cotton, groundnuts.
- Wildlife conservation due to a good natural habitat for wild animals.
- Development of agro based industries because of the agricultural raw materials like grains.
- Bee keeping due to presence of thorny trees.
- Charcoal burning using the isolated thorny trees.

Problems facing economic activities done in Sahel region;

- The unreliable rainfall leads to crop failure.
- Scarcity of water for both animals and people leads to their death.
- Overgrazing due to large herds of cattle reduces productivity.
- Wide spread bush burning during the dry season destroys pasture.
- Existence of pests and diseases e.g. locusts and tsetse flies spread Nagana to cattle.
- Poaching in wild life conservation centres discourages wildlife conservation.
- Inadequate capital limits the establishment of development projects like dams.
- Remoteness of the area due to underdeveloped communication lines limits accessibility.

Steps being taken to solve the problems above;

- Encouraging afforestation and re-afforestation to control soil erosion.
- Establishing valley dams to supply animals with water.
- Encouraging rotational grazing to solve the problem of overgrazing.
- Planting of grasses like Alfalfa to control shortage of pasture.
- Spraying of cattle to control pests and diseases.
- Gazetting areas into national parks and reserves to control poaching.
- Financing development projects like irrigation farming and mechanized in agriculture.
- Improving the existing transport means like roads to check remoteness.
- Educating and sensitizing the workers about better farming practices

TROPICAL RAIN FORESTS:

Characteristics of Tropical Rain forests:

- Tall and evergreen trees because trees shed off their leaves at different intervals.
- They have three layers/ Canopies.
- Have lianas, climbers and limited undergrowth.
- Where sunlight reaches the ground/margins, there is thick under growth.
- Predominantly hardwood e.g. Mahogany, Rosewood, Ebony/Appear in impure stands.
- Have broad leaves which are ever green.
- Big/Huge straight and smooth trunk.
- Take long to mature/Lon gestation period.

Conditions which have led to the growth of Rain forests;

- Heavy rainfall received supports the growth of thick forests.
- Hot temperatures of over 20^0C favour rapid growth of trees.
- High humidity leading to evergreen tall trees.
- Low altitude found in the lowlands areas hence dense forests.
- Evenly distributed rainfall throughout the year favours the growth of luxuriant vegetation.
- Supportive Government policy of conserving forests leading to rainforest conserved.
- Low population limiting encroachment on forests.
- Remoteness/inaccessibility of the area limiting exploitation of forests.
- Low latitudinal location leading to growth of tropical rainforests.

Economic activities taking place in Tropical rain forest:

- Collection of wild herbs to cure diseases due to presence of several medicinal plants.
- Wild life conservation for example endangered animals species lime mountain Gorillas.
- Hunting of wild animals for wild beef due to presence of variety of wild animals.
- Fruit and root gathering such as berries, jackfruits due to abundant trees ant that yield fruits.
- Livestock rearing due to presence of abundant pastures for livestock.

- Bee keeping due to presence of a variety of trees where nectar is collected by the bees.
- Charcoal burning and collection of fuel wood due to presence of trees.
- Lumbering due to presence of big trees.
- Crop cultivation due to presence of fertile soils.

BENEFITS/USES OF THE NATURAL VEGETATION TYPE (MEDITERRANEAN VEGETATION, RAIN FORESTS OR ANY OTHER) TO THE PEOPLE LIVING IN THE AREA./IMPORTANCE OF NATURAL VEGETATION TO THE PEOPLE OF AFRICA;

- Source of wood for provision of fuel for domestic or industrial use.
- Rainforests are important catchment areas that are they are source of rivers/streams.
- Decomposition of plant leaves adds manure to the soil thus increasing soil fertility.
- Modification of climate through rainfall formation that attracts crop farming.
- The grassland vegetation is an ideal rangeland/source of pasture for animals thus allowing livestock rearing.
- Thick forest cover prevents soil erosion hence, soil conservation.
- Most of the natural plant species have Medicinal use/significance in form of herbs.
- Source of raw materials /timber/poles for the building and construction industry.
- Grasses and leaves are harvested for roofing and handcraft industry.
- Source of food (roots, leaves, fruits)/nuts/fruits/bee keeping provides honey this supplements human diet.
- Habitat for animals/Wildlife therefore promoting ecotourism.
- Important for Education and Research through field work.
- Cleans the environment/atmosphere by absorbing carbondioxide.
- Thick vegetation is a habitat for wild animals which is a basis for the tourism industry/ Promotes tourism and recreation activities.
- Natural vegetation purifies the environment that cleaning of air by absorbing carbondioxide.
- Forests at as wind breakers that protects farmlands and b buildings.

Effects of human activities on the natural vegetation cover in Africa;
The effects are negative and positive which include the following;

Negative effects;

- Has led to destruction of vegetation cover/deforestation.
- Has led to transformation of vegetation from natural to secondary vegetation.
- Hs led to disappearance of valuable tree species due to clearance of timber/agriculture or settlement.

Positive effects;

- Has led to deliberate protection of some valuable species through establishment of forest.

- Has led to afforestation and reafforestation to supplement natural tree species by increasing acreage of forests.
- Gazetting of forest reserves protects them from encroachment.

Reasons for the reduction/decrease in natural vegetation in Africa;

- Human activities like clearing of land for settlement, agriculture, road, mining, industrialization.
- Natural wild fires/natural fires started by lightening destroy large hectares of vegetation.
- Influence of wild animals like elephants destroy trees.
- Prolonged drought /desertification limit the growth of vegetation.
- Pests and diseases like months and caterpillars destroy vegetation.
- Landslides destroy trees.
- Floods destroy trees and grasslands.
- Pollution from industries limits the growth of vegetation.

Effects of forests destruction in Africa;

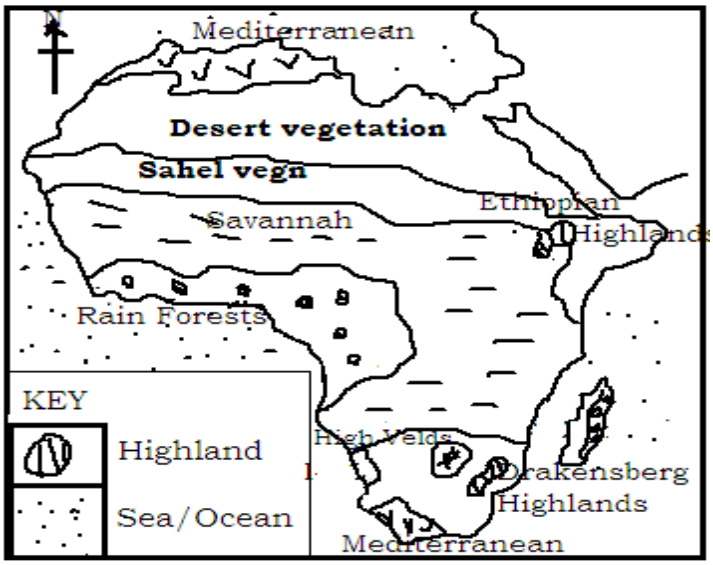
- Has led to desertification and growth of secondary vegetation e.g. grasslands, bushes and scrubs.
- Has led to climate change that leads to reduction of rainfall and increase in temperature/drought.
- Has led to global warming due to increased level of green house gases.
- Reduction of the water table leading to shortage of surface water.
- Soil erosion due to increased exposure of soils to wind and running water.
- Reduction of raw materials for timber based industries.
- Degradation of land leading to loss of soil fertility hence low yields.
- Increased mass wasting/landslides/rock falls.
- Loss of scenic beauty/decline in tourism.
- Reduction in tourism due to destruction of flora and fauna.
- Loss of employment from the forestry related activities.

Outline the steps being taken to conserve forests in Africa;

- Carrying out afforestation and reafforestation programmes e.g. along River Volta in Ghana, Extensive afforestation in Swaziland and Ghana.
- Strengthening environmental regulations against destruction of forests/security guards/Eviction of encroachers.
- Introducing of the other suitable uses of forests e.g. for bee keeping.
- Diversifying other sources of energy e.g. solar, gas to save the forests from destruction for fuel wood.
- Growing of quick maturing tree species e.g. Eucalyptus.
- Sensitization of the masses about the value of forests.
- Promoting of agro forestry on farmlands.
- Promoting of research to improve forestry.
- Spraying of pests and diseases with chemicals.
- Emphasizing International cooperation among African Countries on forest conservation.

  Using of alternative building and construction materials to save wood.

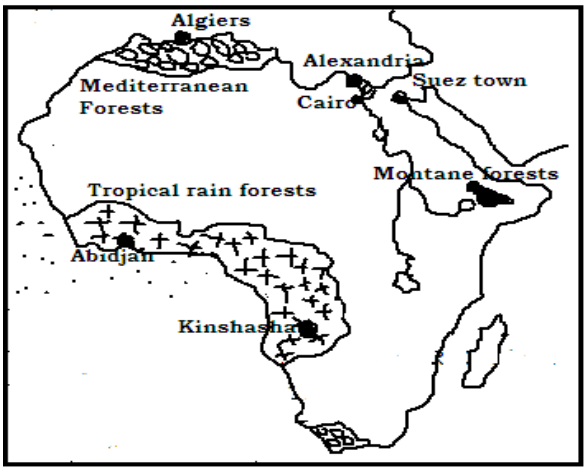
(a) **A sketch map of selected natural vegetation and highlands;**



(a) Draw a sketch map of Africa and on it mark and name;
(i) Vegetation types; Equatorial, Sahel and Mediterranean,
(ii) Latitudes; Equator and Tropic of Capricorn,
(b) Describe the characteristics of the;
(i) Sahel vegetation,
(ii) Mediterranean vegetation.
(c) For any **one** Country in the Sahel Region,
(i) Explain the economic activities carried out by the people.
(ii) Outline the problems faced by the people.
(d) Outline the steps being taken to solve the problems identified in (c) (ii) above.

FORESTRY IN AFRICA

(a) Draw a sketch map of Africa and on it mark and name;
(i) Towns; Abidjan, Algiers and Kinshasa,
(ii) Areas covered by; Tropical rain forests, montane forests, Mediterranean forests. (a) **A sketch map of Africa showing forests and Towns;**



(a) **EITHER; characteristics of tropical rainforest;**

- Tall trees of over 80 metres grow.
- Three canopies/layers/Tiers.
- Ever green forests that is they shed off their leaves at different intervals.
- Little or No under growth except where sunlight reaches the ground.
- Has big buttress root system to support the great height and weight.
- Trees are of mixed species/Impure stands.
- Creeping plants/climbing plants like Lianas grow from tree to tree.
- Trees have broad leaves and smooth tree trunks
- There is growth of epiphytes.
- Trees take long to mature.

OR Characteristics of Montane forests;

- There is altitudinal zonation of Montane forests. That is tropical forests at the lower altitudes/slopes, replaced by temperate forests at the mid-slopes, coniferous and bamboo forests on the upper most slopes.
- The tropical forests (low altitude) are of mixed stands/impure stand and have three layers/canopies.
- Tropical forests have hard wood.
- Temperate coniferous and Bamboo forest are in pure and single canopy.
- Temperate and coniferous have soft wood, have thick bark, waxy bark, needle shaped leaves, straight trucks, cone shaped trees and some species have hollow stems.

Factors which have favoured the exploitation of tropical rain forests;

- Existence of a variety of tree species like Okoume, Read Heart, Mahogany, Green Heart.
- The heavy rainfall and hot temperatures favour quick growth of trees after exploitation.
- Large sums of capital from domestic and foreign investor to cut the trees.
- Ready market for forestry products both locally and foreign.
- Developed transport based on rivers facilitates floating of logs to collecting centres.
- Availability of abundant skilled labour provided by the government to look after the forests and exploit them.
- Appropriate technology like use of power driven saws to extract trees.
- Supportive government policy of diversifying the economy.
- Reliable power supply like HEP to run industries.

(b) Factors which have limited commercial exploitation of tropical rainforests;

- DRC, Congo Brazzaville, Gabon, Liberia, Cote d'Ivoire (Ivory Coast), Cameroon, Ghana, Nigeria.
- The factors are similar and they include the following;

Physical factors:

- Mixed stands bring about problems of uneconomical exploitation; a lot of time is wasted in searching for valuable species which are scattered.
- Long gestation period of the indigenous species limits continuous supply of timber or sustainability of supply.

- Wild animals that scare away the lumber jacks limiting the supply of labour.
- Large buttress roots make exploitation difficult.
- Pests and diseases attack people and trees limiting production.

Human factors:

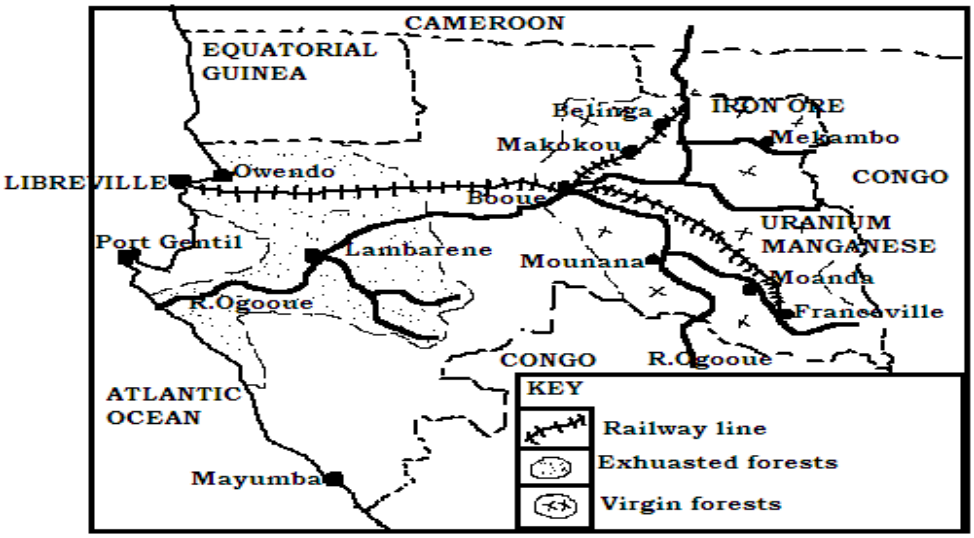
- Poor accessibility/Remoteness as thick vegetation makes road/railway construction difficult. Areas are drained by numerous and unnavigable rivers and their tributaries make extraction hard.
- Low levels of technology in forest exploitation leading to insufficient quantity of timber products e.g. by use of simple chain saws, axes leading to small scale harvests.
- Competition for market from soft wood producing countries limits the market for hardwood products.
- Insecurity as forests are used as hideouts for rebels hindering timber production.
- Limited capital for massive investment in the forestry industry leading to overdependence on foreign investors who repatriate the profits to their home countries.
- Inadequate supply of skilled labour leading to overdependence on foreign labour.

(c) **Contributions of forestry industry to** Algeria, Ghana, Nigeria, Ethiopia, Gabon, DRC, Congo, Ivory Coast, (Cote D'Ivoire), Cameroon, Libya, Nigeria, Congo Brazzaville, Swaziland) (Use one Country);

- Water catchment areas of rivers like R. Congo (DRC), Ogooue(Gabon)
- Foreign exchange is obtained through timber exports.
- Provides employment opportunities to the lumber jacks.
- Source of energy/fuel wood for domestic and industrial use.
- Diversification of the energy sector reducing dependence on HEP.
- Source of food and medicine like roots, fruits and leaves.
- Promotes tourism /Recreation activities based on plant life.
- Urbanization/growth of towns like Nhlangano (Swaziland), Port Gentil (Gabon)
- Modification of climate through evapo-transpiration.
- Source of revenue to the government through taxes imposed on lumbering companies.
- International relations are created through giving licenses to lumbering foreign companies.
- Source of income to the people hence improved Standard of living.
- Industrialization of some areas like Mbabane (Swaziland), Libreville, Franceville (Gabon)

FORESTRY IN GABON

A sketch map of Gabon showing selected features;



Characteristics of equatorial/tropical rain forests;

- Already seen under vegetation.

(a) Factors which have favoured the development of forestry industry in Gabon/ factors favouring the exploitation of forests in Gabon;

- Presence of large hectares of the valuable natural forests with hard wood species like Okoume, mahogany, Ebony, Ozigo and Azobe.
- Hot temperatures and heavy rainfall allows growth of forests.
- Presence of vast land due to low population of Gabon allows tree growth.
- Strategic location of Gabon on the coast favour exploitation of forests for timer.
- Relatively flat landscape facilitates construction of transport routes like roads and railways.
- Highly fertile soils support growth of trees.
- Supportive government policy of licensing lumbering companies.
- Improved technology like the power driven saw, tractors to extract the timber.
- Supportive government policy of afforestation ensure continued tree cutting.
- Availability of developed transport network provided by numerous rivers, roads and railways to exploit and transport bulky logs to coastal ports.
- Availability cheap semi skilled labour provide by the local and skilled labour from Germany.

- Availability of ready market for the valuable light coloured Okoume timber.

Factors which have limited forestry exploitation in Gabon/Problems facing forest exploitation in Africa

- They are too thick which makes it difficult to exploit them through lumbering, tourism and medical research.
- Trees do not grow in pure stands. Valuable trees like Mahogany are widely scattered in forest making selection difficult.
- The logs are big, heavy and bulky for example Ebony, mahogany and Idigbo. This makes felling them very difficult.
- Tropical rainforest have buttress roots which hinder their extraction.
- Inefficient transport routes make it difficult to access and transport forest products.
- Limited demand for Gabon's hard wood products on the World market. This makes lumbering and forestry business non lucrative.
- Limited capital to invest in forestry.
- Over exploitation of some forest has led to depletion of valuable tree species.
- Limited skilled labour to exploit tropical rainforests and identifying trees of high commercial value.
- Presence of fierce wild animals e.g. Leopard, snakes, biting insects limits exploitation of tropical rainforests in Gabon.
- Competition from other countries that produce valuable soft wood such as Norway, Switzerland and Canada limits exploitation of Gabo's forests.
- Tropical hardwood species like Ebony take long to mature which affects lumbering companies.
- Thick undergrowth in tropical forests makes felling, selection and transportation of logs/trees difficult.
- The hilly terrain in the area limits felling and transportation of logs difficult.
- Occurrence of accidents during the process of lumbering and felling of trees leads to loss of lives and discourages lumbering.
- Environmentally conservative organizations tend to oppose lumbering thus limiting exploitation of forest in Gabon

(b) Importance/benefits of forestry industry to Gabon;

- Provides employment opportunities lumberjacks in Gabon from which they get salary thus improved standard of living.
- Has led to development of transport networks/infrastructure like roads, railways that is e.g. Libreville-Booue railway line, rivers thus allowing trade and commerce.
- Forestry exports have led to development of towns and ports e.g. Owendo, Port Gentil, Booue, hence promoting trade and commerce.
- A lot of foreign exchange is earned through timber exports to Japan, France thus facilitating infrastructural development.
- The sale of timber earns lumber jacks local income thus improving their standard of living.
- Has led to development of industries processing products like timber, pulp and paper, furniture at Lambarane.

- Source of government revenue through taxes imposed on lumbering companies in Gabon from Malaysia, France and China.
- Provides fuel wood like charcoal, firewood for domestic and industry.
- Tourism industry based on flora earns Gabon foreign exchange.
- Has promoted international relations through timber exports thus attracting foreign aid.
- Provides medicinal herbs that treat a number of diseases.
- Has led to modification of climate through rainfall formation, hence encouraging agriculture at Lambarane, Booue and others
- Forests control soil erosion thus allowing soil conservation.
- Source of timber for house construction hence providing shelter to people.
- Provides habitat for wildlife like Leopards for the future generation and research.
- Source of honey/fruits collection that supplements people's diet.
- Forestry industry is a source of food stuffs like mush rooms, yam and herbs like moringa, Aloevera thus curing diseases.

(c) Measures being taken to improve forestry industry in Gabon;

- Carrying out reafforestation to replenish the depleted valuable tree species.
- Planting of fast maturing tree species e.g. Eucalyptus/Afforestation.
- Extending of feeder roads and railways further inland to formerly inaccessible areas.
- Controlling forestry activities through legislation against over exploitation.
- Sensitizing of people/ Mass education on forestry/ Awareness campaign about the value of forests.
- Using of energy saving technology to protect trees.
- Carrying out research on new and fast growing tree species.
- Using of machines/modernization of technology to exploit trees.
- Giving financial support for forest farmers.
- Regular patrolling to control and reduce effects of fire outbreaks.
- Diversifying of the economy to reduce over exploitation of trees.
- Establishing of forest management and control centres.

Problems resulting from over exploitation of forest resources/ Effects of over exploitation of forests on the Coastal parts of Gabon;

- Has led to destruction of flora and Fauna hence decline in tourism.
- Has led to extinction of some wild animals due to destruction of their habitat hence affecting research.
- Neglect of agriculture hence food shortage as most labour concentrates on forestry activities.
- Has affected rainfall formation hence leading to aridity.
- Depletion of valuable species like Ebony, Okoume, Azigo, some of which affects medicinal research.
- Removal of forest vegetation has led to soil erosion thus affecting the soil structure.
- Has resulted to green house effect because due to much concentration of Carbondioxide.
- Has led reduced surface drainage in streams and rivers.

- Has led to reduced soil productivity.

FORESTRY IN DRC

Study the table below showing landuse in the DCR (Zaire) and answer the questions that follow;

Table 14

Landuse	**Land area ('000 hectares)**
Crop land	7,893
Permanent pasture	15,000
Forest and woodland	173,860
others	29,952

Source: World resources: A Guide to the Global environment. The Urban environment Oxford 1996 -1997 pg216.

(a) Draw a pie chart to show the different landuse types in Democratic Republic of Congo.

(b) State the landuse type which is;
(i) Most dominant, (ii) least dominant.

(c) Explain the contributions of the most dominant type of landuse stated in (b)(i) above to the development of Democratic Republic of Congo.

(d) Identify the factors which have influenced landuse in the democratic Republic of Congo.

Converting values to degrees;

Cropland $=\frac{7,893,000}{226,705,000}$ X 360^0 = 12.5^0 Forest and woodlands = $\frac{173,860,000}{226,705,000}$ X 360^0 = 276^0

Permanent pasture = $\frac{15,000}{226,705,000}$ X 360^0 = 24^0 others = $\frac{29,952,000}{226,705,000}$ X 360^0 = 47.5^0

A pie chart showing the different landuse types in DRC **(Use your graph book)**

Most dominant landuse is forest and woodland with 276^0

Least dominant type of landuse is cropland with 12.5^0

Contributions of forest and woodland to DRC (Zaire);

- *Refer to the contributions of forestry to Gabon*

Factors which have influenced landuse in DRC/Zaire;

- Hot and wet climate favours the growth of forest and woodlands.
- Remoteness/large areas are left under forests.
- Low population leads to large area under forest cover.
- Abundance of other resource like minerals, fishing and forests reduces attention on agriculture.
- Easy exhaustion of soils due to leaching restricts agriculture.
- Occurrence of pests and diseases affects people, animals and crops.
- Government policy has not favoured uniform regional development.
- Thick vegetation prevents/hinders transport or road construction.

FORESTRY IN SWAZILAND

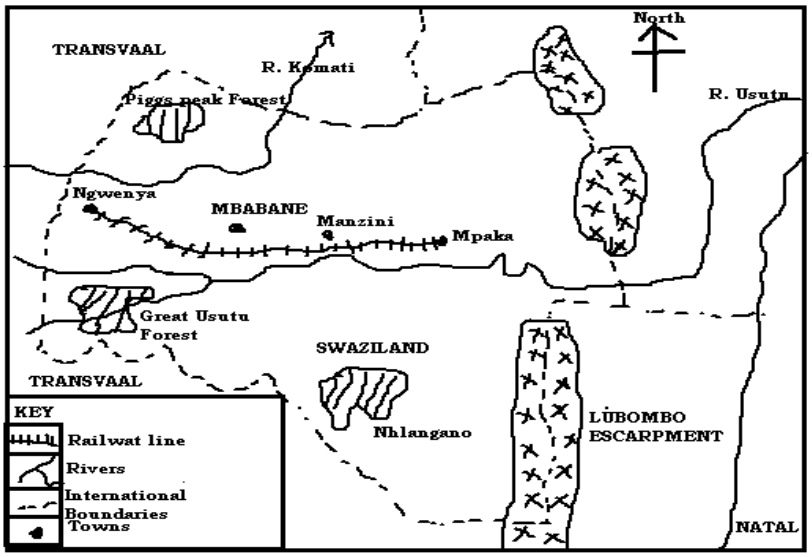
(a) Draw a sketch map of Swaziland and on it, mark and name:

(i) Forested areas; Piggs peak, Great Usutu and Nhlangano,

(ii) River Komati,

(iii) Towns; Mbabane and Manzini, (iv) Railway line from Ngwenya to Mpaka.

A sketch map of Swaziland showing forested areas, a river, selected towns and railways line;



(b) **Factors that have favoured the establishment of forests in Swaziland;**

- Existence of large tracts of land for planting of forests.
- Heavy rainfall received during summer and warm temperatures lead to fast growing of soft wood forests.
- High altitude found in areas of over 1000 metres above sea level experiencing temperate conditions for forest growth.
- Massive deforestation of 1940's in Swaziland exposed the areas to soil erosion prompting government to carry out re-afforestation programmes.
- Presence of quick maturing tree species like pine and Eucalyptus.
- Availability of large capital/funds provided by the government and the common wealth Development Corporation.
- Existence of cheap labour to carry out forestry activities like planting and extracting forests.
- Presence of wide market for the forest products like at Mbabane and Mpaka.
- Well developed/Efficient transport and communication system to distribute the forest products.
- Improved technology of exploiting forest reserves.
- Wide scientific/intensive research leading to fast maturing tree species.

(c) **The values/importance/Advantages of forests to Swaziland**;

- Controls soil erosion due to restoration of the forested areas.
- Wind breakers thus protecting farmlands and settlements.
- Raw materials for the saw milling industries, furniture making industries.

- Provides employment opportunities to the population e.g. forest rangers.
- Has led development of towns/urban centres like Nhlangano Bhunya, others.
- Has led to development of infrastructure like roads, railways to access the forested areas.
- It's a better form of land use in the rugged areas or terrain.
- Source of wood fuel for the population that is firewood, charcoal, others.
- Provides poles for building and construction industry, others.
- Promotes craft industry through making of drums, bows.
- Source of medicinal herbs as local treatment.
- Habitat for wild life/animals which promotes tourism industry hence foreign exchange.
- Source of government revenue through taxation of people involved in forest exploitation.
- Has led to international relationship between Swaziland and other countries that export timber products.
- Has led to climatic modification through evapo-transpiration for rainfall formation.
- Has encouraged research to improve tree varieties.
- Purification of air through transpiration process.
- Others refer to Gabon.

(d) **Problems faced by the forestry sector in Swaziland;**

- Swaziland is a landlocked country which adversely affects its efforts to export forestry products.
- Low levels of technology due to use of rudimentary tools.
- Rugged landscape makes wood transportation difficult.
- Soil erosion which usually occurs after extensive forest harvesting.
- Over dependence on foreign Companies for the felling of trees, processing of forestry products, leads to most of the profits to be repatriated.
- There is limited land for the expansion of the forest as the rest of the land is not ideal for the establishment of forest plantations.
- Fire outbreaks at certain periods e.g. during the dry season which destroys large tracts of plantation.
- Pest and diseases that attack the tree affecting the quality of the products.
- Forest exhaustion/Depletion caused by over exploitation.
- Competition for market with other soft wood producers.
- Competition for land with other activities like farming.
- Price fluctuation of timber products discourages lumberjacks.
- Competition for labour/Shortage of skilled labour limits tree planting and extraction.
- Limited capital discourages expansion of forest resources.

Study the table below showing forest products exported from Swaziland (1990-96) and answer the questions that follow;

Table 15

Year	Forest product exports (M^3)
1990	254,000
1991	254,000
1992	254,000
1993	241,000
1994	239,000
1995	299,000
1996	270,000

Adapted: African development indicators: (1990) The World Bank, Washington D.C pg89.

(a) Draw a line graph showing forest products exported by Swaziland. **(Use your graph book)**

(b) Describe the trend of forest products exported from Swaziland between 1990 and 1996.

Countries in Africa that export forest products;

- Gabon, - Ghana
- DRC, - Nigeria
- Liberia - Swaziland.

Problems faced by the forest products exporting countries in Africa;

- Stiff competition for market from other wood product exporters.
- Bulky nature of the forest products discourages transportation.
- Competition from other raw materials like plastics, metals.
- Long distance to market centres discourages lumber jacks.
- Inaccessibility to valuable hard wood trees in tropical belts and high altitude soft wood forests.
- Reduction in the valuable of tree species as they take long to mature.
- Inadequate capital limits the purchase of modern machines.
- Overdependence on forestry products leads to depletion of forest products.
- Over exploitation discourages sustainable forestry.
- High tariffs imposed on timber reduce profits.
- Pests and diseases reduce the quality of timber.

Study **table 16** below showing changes in forest cover for selected countries in Africa (1990 – 2010) and answer the question that follow;

Table 16

Changes in forest cover for selected Countries in Africa (1990 – 2010)

	Forested area as a percentage of total land area

Country	1990	2000	2010
Gabon	85.4	85.4	85.4
Dem. Rep. of Congo	70.7	69.4	68.0
Rep. of South Africa	6.8	5.7	4.7
Liberia	51.2	48.1	44.9
Senegal	48.6	46.2	44.0
Ghana	32.7	26.8	21.7

Adapted: Africa Development indicators (2012/13), The World Bank, Washington D.C pg57.

(a) Calculate the percentage change in forest cover for each country between 1990 and 2010.

(b) Draw a bar graph to represent the percentage area under forest cover for selected countries in 2010.

(c) (i) Identify the Country with the;
- Lowest, Highest, Percentage change in forest cover between 1990 and 2010.

(ii) Explain the factors which have led to a high rate of forest destruction in the area identified in (c) (i) above.

(a) **A bar graph showing the percentage area under forest cover for selected countries in Africa in 2010. (Use your graph book)**

(b)(ii) **Factors which have led to a high rate of forest destruction in Ghana**;
- Increased demand for timber leading to increased lumbering activities for building and construction.
- Need for wood fuel for domestic and industrial purpose.
- High demand for land for industrial development.
- Wild fires by farmers and hunters leading to mass destruction of forests.
- Mining activities especially where open cast mining and quarrying.
- Increased population leading to forest destruction for settlement.
- Advanced technology that is use of power driven saws in wood harvesting leading to extensive clearance of forests
- Urbanization and extension of ports into the areas gazzetted for forests.
- Weak enforcement of forest regulation and by-laws/Corruption of forest officials.
- Political instability leading to clearance of forests to remove rebel hideouts.
- Wild animals like elephants that browse around trees thus destroying them.
- Pests and diseases like Caterpillars and moths that destroy trees.
- Construction of transport routes encroach on forests.
- Increased demand for land for agriculture to increase food supply.

- Hunting and food gathering like fruits and berries.
- Collection of herbal medicine for treatment.
- Heavy rainfall leads to floods that destroy trees.
- Ignorance of citizens leads to cutting of trees for various proposes.

Effects of forests destruction in Africa/ Impact of forest destruction on the environment

- Has led to desertification and growth of secondary vegetation e.g. grasslands, bushes and scrubs.
- Has led to climate change that leads to reduction in rainfall and increase in temperature/drought.
- Has led to global warming due to increased level of green house gases.
- Reduction of the water table leading to shortage of surface water.
- Soil erosion due to increased exposure of soils to wind and running water.
- Reduction of raw materials for timber based industries.
- Degradation of land leading to loss of soil fertility hence low yields.
- Increased mass wasting/landslides/rock falls.
- Loss of scenic beauty/decline in tourism.
- Reduction in tourism due to destruction of flora and fauna.
- Loss of employment from the forestry related activities.

Outline the steps/measures being taken to conserve forests in Africa;

- Carrying out afforestation and reafforestation programmes e.g. along River Volta in Ghana, Extensive afforestation in Swaziland and Ghana.
- Strengthening environmental regulations against destruction of forests/security guards/Eviction of encroachers.
- Introducing of the other suitable uses of forests e.g. for bee keeping.
- Diversifying other sources of energy e.g. solar, gas to save the forests from destruction for fuel wood.
- Growing of quick maturing tree species e.g. Eucalyptus.
- Sensitization of the masses about the value of forests.
- Promoting of agro forestry on farmlands.
- Promoting of research to improve forestry.
- Spraying of pests and diseases with chemicals.
- Emphasizing International cooperation among African Countries on forest conservation.
- Using of alternative building and construction materials to save wood.

POPULATION OF AFRICA

POPULATION GROWTH

Study **table 17** below showing Africa's population growth between 1950 and 1990 and answer the questions that follow;

Table 17

Year	Number of people (in millions)
1950	199
1960	270
1970	344
1980	453
1990	616

Source: R. G White Africa: Studies for Africa Students.

Draw a line graph to show the trend of population growth between 1950 and 1990.

(Use your graph book)

(ii) **Factors which contributed to increase /rapid population growth of Africa;**

- Serous increase in hygiene which has reduced the death rates leading to increase in population.
- A high fertility rate where African women produce over 7 children each.
- A high birth rate where the number live births per 1000 children born is high.
- Birth control methods have not been embraced to the degree it has been in other Continents.
- Significant improvement in health services. This has reduced mortality, especially infant mortality. For example immunization against the six killer diseases.
- After 1980s, there has been significant reduction in civil wars. This reduced the deaths due to wars as was the case in the previous years.
- African positive attitude towards big families.
- Early marriages in Africa making women produce many children.

Advantages of a big population to a country;

- Encourages rapid growth and expansion of towns which act as accommodation and health centres.
- Leads to utilization of idle resources like minerals, forests because of need for raw materials to make consumer goods.
- Facilitates development of agriculture and industrial sector through providing market.
- Provide security to the country in form of police and the army.
- Provides cheap labour supply to the industrial and agricultural sectors.

(i) **Problems/ Disadvantages resulting from high population growth rates in (b) above**

- Puts a lot of pressure on land and other resources/Leads to land shortage which limits economic growth in the area.
- Strains the government in form of providing social services and necessities like roads and hospitals.
- Results into high level of unemployment resulting into low standard of living.
- Leads to land fragmentation and reduces agricultural productivity.

- High crime rates like pick pocketing, highway robbery due to unemployment.
- Fast Results into congestion/overcrowding and easy spread of pests and diseases like Aids and Tuberculosis.
- High dependency ratio affects savings, investment and people's standard of living.
- Leads to growth of towns and its associated evils like slum development and congestion.
- Leads to high cost of living especially in towns where accommodation and education services are very expensive.
- Leads to insecurity based on ethnicity between different tribes which results into loss of lives.
- Results into scarcity of food/famine leading to malnutrition.

(ii) **Steps being taken to control rapid population growth;**

- There is discouragement of polygamy and promotion of monogamy.
- There is encouragement of outward migration to reduce Africa's population.
- There is discouragement of early marriages by raising /increasing the marriage age to above 18 years.
- Education the people the dangers of having a big population.
- Limiting the number of migrants into Africa.
- There is encouragement of attaining high levels of education to reduce the production period.
- There is encouragement of family planning practices such as spacing children, use of contraceptives.

Study the table below showing total population for selected Countries in Africa and answer the questions that follow;

Africa: Total population for selected Countries. **Table 18**

Country	Total population ('000s)
Algeria	32,900
Dem. Rep. of Congo	57,500
Egypt	74,000
Zambia	11,700
Nigeria	131,500
Rep. of South Africa	46,900
Total	**354,500**

Adapted: Spreading and sustaining Growth in Africa. Africa Development Indicators, 2007. The World Bank, Washington D.C.p21.

(a) Draw a pie Chart to represent the information given in the table above. **(Use your graph book)**

(b) Identify the Country with the;

(i) Highest, (ii) lowest total population.

(c) Explain the conditions responsible for the high total population in the Country identified in (b) above.

(a) **Pie Chart calculations;**

- Algeria $= \frac{32,900,000}{354,500,000} \times 360^0 = 33.4^0 \approx 33^0$
- Egypt $= \frac{74,000,000}{354,500,000} \times 360^0 = 75.1^0 \approx 75^0$
- Zambia $= \frac{11,700,000}{354,500,000} \times 360^0 = 11.9^0 \approx 20^0$
- Nigeria $= \frac{131,500,000}{354,500,000} \times 360^0 = 133.5^0 \approx 134^0$
- Republic of South Africa $= \frac{46,900,000}{354,500,000} \times 360^0 = 47.6^0 = 48^0$
- DRC $= \frac{57,500,000}{354,500,000} \times 360^0 = 58.4^0 = 58^0$

A pie Chart showing population for selected African Countries.**(Use your graph book)**

(b)(i) Country with the highest population is Nigeria.

(ii) Country with the lowest population is Zambia.

(c) **Factors/Conditions for high population in Nigeria/causes of rapid population growth in Nigeria;**

- Availability of plenty food to feed the population.
- Existence of oil in the Delta region which supplements the Country's natural resources.
- Fertile soils in the Southern Nigeria that attracts settlement.
- Reliable rainfall that supports agriculture for production of food.
- Low mortality rates due to improved medical services.
- High life expectancy due to improved socio-economic conditions.
- Polygamy among Muslim communities in Northern Nigeria.
- Christian faith that doesn't allow family planning.
- African culture that allows polygamy.
- Early marriages that leads to production of many children because the couple has many years within the reproduction cycle.
- Migration into Nigeria because of political problems in the surrounding Countries.
- Low levels of education causing ignorance on family planning.
- High fertility among Africans making women produce many children/high birth rates.

(d) **Problems faced by Countries with a large population/rapid population growth;**

- Increased level of unemployment.
- Food shortage which leads to famine.
- Too much pressure on land and other available resources.
- Land degradation, fragmentation and conflicts over resource utilization.
- Encroachment on marginal lands to resettle the additional population.
- Strains the available socio-economic infrastructure like Schools, Hospitals.
- Poor sanitation which may culminate in rapid disease spread.
- Reduction in the standard of living and welfare.

- Poor accommodation leading to evolution/emergence of slums.
- Urban related problems like street children, unemployment, drug abuse, gambling, prostitution.
- High government expenditure on socio-economic infrastructure.

Study the **table 19** below showing population growth in Nigeria (1994 – 2001) and answer the questions that follow;

Table 19

Year	Population (' 000' people
1994	108,010
1995	111,270
1996	114,500
1997	117,680
1998	120,820
1999	123,900
2000	126,910
2001	129,870

Adapted: 2003 African development Indicators, The World Bank pg6.

(a) Draw a line graph to show the information contained in the table.
(Use your graph book)

(b) Describe the trend of the population growth in Nigeria between 1994 and 2001.

(c) Explain the conditions which have led to the trend of population growth described in (b) above.

Line graph

(a) Trend;

- Nigeria's population has been steadily increasing between 1994 – 2001.
- The rate has been uniform (straight line)

(b) Conditions leading to the population trend (increase);

- Improvement in medical care/primary health care which reduces death rates.
- Increase in food supply due to modernization of agriculture,
- Increase in fertility rates.
- Increase in immigration levels.
- Rise in polygamy.
- More influence of religion like Island and Christianity.
- Decline in use of family planning methods.
- Improvement in Sanitation.
- Rise in cases of early marriages.
- Improvement in employment and incomes.

Study Table **20** showing the population size for selected African Countries (1990-2015 projected) and answer the questions that follow;

Population Size for Selected African Countries. **Table 20:**

Country	Population in ('000's)		
	1990	2006	2015 (Projected)

Zambia	8,100	11,700	13,800
Sudan	25,900	37,700	45,600
Nigeria	94,500	144,700	175,600
Algeria	25,300	33,400	38,000
Côte d'Ivoire	12,800	18,900	22,300

Adapted: 2008 World Development Indicators. The World Bank, Washington D.C pp 40-42.

(a) (i) Calculate the percentage population change between 1990 and 2006 for the countries shown in the table.

(ii) Identify the country with the;

- Highest, - Lowest, Percentage population change.

(b) Draw a line graph to show the population trend for the country with the highest percentage population change identified in (a)(ii) above.

(c) Describe the factors which have led to rapid population increase in Africa.

(d) Explain the effects of rapid population increase on the environment in Africa

(a) Percentage population Change = $\frac{\text{New population} - \text{Old population}}{\text{Old population}} \times 100$

Zambia $= \frac{11{,}700 - 8{,}100}{8{,}100} \times 100 = 44.4\%$

Sudan $= \frac{37{,}700 - 25{,}900}{25{,}900} \times 100 = 45.6\%$

Nigeria $= \frac{144{,}700 - 94{,}500}{94{,}500} \times 100 = 53.1\%$

Algeria $= \frac{33{,}400 - 25{,}300}{25{,}300} \times 100 = 32.0\%$

Cote d'ivoire $= \frac{18{,}900 - 12{,}800}{12{,}300} \times 100 = 47.7\%$

(ii) - Country with highest population change is Nigeria with 53.1%

-Country with the lowest population change is Algeria with 32.0%.

(b) **A Line graph showing population trend in Nigeria: (Use your graph book)**

(c) Factors which have led to rapid population increase in Africa;

- High birth rates in a number of countries hence more births.
- Reduced death rates due to improvement in medical services.
- High rates of fertility among Women and men.
- Early marriages among the youths and Moslems.
- Polygamous marriages leading to more children per man.
- Some religious beliefs which do not favour family planning control methods.
- Traditional/cultural beliefs where children are seen as sources of labour and wealth.
- Increased incomes that improved the living standards of the people.
- Illiteracy among people/low levels of education.

- Limited use of family planning methods.
- Immigrations of people e.g. from Asia, Europe, Europe and America.
- Improved medical facilities leading to high life expectancy.

Effects of rapid population increase on the environment in Africa;

Negative effects;

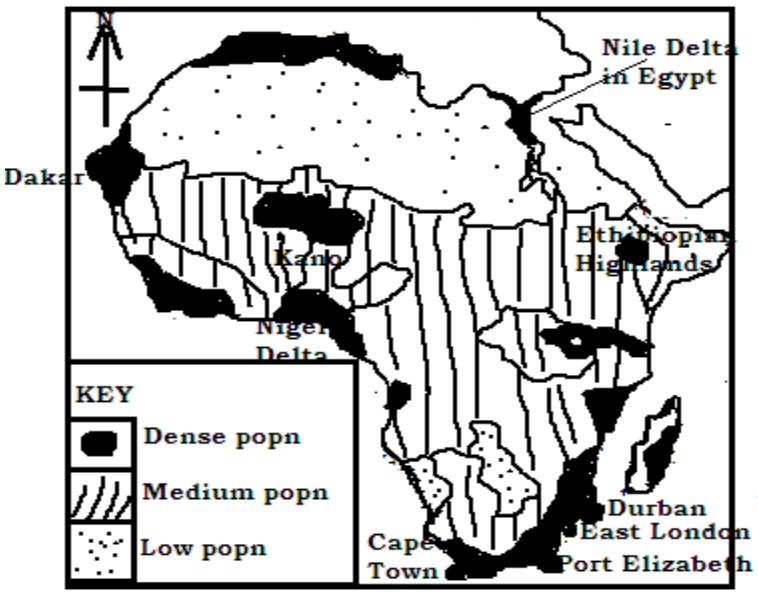
- Shortage of land for settlement and crop cultivation leading to land fragmentation.
- Land degradation/exhaustion due to over cultivation.
- Deforestation leading to reduced rainfall and soil erosion.
- Encroachment on marginal lands such as games parks/reserves hence decline in tourism.
- Shortage of food leading to reduced food security/famine.
- Poverty due to low savings and low investment.
- Increased pressure on social services like roads, school, hospital, others.
- Inadequate accommodation/housing leading to development of slums.
- Rapid spread of epidemics diseases like cholera and typhoid.
- Pollution due to poor disposal of wastes.
- High cost of living due to increased demand for goods and services.
- High rates such as robbery, prostitution.
- Poor sanitation due to overcrowding/congestion.
- Unemployment due to large population size leading to high crime rates.

Positive effects;

- Provides wide market for goods and services.
- Provides a wide tax base for the government revenue.
- Full utilization of natural resources like land.
- Encourages innovations for incased production.
- Encourages development of infrastructures like roads, hospitals, schools, recreational services.

POPULATION DISTRIBUTION IN AFRICA

A sketch map of Africa showing population distribution.



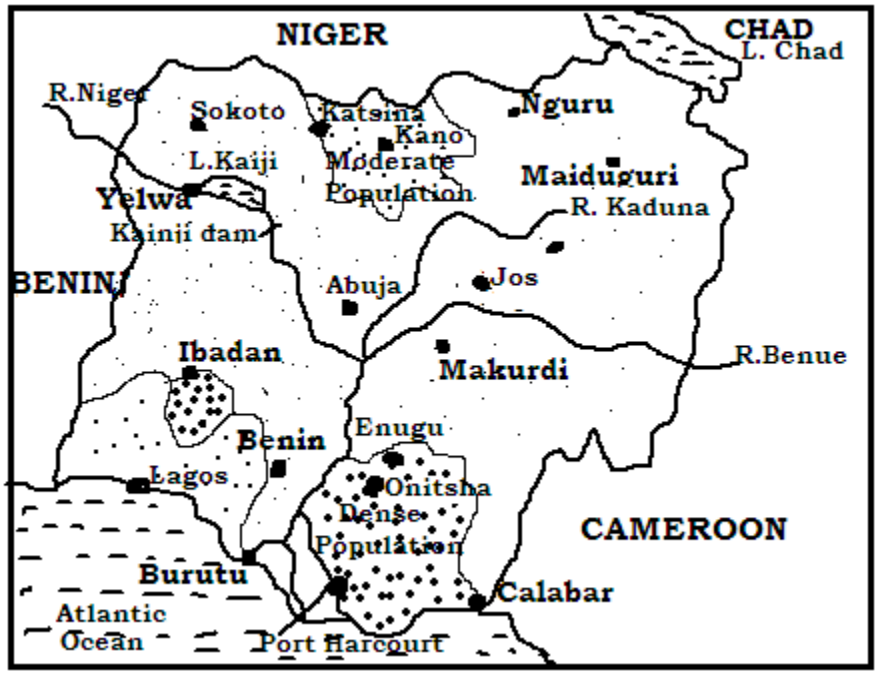
Factors/conditions that influence population distribution in Africa;

- Nature of climate, hot temperatures and limited rainfall limit agriculture and settlement hence sparse population while the relatively wet areas with heavy rainfall encourage agriculture hence attracting dense population for food.
- Soil fertility, fertile soils attract dense population for agriculture while infertile soils discourage agriculture leading to sparse population.
- Distribution of water resources, abundant water supply from rivers for domestic, industrial and agricultural use attracts a dense population while Absence of surface water limits agriculture hence sparse population.
- Distribution of minerals, Variety of mineral resource in an area attracts a dense population for employment while absence of minerals has led to sparse population.
- Influence of relief, Steep areas and those with depressions have discouraged population while gentle slopes have attracted dense population for settlement and agriculture.
- Influence of transport routes/accessibility, Modern roads and railways encourage trade and commerce hence dense population, while inaccessibility has led limits trade and commerce leading to sparse population.
- Influence of ancient kingdoms, ancient kingdom that were affected by slave trade were depopulated hence a sparse population. Areas that were protected from slave trade attracted a dense population hence dense settlement
- Influence of urbanization, Urban centres with better schools, accommodation, transport attracted dense population for such services while rural areas without such services have led to sparse population.
- Government policy of directing economic developments, positive government policy has attracted dense population in such areas while negative government policy has led to sparse population in such areas.

- Influence of biotic factors/pests and diseases. Areas infested with locusts, tsetse flies have discouraged agriculture and settlement hence sparse population while which are free from such pests and disease vectors have attracted dense population.

POPULATION DISTRIBUTION IN NIGERIA

Sketch map of Nigeria showing population distribution



Conditions/factors which influence population distribution in Nigeria;

Physical factors

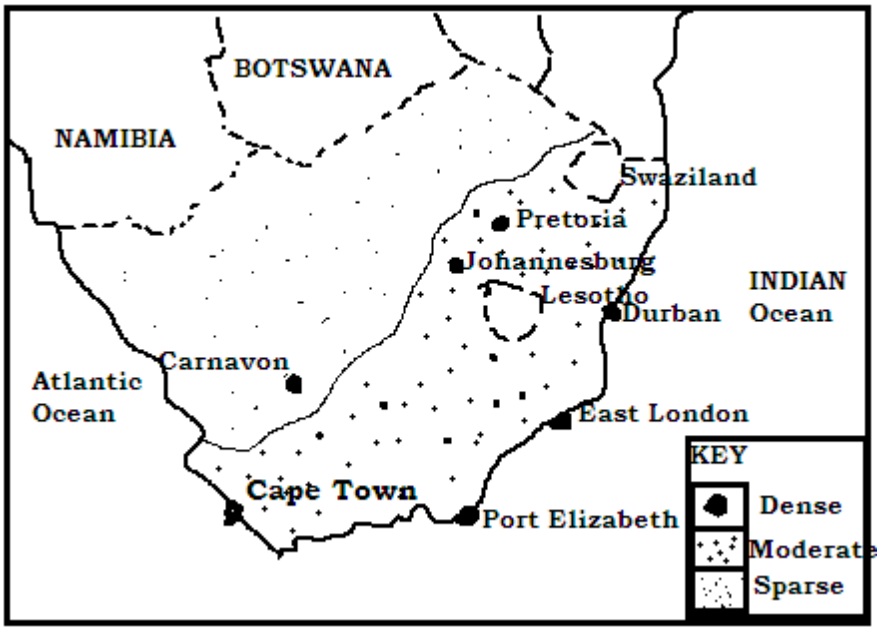
- Nature of climate; areas with heavy rainfall and hot temperatures like Kano and Kaduna have attracted dense population. Areas with low unreliable rainfall and very hot temperatures have discouraged settlement.
- Nature of soils; Deep fertile soils in Kaduna Port Harcourt have attracted dense population for crop to grow crops. Thin infertile soils have discouraged crop growing hence sparse population.
- Nature of relief; Gentle landscape like at Kano and Katsina have attracted dense population while the Jos plateau in the central part is unfit for settlement and agriculture.
- Nature of vegetation cover; the rainforests in central part of Nigeria limits settlement and hence sparse population.
- Distribution of mineral resources; mining of Oil at the Niger delta has attracted dense population for employment.
- Distribution of water resources; Abundant water supply from river R Niger and the Niger delta for domestic and industrial use has attracted dense population.

Human factors;

- The influence of ancient kingdoms; The Hausa Muslims in the north and the Yoruba in the east attracted dense settlement because they were politically stable.

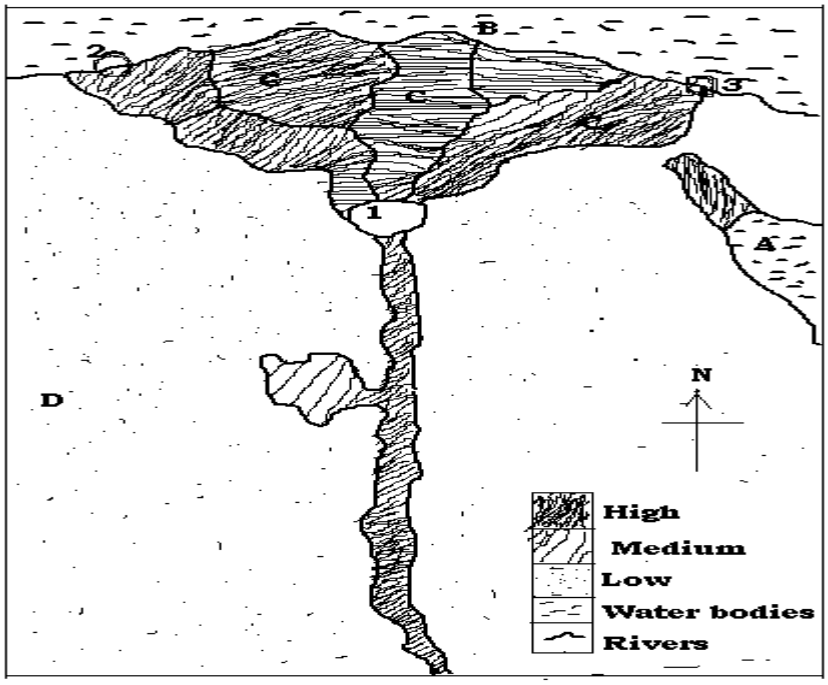
- Influence of urbanization; Towns line Abuja and Port Harcourt have attracted dense settlement for education and employment opportunities.
- Distribution of transport routes; Accessible areas with roads like Katsina, Sokoto, have attracted dense population because easy mobility and trade and commerce.

Sketch map of South Africa showing population distribution



POPULATION DISTRIBUTION IN EGYPT

Study the figure below showing part of Egypt and answer the questions that follow;



(a) Name the;
   (i) Water bodies marked A and B, (iii) High population density area marked C,
   (ii) Towns marked 1, 2 and 3, (iv) Low population density area marked
(b) Describe the conditions which have led to low population density in the area marked.
(c) Explain the problems faced by people living in the sparsely populated areas in Egypt.
(d) Suggest measures that should be taken to overcome the problems faced in (c) above.

(a) (i) Water bodies; **A** is Gulf of Suez/Red Sea, **B** is Mediterranean Sea
(ii) Towns; **1** is Cairo, **2** is Alexandria, **3** is Port Said.
(iii) High population density area **C** is the Nile delta.

LOW POPULATION DENSITY

POPULATION DENSITY: This means the number of people per square kilometer of an area. It is obtained from Total population divided by total land area

(b) **Conditions which have led to low population density in area marked D (Western Desert); (causes of a low population density)**

- Very dry condition of less than 250mmp.a which is highly unreliable discourages settlement.
- Presence of infertile/thin/unproductive soils leading to low agricultural production and are easily eroded by wind.
- Scarcity/shortage/limited surface water in the desert landscape discourages human activities leading to low population density.
- Low soil water content since the soils are sandy and porous/low water retention capacity/poorly drained soils.
- Strong winds causing desert storms that destroy property and infrastructure.
- Remoteness/Inaccessibility in the area with underdeveloped transport and communication routes discourage settlement.
- High rates of evaporation due to extreme hot temperatures of between 35^0C -40^0C.
- Limited economic activities since there are no valuable minerals especially in the west of Egypt.
- Presence of numerous sand dunes limits settlement and disrupts transport and communication lines.

(c) Problems faced by people living in the sparsely populated areas in Egypt;

- High cost of establishing infrastructure such as roads, schools, hospitals.
- Low food production leading to famine, death, malnutrition.
- Inaccessibility of most areas leading to slow movement of goods and people.
- Diseases like eyes infections, flue, cough, leading to suffering/death.
- Pests like locusts which destroy vegetation and crops.

- Strong desert storms leading to destruction of infrastructure/property/lives.
- Labour shortage leading to underdevelopment in various economic activities like mining.
- Shortage of water leading to death of people and animal.
- Low tax base due to low population density in the area.
- Inaccessibility leading to loss of lives and displacement of people of many people.
- Shortage of pasture leading to death of animals
- Under utilization of available resources due to low population density leading to low tax base.

(d) **Measure/steps that should be taken to overcome the problems faced in the sparsely populated/low population density**; (Mind the tense)

- Provision of water from the underground sources/extension of canals from River Nile to drier areas.
- Sinking of bore holes to provide water for domestic use.
- Application of organic manure in the desert should be done to improve on the soil fertility.
- Use of irrigation farming to supplement on the limited rainfall.
- Setting up development projects like settlement projects and industries to encourage immigration.
- Diversification of economic activities to create more employment opportunities and widen the tax base.
- Afforestation/planting trees to improve on vegetation cover to modify the climate/ Planting of trees in steep areas to avoid landslides thus attracting settlement
- Growing of drought resistant crops and pastures to increase food supply.
- Importation of food from others countries to supplement on what can be produced.
- Aerial spraying of pests to reduce on pests.
- Importation of labour from other countries to work in different economic activities.
- Rearing of animals that are adapted to desert conditions e.g. camels used for transport and meat.
- Mineral exploration and exploitation to provide employment.
- Development of rural areas by providing water, power and other essential services to attract settlement.
- Opening up remote areas by constructing roads, railways and airports to increase accessibility.
- Spraying with chemicals/setting up health centres to solve problem of pests and diseases.
- Reclaiming/draining areas to make them usable.
- Provision of fertilizers/manure to improve soil fertility.

Study **table 21** below showing the population of selected African Countries (2012) and answer the questions that follow;

Table 21: Population of selected African Countries (2012)

Country	Total population In Millions	Total land Area (1000 Km^2)
Angola	20.8	1,246.7
Cameroon	21.7	475.4
Gabon	1.6	267.7
Zambia	14.1	752.6
Liberia	4.2	111.4

Adapted: 2014 World Development Indicators: The World Bank Washington D.C pp12- 16.

Draw a bar graph to represent the population of the Countries shown in the table above. Calculate the population density for each of the selected African Countries.

(i) Identify the Country with the;

- Lowest, - Highest, population density in the table above.

(ii) Explain the conditions which have led to a low population density in the Country identified in (c)(i) above.

Suggest steps that should be taken to solve the problems of low population density in the Country identified in (c)(i) above.

() **A bar graph showing population of selected African States (2012)**
(Use your graph book)

Population density for selected African countries:

Angola $= \frac{20,800,000}{1,246,700} = 16.68 \approx 16.7$ people/Km^2

Cameroon $= \frac{21,700,000}{475,400} = 45.6$ people/Km^2

Gabon $= \frac{1,600,000}{267,700} = 5.97 \approx 5.98$ people/Km^2

Zambia $= \frac{14,100,000}{752,600} = 18.73$ people/Km^2

Liberia $= \frac{4,200,000}{111,400} = 37.7$ people/Km^2

(c)(i) The country with the;

- Lowest population density is Gabon with 5.97 people/Km^2
- Highest population density in Cameroon with 45.6 people/Km^2.

(ii) **Conditions for the low population density in Gabon**;

- Infertile soils leading to low agriculture which would attract settlement in the area.
- Some areas are too wet and hot and this discourages human settlement.
- High incidence of pests and diseases which discourages people from inhabiting certain areas.
- Limited economic activities in some areas such as agriculture, mining and industry limiting employment opportunities.
- Remoteness of some areas which makes them inaccessible by roads and railways limits settlement.

- Steep relief/southern highlands and in the East discourage settlement and farming.
- Government policy of gazetting areas as national parks and forest reserves limits settlement.
- Poor drainage in some parts of the country limits settlement.
- Dense/thick vegetation/forest discourages settlement.
- Dangerous wild animals scare away people in some areas.
- Political instability discourages settlement in some areas.

(d) **Problems facing people living in area of low population density;**

- Use those given for Egypt.

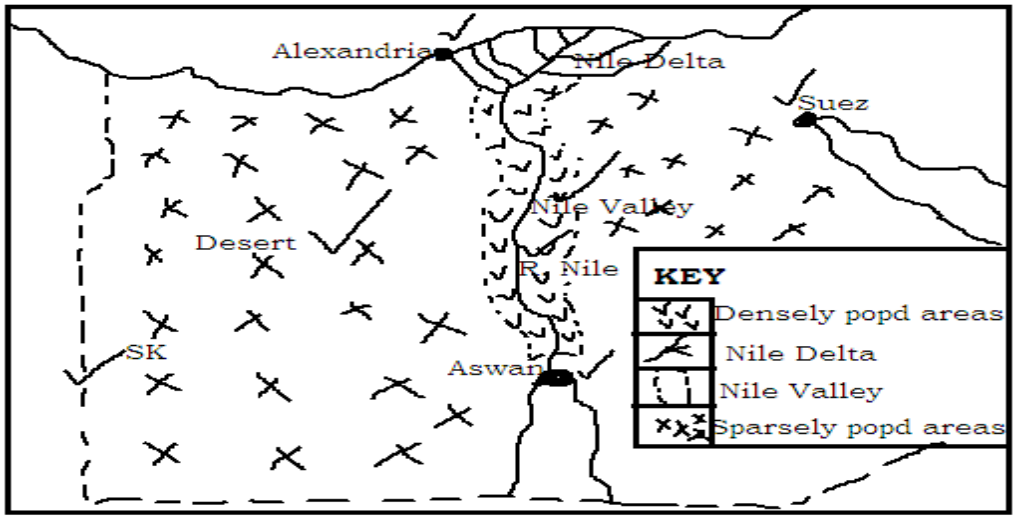
(a) Draw a sketch map of Egypt and on it, mark and name;

(i) River Nile, (iv) Areas with a population density of less than 3 people per km^2.

(ii) Towns; Aswan, Suez and Alexandria,

(iii) Areas with a population density of over 1,000 people per km^2,

(a) **A sketch map of Egypt showing selected features.**



Factors (Causes) which have led to a high population density in the area marked in (a)(iii) above;

- Perennial/constant/permanent source of water from river Nile for irrigation and navigation.
- Availability of rich/fertile alluvial soils brought about by River Nile during time of floods has attracted farmers.
- Gently sloping land/relief which allows basin irrigation and construction of canals.
- Extensive land for agriculture under perennial irrigation leading to increased food production thus attracting a dense population.
- Many/numerous industries along the Nile valley and Nile delta to process agro- based industries attract a large population for employment.
- Presence of social amenities like piped water at Cairo, Port Said and Alexandria. /Towns have several social services like trade, accommodation, health care thus attracting a high population density.

- Variety of transport and communication systems by water, road and railway.
- Presence of a variety of minerals like iron ore, Salt, Phosphates, manganese has attracted many people.
- Political stability which has attracted many people in the area.
- Extensive/prosperous fishing grounds attract many people for fish proteins.
- Early settlement along the Nile and delta/Early civilization by the Cushites and Greeks leading to high population.

Challenges/problems faced by people living in densely populated areas in Egypt;

- Overcrowding /congestion of people leading to easy spread of diseases.
- Strains on the social amenities like schools leading to constant break down.
- Poor sanitation leading easy spread of diseases.
- Over exploitation of natural resources hence their depletion.
- High dependence burden that discourages saving.
- Shortage of food leading to high expenditure on imported food.
- Land shortage for agriculture and settlement hence low food production.
- Unemployment leading to low standard of living and crimes.
- Pollution of the environment like air, water and land hence poor health, easy spread of diseases.
- Has resulted to land wrangles resulting to fights and loss of lives.
- Development of slums leading to loss of lives and property.
- Destruction of vegetation leading loss of bio-diversity.
- Underdeveloped infrastructure due to slum development.
- Flooding of low lands leading to loss of lives and property.

Steps being taken to address the challenges above;

- Building sky scrappers to effectively utilize the available land.
- Encouraging outward migration/resettlement to less populated areas.
- Practising modern agriculture methods to maintain soil fertility/crop rotation.
- Importing food to supplement on domestic food production.
- Diversifying the economy by promoting tourism, industrialization, mineral extraction.
- Encouraging use of population control measures /use of family planning methods.
- Mass awareness and education programmes on the dangers of high population.
- Promoting tree planting along the Nile delta and valley.
- Employing security personnels/strengthening security.
- Electrifying rural areas to attract settlement.
- Carrying out irrigation farming to increase agricultural production.
- Expanding/Extending social services like hospitals to rural areas.
- Constant dredging of embankments to control flooding.

AGRICULTURE IN AFRICA

ARABLE FARMING IN AFRICA

SHIFTING CULTIVATION

(a) (i) characteristics of shifting cultivation;

- The forests are cleared by fire and use of rudimentary tools like hoes.
- Different types of crops are grown on the same piece of land.
- Little attention is given to the crops until when they sprout.
- The produce is strictly for home consumption.
- Family labour is used.
- The cultivated crops are usually small.
- The cultivated plots are usually scattered.
- The sites are usually selected in virgin forests by experienced elders.
- When the crop yields decline the site is abandoned and a fresh clearing is made in another area.

(ii) **Areas in Africa where shifting cultivation is practiced;**

- Chipising district in Eastern Zimbabwe,
- Central African Republic,
- Benue Valley of Nigeria.

(b) (i) Advantages of shifting cultivation; (**Reasons for practicing shifting cultivation is practiced)**

- The constant movements reduce the risks of diseases.
- It requires less labour to produce a given amount of food.
- Bush burning adds ash to the soil which improves its fertility.
- The scheduling of work allows time for other activities like hunting and fishing.
- Constant movements ensure fresh and fertile sites.
- Bush burning is an effective way of eradicating weeds and pest like moths, caterpillars and rats.
- Soil erosion is minimized because small plots of land are exposed.

(c) Disadvantages of shifting cultivation;

- Low crop yields are obtained,
- It discourages growth of crops (cash crops) for monetary purpose.
- It hinders development of infrastructure because people are ever moving.
- Bushing kills the organic matter and bacteria which hinders soil forming processes.
- A lot of time is wasted in land.
- There much destruction of natural forests.
- It can be practiced in areas of low population.

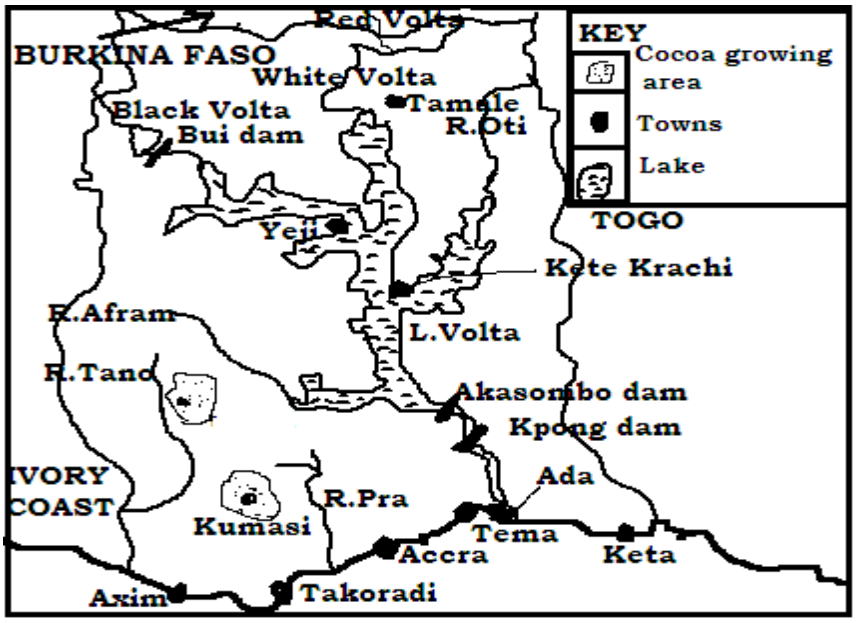
(d) (i) **Other traditional farming systems in Africa;**

- Rotational bush fallowing, Nomadic Pastoralism, Hunting and gathering.

(ii) **Steps being taken to improve traditional farming systems in Africa;**

- Nomadic Pastoralism is being discouraged in favour of ranching like in Botswana, Natal.
- Herders are being educated and encouraged to reduce on the herds to avoid low quality yields.
- Extension services through veterinary doctors are being extended to farmers to educate the framers.
- Demonstration farms are being established in Botswana so that farmers can copy better farming practices.
- Better agricultural equipments are being availed to farmers like tractors, Combine harvesters.
- Fertilizers are being applied to improve soil fertility.
- Loans and other financial assistance is being given to framers so that they can invest more in modern agriculture.

COCOA GROWING IN GHANA:



Study **Table 23** below showing Cocoa production in Ghana (1997 – 2003) and answer the questions that follow;

Year	Metric production
1997	288,000
1998	333,000
1999	319,000
2000	405,000
2001	362,000
2002	358,000
2013	392,000

Adapted' African Development indicators; The World bank, Washington, DC pg 92.

(a) Draw a line graph to represent the information above.

(b) Describe the;

(i) Trend of Cocoa exports in Ghana between 1997 and 2003.

(ii) Conditions which have influenced the trend in Cocoa exports shown in the table above.

(a) A bar graph showing Cocoa production and exports in Ghana (1999 – 2003)

(Use your graph book)

(b) Trend

(ii) **Conditions for the trend;**

Increasing trend;

- Improvement in soil fertility through use of manure and fertilizers.
- Increase market prices boosted production.
- Increase in capital invested in Cocoa production.
- Increase in use of modern methods like pests and disease control.
- Increase in government support through lowering taxes on farm implements.
- Improvement in transport network facilitates marketing of the produce.
- Improvement in the skills of labour through weed control.
- Improvement in technology in form of cocoa processing.

Decreasing trend;

- Increase in pests and diseases that reduce production levels.
- Fall in the local and international price/market for Cocoa discourages farmers.
- Rise in market quotas/tariffs that discourage production.
- Decline in labour supply due to stiff competition from other crops.
- Decline in government support by opting for other crops.
- Increase in post harvest losses.
- Decline in soil fertility due to monoculture.
- Increase weather vagaries like drought, hailstorms that destroy crops.
- Decline in government facilities.

(c) Other agricultural exports from Ghana;

- Coffee, - Ground nuts, - Maize, - Bananas, - Rubber,
- Oil palm, - Cassava, - Sugar - Tobacco, - Millet, - Yams

(d) Contributions of cocoa growing to the development of Ghana;

- Provides employment to Cocoa farmers from which they get wages/salaries.
- Has led to development of infrastructure like roads, water ways extending to plantation trees.
- Provides raw materials to the industrial sector.
- Has led to diversification of the economy thus reducing over reliance on forestry.
- Has led to development of agricultural town like Tamale and Kumasi with better accommodation.
- The sale of Cocoa has generated income to farmers hence improved standard of living.
- Cocoa farmers provide market for the industrial products like fertilizers.

- Cocoa exports to Britain earn Ghana foreign exchange.
- Cocoa is an important beverage/food consumed locally and exported.

PLANTATION FARMING IN AFRICA

(a) **Plantation agriculture** is the growing of a single cash crop on a very large scale.

(b) Countries in Africa where Plantation agriculture is practiced;
- Nigeria, DRC, Sierra Leone, Liberia Malawi.

Characteristics of plantation farming include;
- One crop is grown that is monoculture.
- Crop is grown mainly for commercial purpose.
- Large acreage of the crop that is large expanse of land.
- Mechanization of the production process like use of tractors, weeds.
- Mostly foreign owned.
- Scientific methods of production like use of fertilizers, herbicides, insecticides.
- Large capital is used on the farm.
- Perennial crops are grown.
- Labour intensive operations especially at harvesting time.
- Have on-site processing of the products because they are bulky.
- Large output/high yields.

(c) (i) **Crops grown on plantation agriculture;**
- Nigeria has oil palm and rubber.
- Sierra Leone has coffee and oil palm.
- Malawi has Tea, Tobacco and Sugar canes.
- Liberia has Rubber.

(ii) **Conditions favouring plantation agriculture in Nigeria;**
- Heavy rainfall of over 1500mm pa received throughout the year allows growth of perennial crops.
- Fertile soils allow luxuriant growth of crops.
- Undulating landscape that favours mechanization.
- Hot temperatures that favour growth and ripening of crops.
- Developed transport systems that favours marketing of produce.
- Sparse population that favours plantation to be set up/Vast land where plantation are set up.
- Availability of large sums of capital for buying machines and land.

(d) (i) **Advantages of plantation agriculture in Nigeria.**
- Provide raw materials to agro-based industries like tyre and cosmetics factories.
- Provide employment opportunities to planters, harvesters, engineers who work on the farm.
- Have led to establishment of out grower schemes through which s\small scale farmers get opportunities to sell their produce to the plantation.
- Have promoted research thus better crop varieties.
- Source of revenue to the government through taxes.
- Earns Nigeria foreign exchange through exports.

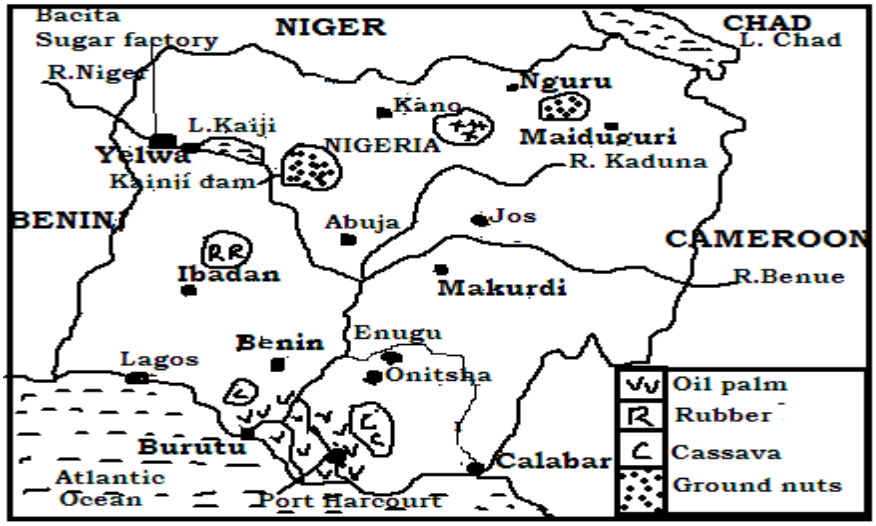
- Has promoted international relations through agricultural exports thus attracting financial assistance.
- Has led to infrastructural development like school and hospitals.

(ii) **Disadvantages of plantation agriculture in Nigeria.**

- Encourages monoculture that leads to soil exhaustion.
- Many plantation crops take long to mature for example Palm oil.
- Planting of a single crop makes the country suffer from price fluctuations.
- Weather vagaries like hail storm leads to great losses.
- Has led to displacement of works in bid to acquire large chunks of lands.
- Pests and diseases easily affect the plantations/ Easy spread of disease due to monoculture.
- Has led to decline in food production since many people are employed on the estates which are not food producing.
- Heavy capital is required for investment in the large scale venture.
- High cost of maintenance of infrastructure.
- Pollution of air, water and land due to establishment of industries.
- Fire outbreak usually destroys large areas of the plantation.
- Profit repatriation by the foreign sugar cane growing companies.

PALM OIL GROWING IN NIGERIA:

A sketch map of Nigeria showing selected Palm oil growing areas, Ports, rivers and Lake Kanji.



Study the **Table 22** below showing the volume of palm oil output in Nigeria (1997-2002) and answer the questions that follow;

Year	Output (metric tons)
1997	810,000
1998	845,000
1999	896,000

2000	899,000
2001	903,000
2002	903,000

Adapted from: 2003 African development indicators, The world Bank, p224

(c) Calculate the percentage change in palm oil production in Nigeria between 1997 and 2002.

(d) (i) Draw a line graph to represent the information given in the table above.
(ii)Describe the trend in the palm oil production in Nigeria between 1997 and 2002.

(a) Percentage change in palm oil output = $\frac{903,000-810,000}{810,000}$ X 100 = 10.5%

(b) (i) A line graph showing the volume of palm oil output in Nigeria (1997 – 2002)

(Use your graph book)

(ii) **Trend in the palm oil production in Nigeria between 1997 and 2002**.

- There was a general increase in palm oil production between 1997 and 2002.
- There was a sharp increase in palm oil production between 1997 and 1999.
- There was a slight increase in palm oil production between 1999 and 2002.
- Between 2001 and 2002, the output was uniform.

Conditions which have favoured the growing of palm oil in Nigeria;

Physical factors;

- Presence of well drained fertile soils allows proper growth of palm oil.
- Hot temperatures of above 21^0C allow ripening of palm oil.
- Heavy rainfall of over 1500mmpa received through the year allows proper growth of palm oil.
- Fertile alluvial soils in the Port Harcourt area deposited by river Niger encourage luxuriant growth of palm oil.
- Large expanse of land that enables extensive growing of oil palm.
- Gently/undulating landscape that favours mechanization for an increased output.
- Low incidence of pests and diseases that would affect oil palm plantations. This encourages production.
- Low altitude not exceeding 1800m a.s.l favours growth of oil palm trees.

Human factors;

- Availability of cheap skilled labour to plant and harvest oil palm provided by Nigeria's population of over 131 million people.
- The wide market for the oil provided by both large market of over 131 million people and foreign market in UK, Libya, USA.
- Supportive government policy e.g. provision land to potential oil palm plantation investors.
- Efficient transport network based on roads, railways links oil palm plantations to market centres of Lagos, Ibadan, Calabar and Port Harcourt.

- Intensive research has developed new stains/varieties of oil palm trees and high yielding and quick maturing oil palm trees.
- Availability of large capital to buy machinery, land and pay labour.

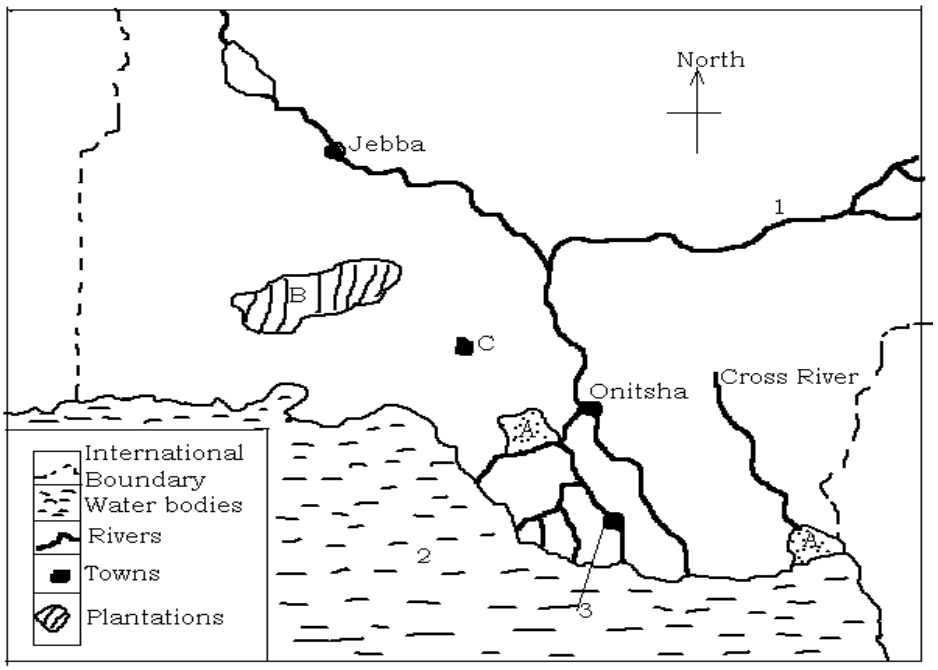
(c) **Challenges/problems facing the oil palm growers in Nigeria;**

- Pests destroy palm oil trees.
- Diseases like Freckle, blast and anthracnose which destroy the palm oil trees.
- Competition for market from other palm oil growing nations like DRC, Ivory Coast and Gabon
- Political instability that disrupts farming activities.
- Price fluctuations discourage farmers.
- Soil exhaustion due to monoculture leads to low output.
- Inefficient transport network limits marketing of oil palm products.
- High cost of farm inputs e.g. fertilizers limits production.
- Poor storage facilities lead to losses.
- Growth of deep rooted weeds like slam which competes for nutrients with palm oil
- Occasional drought leads to low harvests.

(d) **Measures/steps being taken to increase oil palm production in Nigeria;**

- Spraying with pesticides to control pests and diseases.
- Planting of leguminous crops like beans to improve soil fertility.
- Application of fertilizers to improve soil fertility.
- Developing of disease resistant varieties to reduce losses.
- Educating of farmers better farming practices such as mulching to increase output.
- Developing of agro-based industries to reduce wastage.
- Recruiting of seasonal workers e.g. student during the harvesting period to solve the problem of labour shortage during harvesting season.
- Restoring of political stability through holding democratic politics.
- Forming of farmers' co-operatives to solve the problem of marketing.
- Acquiring of loans from co-operative banks to solve the problem of limited capital.
- Diversifying of crops to reduce the problem of price fluctuation.
- Forming oil palm cooperatives to solve the problem of marketing.

Study the figure below; Sketch map showing Southern Nigeria and answer the questions that follow;



(a) Name any;

(i) One plantation crop grown in areas marked A,

(ii) One cash crop grown in are marked B,(iv) Water bodies marked 1 and 2.

(iii) Port marked 3 (v) Towns marked C and D.

(a)(i) Plantation crop A is Rubber/Rice/Oil palm.

(ii) Cash crop in B is Cocoa.

(iii) Water bodies; 1 is River Benue, 2 is Atlantic Ocean.

(iv) Port 3 is Harcourt. (v) Towns; C is Benin, D is Enugu.

(b) **Describe the physical conditions that have favoured farming in the area marked B**;

- Existence of large expanse of land for plantation farming due to low population.
- Forested environment/trees offer shade for the oil palm and rubber.
- Heavy rainfall of over 1000mmp.a which is well distributed all the year around.
- Hot temperatures of over 20^{0}C all year around for proper growth and ripening of the oil palm.
- High relative humidity throughout the year for growth of rubber/oil palm.
- Deep fertile soils which are ideal for proper growth of rubber and oil palm.
- Gently sloping/low lying areas towards the coast for easy movement of infrastructure such as roads.
- Low altitude of 0-200m above sea level favouring hot temperature hence growth of rubber and oil palm plantations.

(c) Explain the importance of plantation farming to the development of Nigeria;

- Raw material for agro based industries.

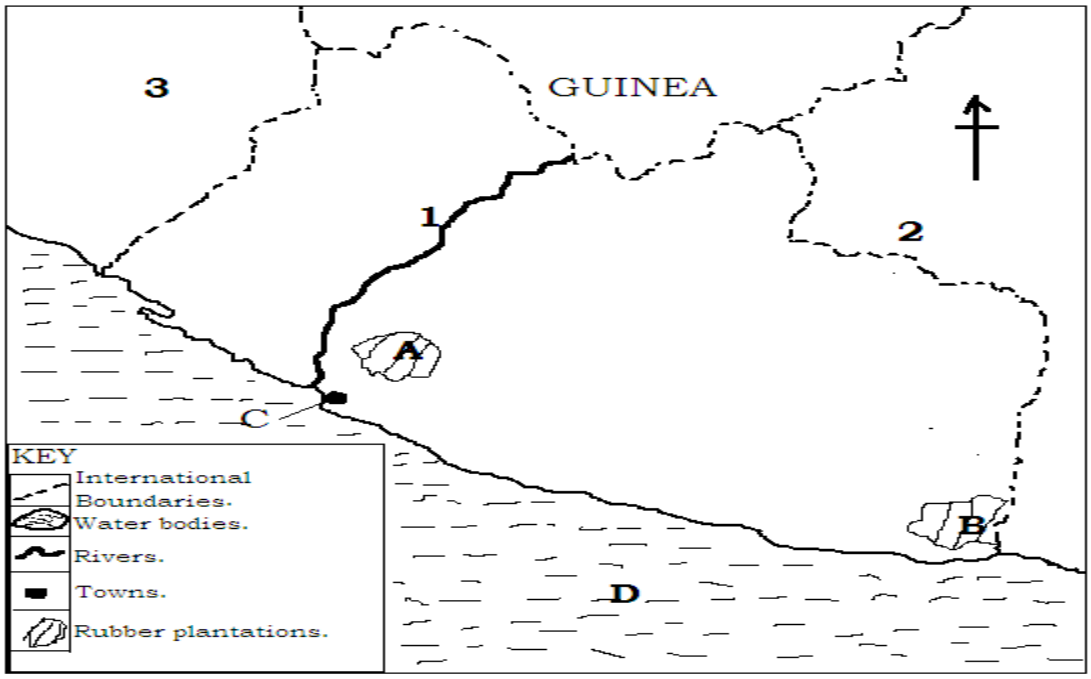
- Provision of employment opportunities for the population leading to better standard of living.
- Foreign exchange is earned through rubber and palm oil exports.
- Oil palm is source of food like wine and palm oil.
- Source of revenue through taxation.
- Diversification of the economic activities for alternative source of foreign exchange.
- Provision of market for agricultural inputs.
- Development of infrastructure like roads, schools, railways.
- Source of income to improve the people's standard of living.
- Promotion of international relations through international trade.
- Encouragement of research leading to quality production.
- Expansion of plantation to include out growers for increased output.
- Urbanization which provide market for goods and services.

(d)**Challenges faced by the plantation farming in Nigeria;**

- Pests and diseases which destroy the crops.
- Competition for market from other sources of the oils and wines.
- Competition from synthetics/substitutes verse rubber products.
- Price fluctuations in the world market discourage farmers.
- Labour shortage especially during harvesting leads to wastage
- Soil exhaustion due to monoculture leads to low output.
- Overdependence on few export crops like rubber and oil palm.
- Weather vagaries such as drought, hailstorms, others, lead to low output.
- Long gestation period for rubber discourages production.
- Fire outbreak during the dry season destroys farmlands.
- Shortage of capital to be invested limits productions
- Political instability leading to disruption of farming.
- Impassable roads during rainy season affect marketing of the produce.

RUBBER GROWING IN LIBERIA

Study Figure **below**, the sketch map of Liberia and answer the questions that follow;



(a) Name the;

(i) Rubber plantations marked A and B,

(ii) River marked 1,

(iii) Countries marked 2 and 3,

(v) Port marked ,

(vi) Water body marked D.

(a) (i) Rubber plantations; **A** is Harbel, **B** is Cavalla,

(ii) **1** is River St. Paul.

(iii) Countries; **2** is Ivory Coast/ Cote D'Ivoire, **3** is Sierra Leone,

(iv) Port is Monrovia, (v) Water body D is Atlantic Ocean.

(b) **Physical factors which have led to the development of plantation farming in Liberia;**

- Extensive/Large tracts of land for establishment of large Rubber plantations.
- Hot temperatures of over 26^0C allow growth of rubber trees.
- Heavy rainfall of over 2000mm p.a leads to high yields of latex.
- Relatively high humidity encourages rubber growth.
- Well drained fertile soils that support plantation rubber growing.
- Numerous trees that provide shade for the young rubber trees.
- Gently sloping relief for easy mechanization.
- Proximity/Nearness to the coastal areas for easy importation of inputs for rubber growing.
- Low lying altitude that ensure warm/hot conditions necessary for rubber growing.

(c) **Problems faced by plantation farmers in Liberia;**

- Competition for market with other rubber producing states reduces profits.
- Competition from synthetic fibres leading to low incomes.

- Pests that attack the rubber crops leading to low output.
- Diseases that attack rubber leading to low quality output.
- Fluctuation of rubber prices leading to low returns.
- Shortage of labour especially during harvesting leads to low output.
- Inaccessibility to some plantation areas leads to delay.
- Political instability in some areas disrupts farming.
- Monoculture leads to low output.
- Perishability of latex leads to post harvest losses.
- Over dependence on export of a single crop leads to income fluctuations.
- Wild bush fires lead to destruction of rubber plantations.
- Climatic Changes/weather vagaries lead to flooding and destroy rubber trees.
- High cost of plantation leading to increased prices.
- Long gestation period of rubber leading to high maintenance costs.
- Limited land for food crops leading to food Scarcity.
- High taxation by government leading to low returns.

(d) **Steps being taken to improve plantation farming in Liberia;**

- Encouraging out grower schemes to increase output.
- Carrying out diversification of plantation of crops like coffee, Cocoa.
- Using fertilizers to improve soil productivity.
- Using pesticides and insecticides to control pests and diseases.
- Training of labour in modern farming to increase output.
- Expanding of market through market research and advertisement.
- Forming/joining regional cooperation to expand the international market.
- Constructing and upgrading feeder roads for easy accessibility.
- Carrying out regular patrolling/patch harvesting to avert the danger of wild fires.
- Providing of loans to the plantation farmers.
- Providing of subsidies to the farmers like agro-chemicals.
- Encouraging foreign investment in the country to solve the problem of limited capital.
- Giving tax holidays to plantation owners to increase production

SUGAR CANE GROWING IN REP.OF SOUTH AFRICA

Study the table below showing the volume of crops produced by the Republic of South Africa (2002) and answer the questions that follow; **Table 24**

Crop	Output (metric tons)
Maize	9,123,000
Wheat	2,400,000
Sugar cane	22,340,000
Sorghum	238,000
Barley	142,000

Total	**34,252,000**

Adapted: African Development Indicators (2003) The World Bank, p225

(a)(i) State the;

- Leading,
- Least, crop which was produced in the Republic of South Africa in 2002.

(ii) Calculate the volume of cereal crops produced in the Republic of South Africa in 2002.

(b)Draw a pie chart to show the relative importance of each crop grown.

(a) (i) -Leading crop produced is Sugarcane,
-Least crop produced is Barley.

(ii) Volume of cereals = Maize + Wheat + Sorghum + Barley
9,123,000 + 2,400+ 238,000+ 142,000
OR Total output – Sugar cane
34,903,000 – 22,349,000 = 11,903,000 metric tons

(b)**Calculations**;

Maize = $\frac{9,123,000}{34,252,000}$ X 100 = 26.6% $\frac{26.6}{100}$ X 360^0 = 95.9^0

Wheat = $\frac{2,400,000}{34,252,000}$ X 100 = 7.0% $\frac{7}{100}$ X 360^0 = 25.2^0

Sugar cane = $\frac{32,349,000}{34,252,000}$ X 100 = 65.3% $\frac{65.3}{100}$ X 360^0 = 234.9^0

Sorghum = $\frac{238,000}{34,252,000}$ X 100 = 0.7% $\frac{0.7}{100}$ X 360^0 = 2.5^0

Barley = $\frac{142,000}{34,252,000}$ X 100 = 0.4% $\frac{0.4}{100}$ X 360^0 = 1.4^0

A pie chart showing crop production in Republic of South Africa in 2002
(Use your graph book) (should have both degrees and percentage)

(c)(i) Crop under plantation is Sugar cane

(ii) **Characteristics of plantation farming include;**

- ***Refer to the previous questions.***

(d)(i) **Advantages of plantation agriculture include;**

- Leads to development of infrastructure like roads and railways.
- Employment opportunities to the workers thus increased standard of living.
- Source of revenue by those employed as well as the out growers and others engaged in related activities.
- Exported to earn foreign exchanges.
- Increased revenue through taxes.
- Promotion of international relations through exports
- Provision of raw materials to the agro based industries.
- Provides ready market to industrial products like fertilizers.
- Has facilitated research and education through fieldwork.
- Has led to urbanization like at Durban, Margate.
- Has promoted out grower schemes who sell their produce to the Estate.

(ii) **Disadvantages of plantation agriculture include the following;**
Refer to the previous questions.

Study table below showing sugar exports from S. Africa (1998 – 2003) in metric tones and answer the questions that follow; **Table 25**

Year	Exports "000"
1998	1,230
1999	1,140
2000	1,470
2001	1,540
2002	1,170
2003	1,000

Source: Africa Development Indicators.

(a)(i) Calculate the percentage change in Sugar exports between 1998 - 2003.

(ii) Draw a line graph to show the trend of Sugar exports.

(b)(i) Describe the trend in Sugar exports between 1998 – 2003.

(ii) Explain the causes of the trend in (b)(i) above.

(a)(i) Percentage change = $\frac{New\ Value - Old\ value}{Old\ value}$ X 100

$\frac{1,000,000 - 1,230,000}{1,230,000}$ X 100

$= -18.7\%$

(ii) A line graph showing Sugar exports from the Republic of South Africa (1998 2003) **(Use your graph book)**

(b)(i) Trend;

- Trend in Sugar exports is fluctuating between 1998 – 2003.
- It dropped/declined gradually between 1998 and 1999 from 1,230,000 to 1,140,000.
- There was an upward/increase from 1,140,000 to 1,540,000 between 1999 and 2001.
- The exports again decreased sharply from 1,540,000 to 1,000,000 between 2001 and 2003.

(ii) **Causes for the trend (decline)**;

- Increase in occurrence of drought.
- Decrease in soil fertility/soil exhaustion due to monoculture.
- Increase in occurrence of diseases like sugar blight leads to crop failure.
- Outbreak of fires.
- Decrease in capital invested among the out growers limits sugar cane growing.
- Stringent market quotas lint large scale production.
- Decrease in labour supply/labour strikes disrupt production leading to wastage.
- Increase in post harvest losses
- Depreciation of machines
- Increase in taxes imposed on sugar cane farmers.
- Fall in prices of sugar

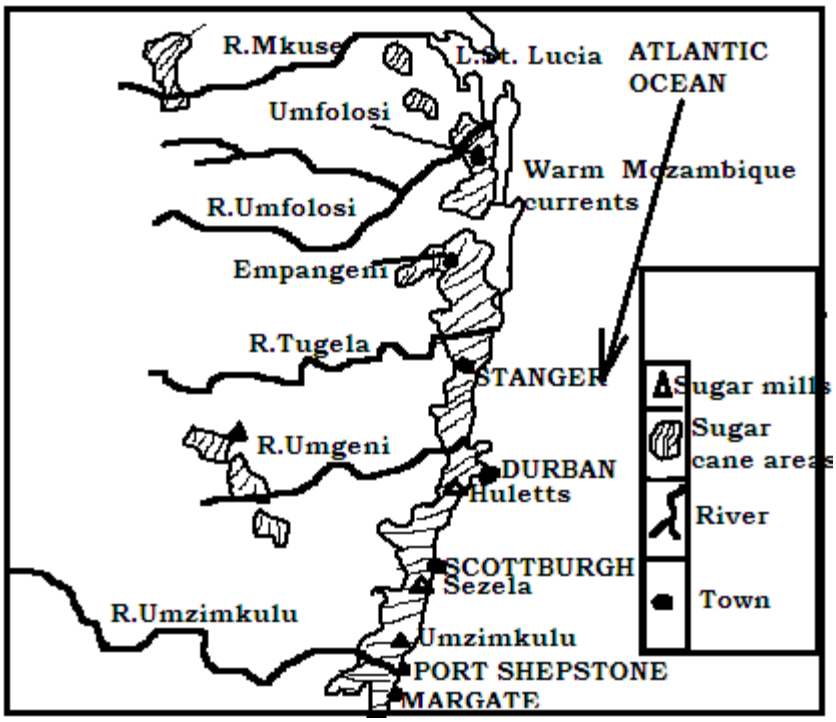
- Competition for land with other crops leading to reduced production.

(d) (i) **Uses of Sugar;**

- Pharmaceutical making/Medicines/Drugs
- Used in Confectionery/Sweets/Baking/Cooking
- Used in dairy products - Used in explosives
- Making of polishes - Making of paper - Making of fuel
- Making of animal fees.

(ii) **Measures that have been taken to promote sugar exports in South Africa;**

A sketch map of Natal showing sugar growing areas and sugar mills;



Study the table below showing sugar exports from the Republic of South Africa (1998-2003) and answer the questions that follow**;**

Table 6: Republic of South Africa: Sugar exports (1998-2003) **Table 26**

Year	Sugar exports (metric tones)
1998	1,230,000
1999	1,140,000
2000	1,470,000
2001	1,540,000
2002	1,170,000
2003	1,000,000

Adapted: 2005 African Development Indicators, The World Bank, Washington D.C pg 99

(a) Draw a line graph to represent the trend in sugar exports from the Republic of South Africa between 1998 and 2003.

(b) Describe the trend in sugar exports shown in (a) above.

A line graph showing Sugar exports from the Republic of South Africa (1998 – 2003)

(Use your graph book)

(b) Trend;

- Trend in Sugar exports is fluctuating between 1998 – 2003.
- It dropped/declined gradually between 1998 and 1999 from 1,230,000 to 1,140,000.
- There was an upward/increase from 1,140,000 to 1,540,000 between 1999 and 2001.
- The exports again decreased sharply from 1,540,000 to 1,000,000 between 2001 and 2003.

(c) **Conditions for the growth of Sugarcane in the Republic of South Africa;**

- Hot monthly temperatures of over 21^0 - 30^0C for ripening of sugarcanes.
- Heavy rainfall of about 2000mm per annum which favour ripening of sugarcanes.
- Sunny conditions which increase the sugar content and for ripening of canes.
- Presence of the warm Mozambique current which create warm temperatures and increase on rainfall which favours sugarcane growing.
- Presence of fertile well drained alluvial soils which favours sugarcane growing.
- Availability of large capital to carry out plantation farming with irrigation e.g. in the Natal Kwazulu province.
- Supply of large labour force both skilled and semiskilled to work in Sugar plantations.
- Availability of many processing factories/plants within the plantations which helps to process a would be bulky raw material.
- Presence of strong cooperatives for marketing and transportation of sugar e.g. **SASA.**
- Presence of modern technology which increase the level of agricultural productivity.
- Presence of relatively flat relief which encourages mechanization.
- Positive government policy which encourages the growing of sugar canes.
- Availability of large market within South Africa and abroad which encourages Sugarcane growing.
- Presence of efficient transport like roads and railways which quickens the delivery of products to market centres.
- Presence of many rivers which provide a large volume of water for irrigation.
- Intensive research which has encouraged high yields.
- Presence of vast land for establishment of Sugar plantation.

(d) **Benefits/Contributions of Sugarcane growing to the people/development of South Africa;**

- Has enabled the development of Towns/urban centres like Durban, Tongaat, Margate, and Port Shepstone in South Africa.

- Source of raw materials leading to development of agro-based industries processing sugar.
- Use of sugar by-products to produce thermal energy and fertilizers, alcohol manufacture.
- Has led to development of infrastructure like roads, railways, water systems, schools. Hospitals, water supply.
- Export of Sugar earns South Africa foreign exchange.
- The government earns revenue from taxes.
- Source of income for the employed people leading to better standard of living.
- It has led to promotion of out grower schemes which sale their products to the estates.
- Has led to generation of power from the burning bagasse for domestic and industrial use.
- Sugar in important beverage/food thus improving people's diet.
- It provides raw material to other industries e.g. those making sweets, soft drinks.
- It provides market for agricultural inputs like fertilizer, pesticides.
- Has promoted international trade therefore promoting international relations/trade opportunities.
- Improved skills/scientific methods of agricultural production through education and training.
- Diversification of the economy therefore reducing overdependence on mining and industrialization.

Major province where sugar canes are grown in South Africa;

- Kwazulu Natal/ Natal province.

Suggest the measures that should be taken to improve sugar production in the Republic of South Africa

- Addition of fertilizers to improve on soil productivity.
- Formation of cooperatives to access market, credit and research./ Farmers' cooperatives like South Africa Sugar Association have been given more loans.
- Use of irrigation farming to ensure continuous production.
- Attracting of foreign investors to increase capital investment.
- Spraying using agro-chemicals to control pests and diseases.
- Use of migrant labour and mechanization of farming activities to address labour shortage.
- Extension of market through regional cooperation like SADC, BRICS (Brazil, Russia, India, China and Republic of South Africa).
- Promotion of out grower scheme to boost production.
- Extension of subsidies to farmers to boost production.
- Construction of transport works like railways to facilitate distribution of sugar canes and sugar.
- Improving workers conditions to reduce on labour strikes.
- Training of labour to increase production. / Labour has been trained in disease and weed control.

- Carrying out research into better cane varieties to ensure high output.
- Provision of firefighting equipment to mitigate the effect of wildfires.
- Extension of processing industries to boost production.
- Value addition through setting up sugar processing factories at Margate.
- Modern storage facilities have been setup to reduce post harvest losses.

Study the table below showing Sugar production in the Republic of South Africa and answer the questions that follow; **Table 27**

Year	**'000 Metric tonnes**
2005/6	17,000
2006/7	16,000
2007/8	16,000
2008/9	15,500
2009/10	15,000
2010/11	14,000
2011/12	14,000

Adapted: *http://www. Illovosugar.co.za/world-of-sugar-statistics South Africa.*

(a)Draw a bar graph to show the information in the table above. **(Use your graph book)**

(b) (i) Describe the trend in sugar production in South Africa between 2005/6 and 2011/12.

(ii) Explain the cause of the trend ion Sugar production in the Republic of South Africa 2005/6 and 2011/12.

LIVESTOCK FARMING IN AFRICA

NOMADIC PASTORALISM:

(a) Draw a sketch map of West Africa and on it mark and name;

(i) Area covered by the Sahel,

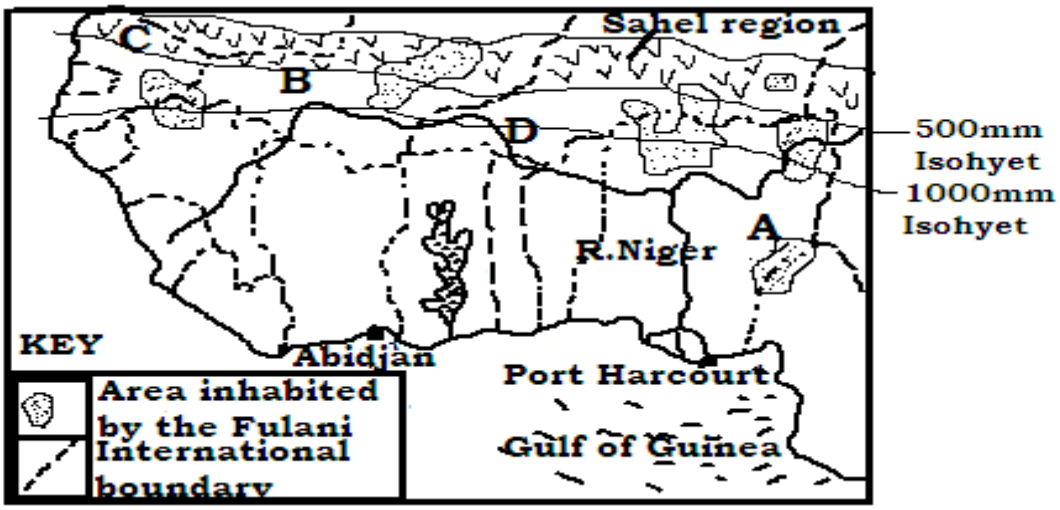
(ii) Countries: Nigeria, Mali and Senegal,

(iii) The Gulf of Guinea,

(iv) River Niger.

(b) (i) Name any **one** tribe practicing nomadic Pastoralism in the Sahel.

(a) **A sketch of the West Africa showing areas covered by the Sahel, some countries, the Gulf and a river**.



(b) (i) **Tribes practicing nomadic Pastoralism in the Sahel;**

- Fulani, - Tuaregs, Dinkas, Nuers, - Somalis,

Characteristics of nomadic Pastoralism in Nigeria;

- Fulani practice transhumance that is they migrate seasonally north and south of with their herds in search for water and pasture following the rainfall pattern.
- It's a conservative culture.
- Animals move long distance.
- Animals lose their weight, contact diseases, pests and die in large numbers.
- Herds kept are disease and pest resistant.
- Animals are kept for subsistence (meat, blood, milk, skins, prestige, marriage)
- They burn grasses and they graze communally on the communally owned land.
- They dig well and water their animals as they move.
- Elders remove ticks, encounter hostiles tribes and wild animals and conflict with settled cultivators.
- They barter animals and animal products for goods.
- Sell animals for money as they move.
- Remove ticks/local treatment of cattle is used.
- There is over stocking.

(ii) **Conditions/factors which have encouraged/favoured the practice of nomadic Pastoralism in the Sahel of Africa;**

- Very low and unreliable rainfall of less than 500mmpa/Long periods of drought leading to growth of little pasture leading to nomadic Pastoralism.
- During the wet season the Fulani move to the North due to humid conditions in the South and associated problems such as tsetse flies, ticks, beasts that attack their animals.
- Presence of tsetse flies especially in the South which causes the North Ward movement.
- Availability of plenty of unoccupied land/sparsely populated areas which allows free movement of the nomads.

- Existence of low quality/poor pastures which necessitate movement/ the search for pasture and water during the long dry season in the North forces the Fulani to move to the South.
- Presence of diseases which attack livestock and sometime kill the animals/ The Fulani also move away regularly to avoid contact with diseased herds from their neighbours.
- Infertile soils with low carrying capacity.
- Cattle rustling in the region which may lead to loss of livestock.
- Cultures/traditions/low level of education of the Nomads that they have to move.
- During the dry season, there are cases of outbreaks of fires which cause extensive damage of pasture for their animals.
- Land disputes/conflicts with the arable farmers make them to move.
- Shortage of surface water/water points in the grazing areas makes them move to get it at the Oases.
- Land tenure system of communal ownership of land encourages free movement of Nomads/ The communal ownership of land allows easy movement of the Fulani cattle keepers who are indulged in cattle raids therefore because of security reasons, they are compelled to keep on moving from north to South.
- The Fulani area has low/sparse population and therefore vast land for transhumance has to be carried out.
- Wild animals like the Hyenas, Desert foxes which attack livestock makes the move.

  Factors that limit/discourage the North ward movement (Fulani) of the nomadic pastoralists;
- Limited rainfall leads to low limited surface drainage.
- Very hot temperatures are not suitable for proper growth of cattle.
- Desert landscape like sandy and bare patches of land.

  Factors that limit/discourage the South ward movement (Fulani) of the nomadic pastoralists;
- Pests like tsetse flies threaten cattle.
- Diseases like Nagana kill cattle.
- Forested areas are inaccessible.
- Unfavourable land tenure system (Private ownership of land) discourages free movement of cattle.

(c) Effects of nomadic Pastoralism in the Sahel; / Explain the effects of nomadic Pastoralism on the environment in Nigeria;

Negatives effects;
- Leads to destruction of vegetation cover due to overstocking.
- Overgrazing leads to soils erosion, soil exhaustion and destruction of soil structure.
- Leads to lowering of the water table due to destruction of vegetation cover.

- Bush burning destroys valuable tree species and humus which eventually leads to growth of secondary vegetation.
- Leads to expansion/spread of the desert conditions/Desertification.
- Land conflicts/wars/raids over resource utilization.
- Difficult for the government to provide social services due to nomadism as people constantly move.
- Limited land available for grazing leads to competition with cultivators/arable farmers.
- A lot of pollution in the region as a result of bush burning.
- Easy spread of pests and diseases due to communal grazing.
- Low yields from the poor quality animals.
- Mass movement of cattle leads to soil compaction and destruction of soil structure.
- There is destruction of vegetation as they clear trees for settlement/temporary structures.
- Creation of too much dust during dry season that causes environmental pollution.
- Constant movement and contact between herds leads to spread of pest and diseases.
- During the course of movement, they scare or kill other animals leading to the extinction of such animals.

Positive effects/Contributions of livestock industry to the countries occupied by the Fulani;

- Has created employment opportunities for farmers who look after cattle.
- Animal droppings act as fuel and manure to fertile the soils thus facilitating arable farming.
- Leads to the development of infrastructure.
- Leads to introduction of modern agriculture schemes like ranches.
- Provides animal products to the people like manure, hides, skins, ghee.
- Source of local income for some people through sale of milk or beef.
- Some products are exported to earn a lot of foreign exchange.
- Animals can be used for the ploughing and transport.
- Animals can be used for cultural rites like dowry.
- It's a source of revenue from taxes
- It's a source of food such as milk, blood, meat to the local population.
- Pastoralism is a source of employment to the local population like herdsmen.
- Pastoralism provides raw material such as milk, hides and skins for the growth of manufacturing industries. like skins, hones and hides to tanning industries
- Traditionally, Pastoralism acts as a source of wealth for dowry.

(c) Steps being taken to improve/modernize the livestock industry in the Sahel;

- Educating and sensitizing masses about better practices of animal rearing.
- Introducing of ranches/paddocking to reduce shortage of pasture.

- Providing of water by constructing valley dams, borehole, and ponds to reduce water shortage.
- Encouraging pastoralists to settle in specific places through introduction of social services like roads.
- Providing of extension workers to control diseases.
- Improving of transport (railways, roads and air) to facilitate marketing.
- Establishing of ranches to control overgrazing and over stocking.
- Providing of organized markets for animal products.
- Spraying/dipping/vaccination of livestock to control pests and diseases to minimize loss of livestock.
- Introducing of exotic species with higher productivity to get more milk and beef.
- Using of supplementary feeds to add on the poor pastures of the herders.
- Carrying out selective breeding/ artificial insemination/cross breeding to improve on animal breeds.
- Forming of cooperative societies for easy marketing of products/acquisition of loans.
- Setting up processing industries to process animal products/value addition through industrial processing.

(d) **Steps being taken to improve the livestock industry in Nigeria;**

- Encouraging of the Fulani to settle down for permanent settlement.
- Introducing of ranches, paddocking and demonstration.
- Reducing of livestock/herds to respect the carrying capacity of land.
- Providing of permanent water sources such as dams, boreholes, others.
- Introducing of better and quick maturing pastures which are nutritious and drought resistant.
- Improving of livestock breeds through research that is cross breeding, artificial insemination.
- Carrying out Vaccination/inoculation to control diseases./Spraying/dipping against pests.
- Forming of co-operatives to help farmers to off-set problems of industrial production such as credit facilities, transport, others.
- Carrying out Massive education/awareness programmes by veterinary extension workers.
- Introducing of mixed farming.
- Improving of existing infrastructure such as roads, railways, schools.
- Establishing of animal products processing industries in this area.
- The government is ensuring political stability.

(a) Draw a sketch map of Nigeria and on it, mark and name;

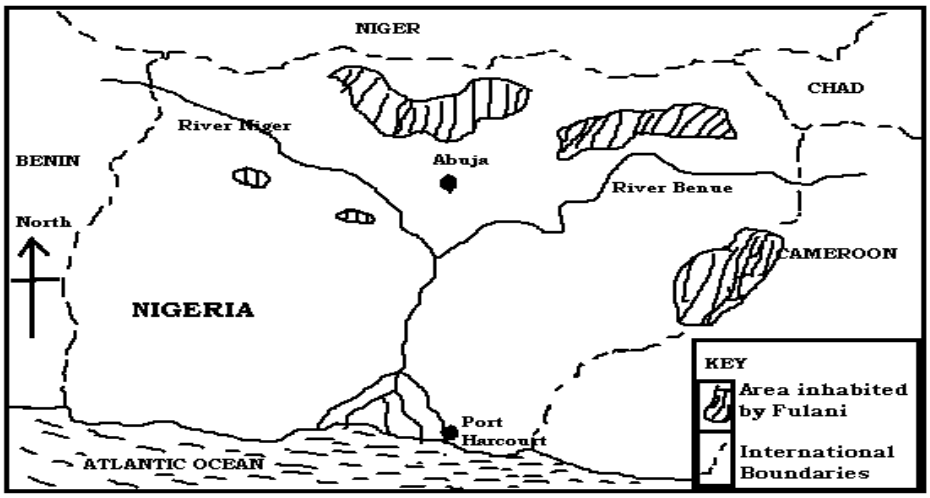
(i) Areas occupied by the Fulani,
(ii) Rivers: Niger and Benue,
(iii) Towns: Abuja and Port Harcourt,
(iv) Any **two** neighbouring countries.

(b) Describe the conditions which have led to the practice of trans-humance/nomadic Pastoralism among the Fulani in Nigeria.

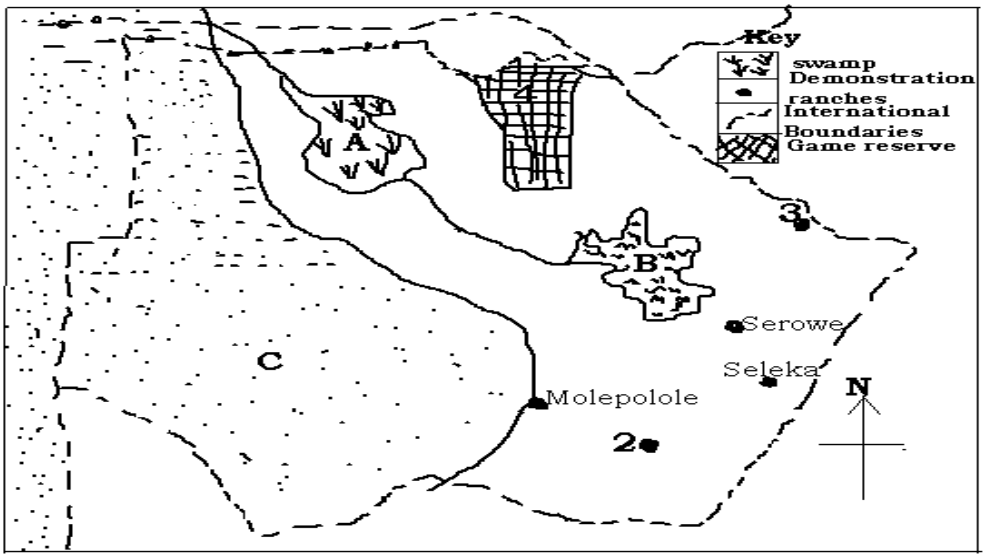
(c) Explain the effects of nomadic Pastoralism on the environment in Nigeria.

(d) Outline the steps being taken to improve the livestock industry in Nigeria.

A sketch map of Nigeria showing areas inhabited by the Fulani, Rivers towns and selected Neigbouring countries;



Study Fig. below: map of Botswana provided below and answer the questions which follow;



(a) Name the;

(i) Drainage features marked A and B,

(ii) Climatic region marked C,

(iii) Game reserve marked 4.

(iv) Demonstration farms 1, 2 and 3

(v) Game reserve 4.

(a) (i) Drainage features; **A** is Okavango basin/swamp,
B is Makarikari basin/salt pan

(ii) Climatic region **C** is desert /semi desert climate/Kalahari desert.

(iv) Demonstration farms;

1 is Maun, 2 is Kanye 3 is Francis town. (v) **Game reserve** 4 is Chobe

(b) **Characteristics of demonstration farms in Botswana;**

- They are large farms of between 1600 – 2800ha.
- Farms are fenced.
- Farms are divided into paddocks.
- Farms are stocked with beef cattle from government and individual farmers.
- Cattle are grazed on rotational basis.
- Farms have well established water supply systems.
- Modern techniques of cattle rearing are applied e.g. artificial insemination, dehorning, castration, selective breeding, spraying.
- Animals are fed on natural pastures.
- Supplementary/artificial feed are given to cattle.
- Record keeping is done.
- The carrying capacity of the land is considered to avoid over grazing.
- Cattle are reared for commercial purposes.
- Demonstration farms are capital intensive.

(c) Factors which led to the establishment of demonstration farms in Botswana;

- Existence of large tracts of empty land due to low population.
- Low and unreliable rainfall amounts/ Dry conditions that is 250 – 460mmp.a which cannot support meaningful herding.
- Need to educate the framers on modern methods of cattle keeping.
- Limited surface water especially during the dry periods.
- Existence of poor pastures and low carrying capacity of the land made it necessary to establish the farms to show better ways of scarce resource management.
- Limited economic activities.
- Availability of high quality breeds of cattle to be used on the farms.
- Favourable/supportive /encouraging government policy of enhancing education of the farmers.
- Availability of adequate capital to invest in demonstration farms.
- Positive attitude of framers to participate activity in the programmed.
- Relatively flat landscape for easy movement of animals/cattle.
- Availability of skilled labour to work in farmers.
- Large market for the products.
- Well development transport network to market centres.

(d) Explain the benefits of demonstration farms in Botswana;

- Has provided education to farmers who have then established their own farms.
- Increased beef production as a lot of animals are fattened for 4 -6 months hence source of proteins.
- Source of income to the farmers through the sale of mature cattle hence improved standard of living.

- Better use of environment by controlling the land carrying capacity through rotational grazing, fencing and water provision.
- Disease control among the animals which has increased the productivity of animals.
- Creation of employment to the population on the demonstration farms and those locally established farms.
- Provides foreign exchange to the government used for social economic development.
- Source of revenue through taxation for infrastructural development.
- Development of infrastructure like roads and railways.
- Creation of international relations through international trade with countries that import beef like UK and S. Africa.
- Diversification of the economy by reducing overdependence on one sector.
- Provides raw materials like hides and skins for industries.
- Urbanization within the farms such as Lobatse, Kanye towns.
- Improvement in beef marketing through BMC(Botswana Meat corporation)

IRRIGATION FARMING IN AFRICA

Study the table below showing agricultural exports (2000) and answer the questions that follow; **Table 28**

Agricultural exports	Metric tons
Sugar	60,000
Meat	109,000
Cotton	232,000
Ground nuts	56,000
Total	457,000

Adapted: 2003 African development indicators, The World Bank, pp 103.

(a) Draw pie chart to Sudan's agricultural exports.

(b) State the;

(i) Highest,

(ii)Lowest agricultural exports from Sudan.

Converting value to degrees;

Sugar = $\frac{60,000}{457,000}$ X 360^0 = 47.3^0 Meat = $\frac{109,000}{457,000}$ X 360^0 = 85.9^0

Cotton = $\frac{232,000}{457,000}$ X 360^0 = 182.8^0 Ground Nuts = $\frac{56,000}{457,000}$ X 360^0 = 44^0

A pie chart showing Sudan's agricultural exports (2000) (Show degrees)

(Use your graph book)

(a) (i) Cotton with 232,000 metric tones.

(ii) Ground Nuts with 56,000 metric tones.

(b) Conditions which have favoured the development of the agricultural sector in Sudan;

- Presence of river Nile and its tributaries provides water for irrigation.

- Low incidence of water logging because of low water table/well drained soils allows proper growth of crops.
- Gently sloping landscape allows gravity flow of water in irrigated areas.
- Presence of fertile clay soils that retain water/minimize seepage of water needed for crop growth
- Sunny conditions favours ripening of crops.
- The grass land vegetation cover reduces the cost of clearance.
- Vast land where crops are grown.
- Low incidence of pests and diseases due to dry conditions/aridity.
- Availability of well developed transport based on railways and rivers facilitates distribution of agricultural produce to market centres.
- Long tradition (history) of irrigation along R. Nile facilitates commercial irrigation.
- Availability large sums of capital invested in crop growing,
- Availability of skilled and semi skilled labour to plant and harvest crops.
- Improved technology helps in crop irrigation.
- Availability of ready market for agricultural crops and the products.
- Intensive research leading to introduction of fast maturing crops.

(c) (i) **Problems which are faced by the agricultural sector in Sudan;**

- Need for heavy capital/inadequate capital for investment limits agricultural expansion.
- High cost of production due to constant dredging.
- High rates of evaporation lead to salination.
- Price fluctuation due to changes in market demand.
- Soil exhaustion/reduction in soil fertility leads to low output.
- Pests and diseases like Bilharzia and malaria lead to low the productivity of farmers.
- Political instability in some parts discourages agricultural production.
- Shortage of water leads to low crop yields.
- Competition for market from other cotton farmers discourages Sudan farmers.
- Seasonal floods destroy crops.
- Soil erosion leads to low crop yields.

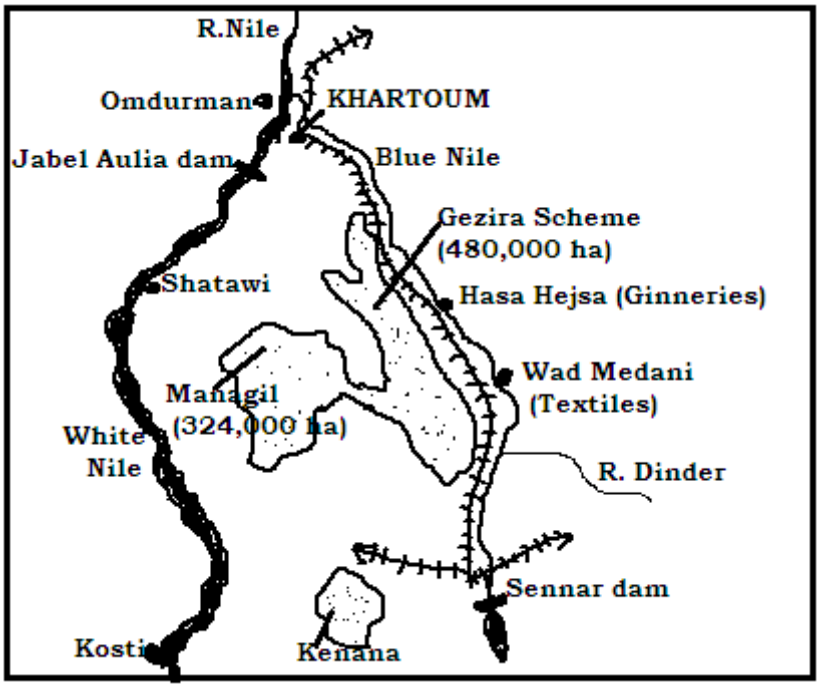
Steps being taken to improve agricultural sector in Sudan;

- Using fertilizers to increase agricultural productivity.
- Modernizing/Using of machines and scientific methods in weed control and crop management.
- Carrying out research/Mass education to come up with drought resistant crops.
- Carrying out constant dredging of canals to remove silt.
- Opening up of new areas/land under irrigation.
- Forming of marketing cooperatives to manage the marketing of crops and the sharing of profits.
- Providing of extension services to control crop diseases.

- Carrying out mixed farming to improve soil fertility.
- Spraying of pests and diseases with pesticides/chemicals.
- Carrying out constant weeding and use of herbicides to control the growth of weeds.
- Planting of trees to control soil erosion.
- Constructing of feeder roads to allow marketing of agricultural products.
- Constructing of dams to supply water during the dry season.

IRRIGATION FARMING IN SUDAN:

A sketch map of Gezira irrigation scheme showing selected rivers, Towns, Railways lines and managil extension



Factors the location of Gezira Irrigation scheme;

- The abundant water from the Blue Nile from the Ethiopian highlands.

- The clay soils prevent leaching.
- Low lying relief allows mechanization.
- Gentle landscape allows gravity irrigation.
- Fertile soils allow luxuriant growth of soils.
- Semi-aridity allows low incidence of diseases and pests making it suitable for cotton growing.
- Vast land due to sparse population.
- Ready market for cotton provided by Britain.
- Large sums of capital from European countries to fund the project.

Benefits of the Gezira Scheme to the people of Sudan;

- Has led to industrialization.
- Employment opportunities to farmers who look after the scheme.
- Led to introduction of new crops like sugarcanes.
- Provides the needed animal feeds to the pastoral tribes.
- Has promoted commercial agriculture like cotton growing, sugarcanes
- Has led to acquisition of skills through adult education.
- Has led infrastructural development like roads and railways, canals.
- Made perennial irrigation possible thus increased food production.
- Increased income as a result of sale of agricultural products.
- Promoted tourism based on agricultural farms.
- Attracted permanent settlement.

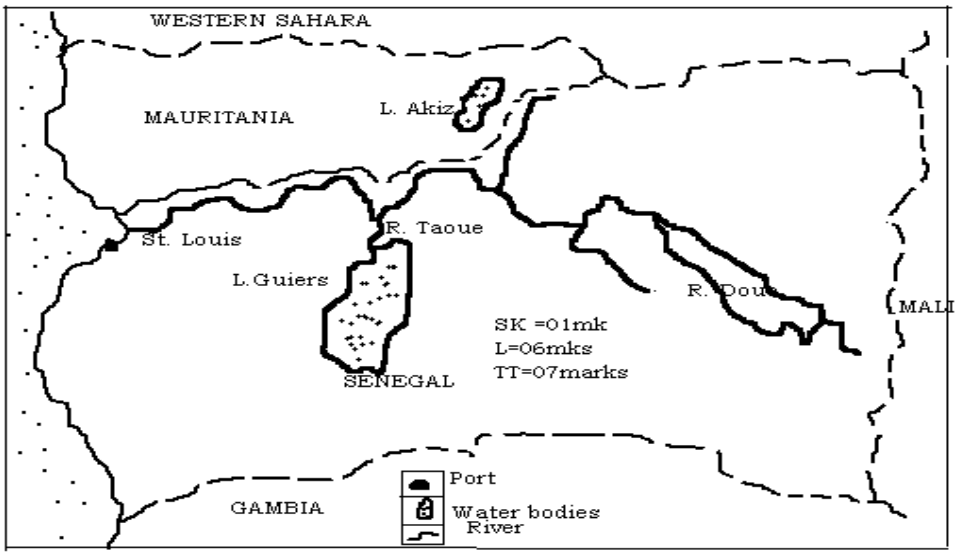
Problems brought about by the Scheme;

- Led to displacement of people due the reservoir created.
- Led to salination due to excessive evaporation.
- Diseases and pests due to stagnation of water.
- Led to siltation of the canals increased the cost of dredging.
- Shortage of labour discourages cotton picking.
- The land tenure system has made people become squatters on their land.
- Monoculture has led to soil exhaustion.
- Has led growth of weeds like Seid due to siltation.
- Growth urban centres with evils like slums development.
- High cost of maintain the scheme increased government expenditure.

(a) Draw a sketch map showing the Richard Toll Scheme on River Senegal and on it mark and name;

(i) Countries; Senegal and Mauritania,
(ii) Port; St. Louis,
(iii) River tributaries, Taoue and Doue,
(iv) Lake Guiers.

(a) A sketch map showing the site of Richard Toll Scheme:



(b) **Describe the conditions which have favoured large scale farming;**

- Gently sloping relief which allows gravitational flow of water to all areas of the scheme/mechanization of the farms.
- Fertile alluvial soils periodically deposited by the Senegal River flood waters favour the growth of crops.
- Availability of permanent source of water / river Senegal for irrigation.
- Existence of large tracts of land with a relatively low population ideal for irrigation.
- Availability of adequate capital to invests in large scale irrigation.
- Positive/supportive/favorable government policy to support agricultural development.
- Advanced/modern/appropriate technology to pump water to all areas of the scheme.
- Availability of flexible means of transport e.g. roads for transportation of materials to and from the scheme.

(c) **Explain the benefits of the Richard Toll scheme:**

- Source of valuable food to feed the population in form of fruits, vegetables, rice, Sugarcanes.
- Reclamation of land to resettle landless people.
- Improved farming skills through training.
- Controlled flooding and sea incursions protecting agricultural land and settlement.
- Led to international relations through exports and tourism.
- Increased incomes leading to higher standards of living.
- Generation of revenue through taxation.
- Exportation of agricultural products to earn foreign exchange.
- Development of infrastructure like roads, canals, railways, schools, others.
- Has created employment to the local people who earn income.
- Provision of raw materials for agro-based industries.
- Urbanization e.g. St. Louis, Dakar.
- Led to tourism leading to generation of foreign exchange.

- Source of water for industrial and domestics use.
- Provision of fish to supplement diet of the people.
- Diversification of the economy through development of tourism.
- Promotion of education and research thus improving the quality of products.

(d) **Problems resulting from the establishment of the scheme;**

- Loss of the periodic alluvial soils deposited by the flood waters.
- Salination due to high evaporation and transpiration rates.
- High costs of maintaining irrigation infrastructures.
- Displacement of people by the lake.
- Industrialization has led to loss of vegetation cover/land degradation.
- Pollution of air, water and land due to agro-based industries and use of agro-chemicals.
- Rapid growth of weeds due to irrigation.
- Siltation of canals which requires constant dredging of canals

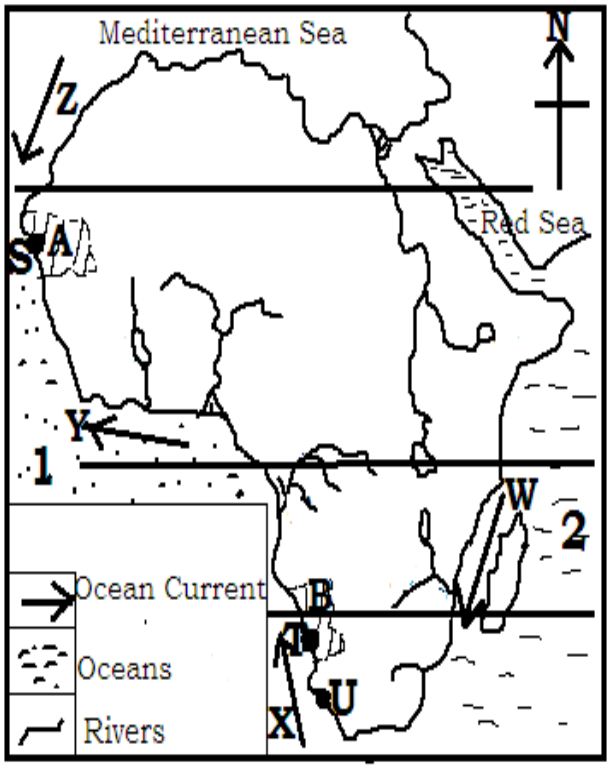
(c) Effects of the Scheme on the environment in Senegal;

- Requires both positive and negative effects of the Scheme on the environment in Senegal.
- Positive effects have already been seen above
- **Negative effects are the problems resulting (have already been seen above)**.

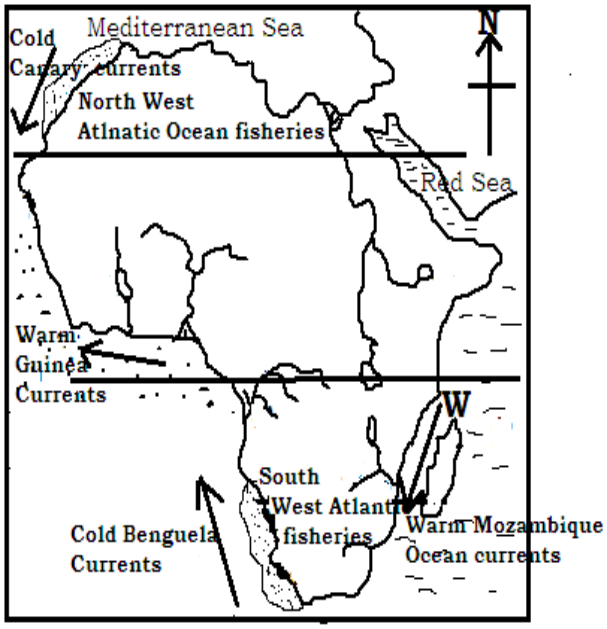
(d) **Measures being taken to reduce/address the negative environmental effects of the Scheme;**

- Dredging of the silted areas to remove silt.
- Increasing education/awareness programmes to improve sanitation.
- Diversifying the economy and crops grown.
- Using of fertilizers to improve on the poor soils.
- Planting of more tree/afforestation to improve on vegetation cover.
- Controlling pests and diseases through spraying.
- Setting up of healthy centres to address the water bone diseases.
- Setting up resettlement schemes to help the displaced.

FISHING IN AFRICA



Study **Fig. below:** Map provided below showing Africa's major fishing grounds and answer the questions which follow;



(a) Name the;

(i) Ocean currents marked X and Y, and B,

(ii) Fishing ports marked S, T and U,

(iii) Countries marked A

(iv) Ocean 1 and 2

(a) (i)Ocean currents; X is Cool Bengeula currents, Y is Agulhas/warm Mozambique

(ii) Countries; B is Namibia A is Senegal.

(i) Ports; S is Dakar, T is Walvis Bay, U is Cape Town.

(ii) Oceans; 1 is Atlantic, 2 is Indian

Factors which have favoured marine fishing in any one Country (<u>Senegal or Namibia</u>); NB Chose one country but not both;

Physical factors;

- Existence of a variety of fish species like Tuna, Hake, Pilchard, Sardines.
- Large fishing grounds/large water bodies where fishing takes place.
- Abundant /plenty of fish food/planktons on which fish feeds.
- Extensive continental shelf which enables reproduction/fish breeding along the coast.
- Indented coastline for fish breeding and port development.
- Sunny climate for sun drying fish.
- Limited economic activities due to hostile environment thus fishing becomes an alternative.
- Meeting of cold and warm currents/upwelling/mixing of ocean currents that are ideal for breeding of fish.

Human factors;

- Large sums of capital from local and foreign companies.
- Favourable government policy of liberalizing fishing activities.
- Modern/developed technology like use of trawlers and liners.
- Skilled and semiskilled labour to work in the fishing industry.
- Improved research into fishing activities hence improved quality.
- Accessibility/well developed transport network to connect the fishing grounds to consuming/market centres.

(i)**Types of fish caught;**

- Pelagic fish - Demersal fish, - Crustaceous fish

(ii)**Methods of fish preservation.**

- Freezing/refrigeration - Canning/Tinning
- Sun drying. – Salting - Smoking/Grilling

problems faced by the fishing industry in Africa;

- Over fishing limits sustainable fishing.
- Inter territorial water conflicts due uncontrolled fishing.
- Illegal fishing methods lead to depletion of fish.
- Underdeveloped communication lines from land sites discourage fish marketing.
- Remoteness of some fishing grounds lifts fish landing.
- Rudimentary (Traditional) fishing methods limit commercial fishing.
- Presence of water weeds in some lakes and rivers limits proper growth of fish.
- Pollution of lakes and rivers due to dumping of chemicals and wastes in them.
- Strong winds and water waves are dangerous to fishermen.
- Limited capital limits the use of modern fishing gears.
- Limited domestic market due to taboos and general poverty in Africa.
- Accidents lead to death of fishermen.
- Fish predators threaten other fish species.
- Competition for market from other protein food stuffs.
- Limited marketable commercial fish species.

- Pirates threaten the fishermen.
- Limited skilled labour limits fish landing.

Measures being taken to improve commercial fishing;

NB: These are similar for any chosen Country;

- Imposing heavy fines for over fishing.
- Passing strict/legal laws/legislation/license to control against over fishing.
- Educating/sensitizing fishermen for better methods and preservation.
- Encouraging foreign fishing companies to invest in fishing industry.
- Searching for market abroad for fish export.
- Identifying and demarcating of international boundaries/ territorial waters to reduce/protect the encroached area.
- Maintaining high quality standards through intensive research and diversifying fishing industry.
- Maintaining anti-pollution laws/treatment/recycling of industrial wastes.
- Patrolling water bodies to avoid encroachment.
- Restocking to introduce new commercial fish species.
- Improving transport/upgrading roads to access the market centres.
- Constructing/upgrading of landing sites/ports for better handling of large vessels.
- Forming of cooperatives to access loans for capital/ investment.
- Fish farming to supplement and increase fish output.
- Setting up fish processing plants to improve on quality and quantity of fish.

Other questions:

Countries A and B have important fishing grounds. For any **one** of these countries;

(a) (i) Explain the conditions favouring fishing activities.

(ii) Describe the methods used for catching fish. (Refer to fishing in British Columbia)

(a) Draw a sketch map of Africa and on it mark and name;

(i) Ocean currents; Benguela and Canary,

(ii) Ports; Lagos and Port Elizabeth,

(iii) Any two marine fishing grounds,

(a) Name any two;

(i) Types of marine fish caught in Africa,

(ii) Major fish producing Countries in Africa,

A sketch map of Africa showing selected features.

(a) (i) **Types of marine fish Caught in Africa;**

- Demersal, - Crustaceans, - Anandromous,

(ii) **Major fish producing countries in Africa are;**

- Republic of South Africa,
- Ghana, - Namibia
- Senegal - Egypt

- Algeria - Morocco,

(b) Conditions which have favoured the fishing industry in Angola;

- The conditions are more less the same.

Physical factors

- Presence of large water bodies/fishing grounds where fish catching takes place.
- Availability of a diversity of commercial fish species like Tuna and Mackerel.
- Presence of abundant fish planktons which fish feeds.
- Large quantities of fish found in marine and fresh water bodies.
- Indented coastline allows development of fishing ports.
- The meeting of cold and warm Ocean Currents off the West African Coast and the South Western part of S. Africa that the cold Benguela and warm Mozambique creates ideal conditions for the growth of fish planktons.

Human factors

- High levels of technology/modern methods of preserving fish like freezing.
- Availability of skilled labour provided by the white settlers to catch and market fish.
- Availability of large sums of capital to purchase fishing equipment.
- Improved fish farming through research.
- Developed transport facilities allow easy marketing of fish.

MINING INDUSTRY IN AFRICA

MINING IN NIGERIA

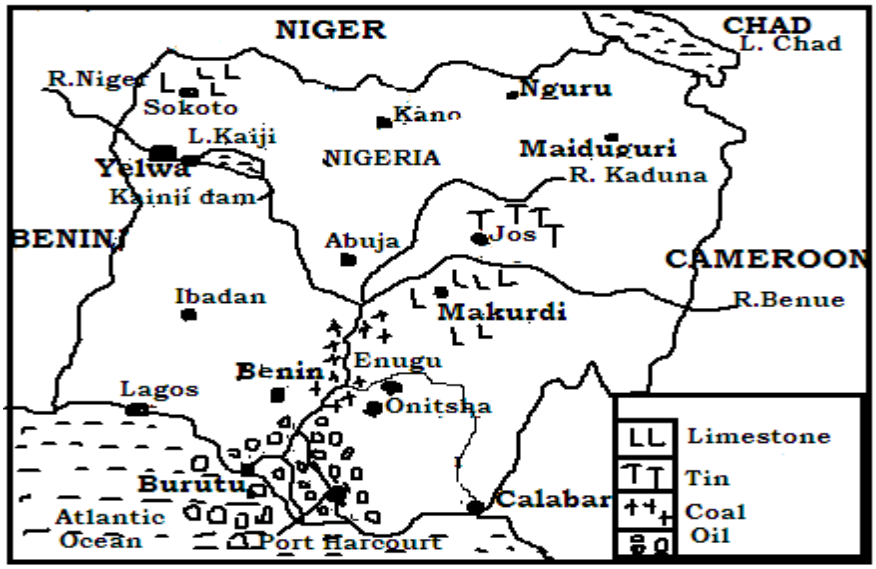
Draw an outline map of Nigeria and on it mark and name;

(i) Oil (iii) Iron ore

(ii) Coal (iv) Tin (v) Limestone.

What factors have favoured the mining of any **two** minerals mentioned in (a) above?

A sketch map of Nigeria showing mineral distribution.

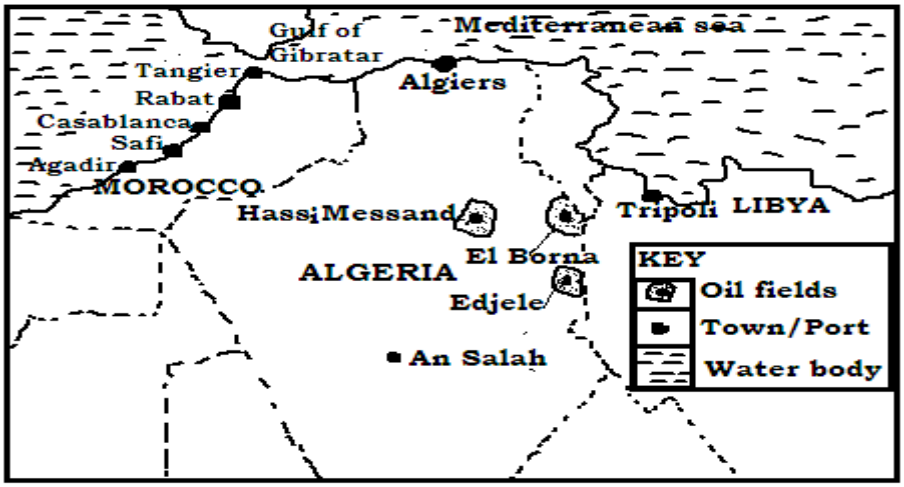


(b) **Factors have favoured the mining of any two minerals (Oil and Tin);**

- Large quantity ores that encourages commercial mining.
- Huge HEP from Kanji dam that runs mining machines.
- Supportive government policy through offering licences to mining companies.
- Skilled and semi skilled labour to explore and extract minerals.
- Advanced technology like use of modern derricks.
- Large sums of capital to buy mining machines.
- Well developed transport facilitated distribution of minerals to processing centres.
- Abundant water supply from rivers like Niger facilitates purification of minerals.

OIL MINING IN ALGERIA:

Study the sketch map of Algeria below and answer the questions that follow;



(a) (i) Town X is Algiers

(ii) Oil fields; 1 is Hassi Messand, 2 is El- Borna, 3 is Edjele.

(iii) Country Y is Morocco, (iv) Water body 4 is Mediterranean sea.

(b) Conditions which have favoured oil mining in Algeria;

- Presence of large oil deposits/reserves makes mining cheap.
- Proximity to the coast allows easy refining and export of oil.
- Availability of large capital for the exploitation, mining and processing of Oil.
- Existence of a ready market both at home and abroad like Germany, France, USA, and UK.
- Availability of skilled labour to extract oil.
- Advanced technology helps in mineral exploration and extraction.
- Well developed transport helps in distribution of oil to the coastal ports and Towns.
- Supportive government policy through licensing mining companies.

Describe the process of mining Oil;

- Surveying/exploration is done to establish the existence of Oil wells/deposits, rock alignment and hardness.
- Derrick building is done.
- Drilling is then done to obtain the oil from the well.
- Oil id pumped out of the Reservoir.
- The crude oil is then transported by pipe line to coastal areas for refining into different products like Paraffin, petrol, Plastics, Vaseline, others.

Contributions of Oil mining to the economy of Liberia;

- Exportation of oil products earns Algeria foreign exchange.
- Source of valuable energy for domestic and industrial use.
- Raw material for industries producing plastics, petro-chemical, Vaseline, Pharmaceuticals.
- Has led development of towns and infrastructure like communication lines.
- Has promoted international relationship with in members of OPEC (Organization of Petroleum Exporting Countries)
- Taxes imposed on Oil products earn Algeria foreign exchange.
- Has led to diversification of the economy the reducing overdependence of fishing.

Other minerals mined in Algeria are;

- Natural gas, Iron ore. Zinc, Copper.

Study **Table 30** below showing the value of crude oil as a percentage of total exports for selected African Countries c and answer the questions that follow;

Table 30: Value of crude oil as % of total exports in selected African Countries.

Country	Percentage of total value of exports
Algeria	82
Angola	48
Congo	70
Gabon	79
Nigeria	94

Adapted from: White, R.G. Africa: Studies for East African Studies. Heinemann Educational Books, Nairobi p201.

(a) Draw a bar graph to show the information given in the table.
(b) State the country which depends;
(i) Most, (ii) Least, on crude oil as an export commodity.

(a) **A bar graph showing the value of crude oil as a percentage e of total exports for selected African countries. (Use your graph book)**

(b) (i) The country which depends most on crude oil as an export is Nigeria with 94%
(ii) Least dependant on Crude oil as an export is Angola with 4.8%

(c) (i) **Three uses of crude oil;**
- Fuel in form of Diesel, petrol, paraffin, Benzene.
- Gases, - Spirits.
- Lubricants like Grease, Engine oil,
- Plastics, - Fertilizers, - Drugs, - Detergents
- Petrol-chemicals.

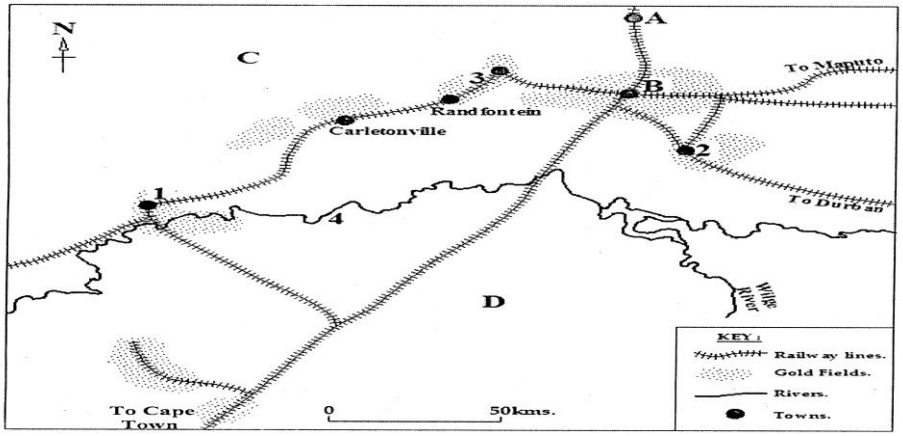
(c) Methods of mining crude oil;

NB: (This is the same regardless of the Country Chosen)
- Exploration/prospecting/surveying is done.
- Installing oil rigs/derricks.
- Drilling into oil seams.
- Installing oil pumps.
- Pumping out crude oil.
- Transporting crude oil through pipes/tanks/trucks to refinery.

(d) Problems resulting from over-dependence on crude oil as an export commodity;
- Price fluctuations leading to unstable foreign income earnings.
- Narrow/limited resources base resulting into economic depression/Neglect of other sectoral development.
- Possibility of over exploitation leading to depletion/exhaustion of oil.
- Competition from alternative sources of energy (solar, Nuclear, HEP) reduces the market as well as income.
- Large scale exploitations/operations results into environmental degradation .e.g. pollution, deforestation.
- Quotas imposed reduce/narrow the market and hence low income from exports.
- Over exploitation may lead to a fall in prices and resultant reduction in incomes.

MINING IN SOUTH AFRICA

Study figure below showing the Rand gold fields of the Republic of South Africa and answer the questions that follow**;**



(a) Name the;

(i) Gold mining centres 1, 2 and 3,

(ii) Cities marked A and B,

(iii) States marked C and D,

(iv) Rivers marked 4.

(a)(i) **Gold mining centre;** 1 is Klerksdorp, 2 is Heidelberg, 3 Krugersdorp.

(ii) City; A is Pretoria, B is Johannesburg.

(iii) State; C is Transvaal, D is Orange Free State. (iv) River 4 is River Vaal.

(b) **Factors that have favoured gold mining in the Rand (Description); Physical**

- Availability of large gold reserves/deposits in the rand (west and East rand) for commercial mining.
- Supply of large volume of water from River Vaal for the mining and processing/purifying of gold.
- Some of the gold deposits are exposed or near the surface for easy mining.
- High quality gold deposits/ores for commercial mining.
- Use of advanced technology for large scale extraction of gold.
- Large supply of cheap power (HEP) and Coal for running the industry.

Human factors;

- Existence of large/ready market for the gold internally and internationally.
- Availability of highly skilled labour using the advanced technology in the mining industry.
- Large supply of cheap migrant labour from the neighbouring countries like Lesotho, Swaziland and Botswana.
- Developed of efficient transport network making easy access to the gold mines.
- Favorable government policy that supports large scale investments.
- Availability of large capital invested in the mining sector by both local and internal companies.

(c) Explain the problems facing gold mining in the Republic of South Africa/Problems facing the mining sector in the Republic of South Africa;

- The existence of some gold bearing reefs at great depth has led to high costs of mining.
- Accidents in the mines cause loss of lives and equipments.

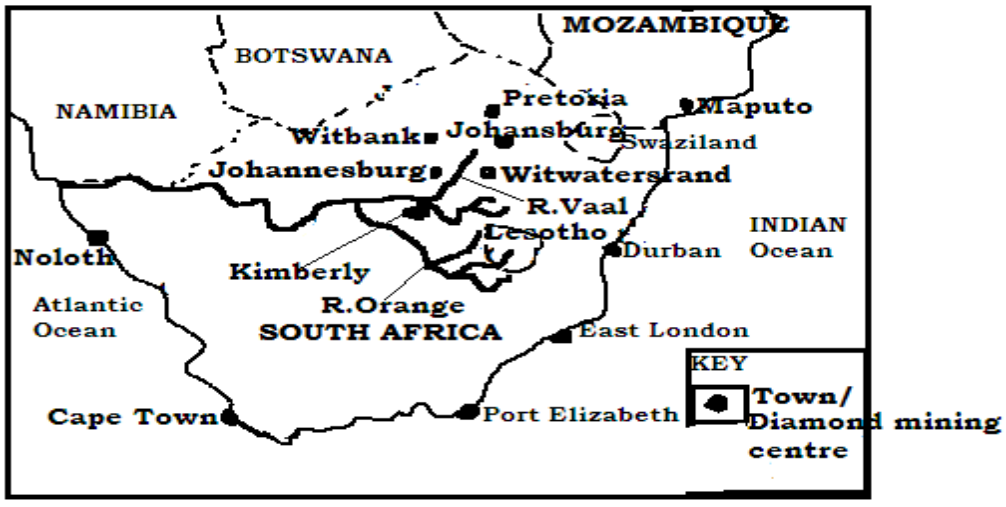
- Pollution of air, land and water resulting from dumping of wastes in the environment.
- Competition in the international market leads to low foreign incomes.
- Strikes/labour unrests due to the demands for the improvements in their working conditions. This leads to loss in incomes.
- Gold exhaustion/depletion leads to closure of mines, unemployment and even residual town/ghosts towns.
- Price fluctuation in the international market reduces profit margins.
- Over population in the mining centres have caused many urban related problems such as theft/robbery, murder, poor hygiene.
- Labour shortage (domestically) resulted into reliance on expensive foreign labour force/immigrants.
- Shortage of capital limiting national investment and reliance on foreign investor.
- Repatriation of profits leading to loss of income.
- High taxes which discourages investors.
- Deep pits left leads to breeding of pests like mosquitoes which spread malaria.
- Limited oxygen and hot temperatures in the mines leads to death of miners.

(d) **Steps being taken to promote the mining sector in the Republic of South Africa;**

- Improving the working conditions of the miners/strengthening trade unions.
- Employing new technology to ease mining.
- Constructing of props/shafts in mines to prevent the collapsing of mining roofs.
- Effecting proper waste disposal measures like treatment, recycling.
- Recycling water from the mine to reduce water shortage.
- Prospecting for more minerals to diversify the mining sector.
- Improving transport to ease movement of minerals and products.
- Carrying out market research/advertising to increase mineral sales.
- Encouraging foreign investors in order to increase mineral extraction/mining.
- Training local workers to improve labour productivity

DIAMOND MINING IN SOUTH AFRICA:

Study the sketch map of South Africa and answer the questions that follow;



(a) Name;
(i) Diamond mining centres marked A, B and C,
(ii) Ports marked D and E, (iii) River marked 1 and 2,

(a) (i)**Mining centres for diamond**;
A is Pretoria, **B** is Kimberly, **C** is Port Noloth.

(ii)**Ports**; D is Cape Town E is Elizabeth, (iii) **Rivers**; 1 is Vaal River, 2 is R. Orange.

(b) **Factors which have favoured diamond mining in the Republic of South Africa**.

- Presence of large deposits of diamond ores in the Kimberite rocks.
- Existence of river orange and Vaal as source of water for purifying diamond.,
- Availability of large sums of capital brought in by big companies like De Beers Company.
- Advanced technology brought in by the early settlers from Europe.
- Availability of both skilled and semi skilled labour.
- Intensive research leading to exploration and processing of diamonds.
- Efficient transport by roads, railways, facilitates export of diamonds.
- Ready market for diamonds because of its beautiful, rare and high value.
- Supportive government policy through attracting foreign investors.

Methods used in mining diamond include;

- Open cast method which involves removal of overlying rocks on top of the Kimberite ores using excavators/tractors. Diamond ores are then removed. The entire debris is then taken to the factory using trucks or trains for processing.
- Adit/deep/shaft mining; the overlying vegetation is removed. Then vertical and horizontal shafts are suck into the rocks to reach the ore. The ore is blasted by explosives. Then removed, loaded and lifted to the surface. The ore is then taken to the factory for processing.

MINING IN LIBERIA:

Study the table below and answer the questions that follow;

Liberia: value of major exports (US$ million) 1976 – 80. **Table 29**

Exports	1976	1977	1978	1979	1980	Total Export Value
Iron Ore	331.6	273.5	274.3	290.0	310.2	1,479.6
Rubber	53.3	59.1	69.1	87.8	102.2	371.5
Logs	34.6	29.3	46.7	50.1	65.3	226.0
Diamonds	16.6	21.4	30.3	39.6	33.5	141.4
Coffee	4.5	6.6	43.0	25.3	27.1	106.5

Adapted from Minns, Africa pg79.

(a) Draw a bar graph to show the total export value the period (1976-80)
Giving evidence from the table,

(b) A bar graph to show the total export value the period (1976-80) **(Use your graph book)**

(c) (i) The table shows many exports from various sectors like mineral products such as iron ore, Diamond, Agricultural products like rubber, logs and coffee. This means that Liberia has a diversified her exports.

(ii) **Advantages of diversifying exports;**

- Saves the country from the effects of price fluctuations.
- Losses due to weather vagaries are minimized.
- Promotes international cooperation since different countries need different imports.
- Reduces overreliance on one export.
- It widens the country's tax base.

(c) (i) **Areas in Liberia where iron ore is mined;**

- Mt. Nimba slopes, - Bong, - Bie Hills, Bomi Hills.

(ii) How Iron Ore is mined;

- Iron is mined by open cast method where trenches of about 10 – 15 metres are cut into the mountain face.
- Iron ore is then drilled out and loaded by a huge garb cane into massive dumper trucks for transportation to the crushing mills.

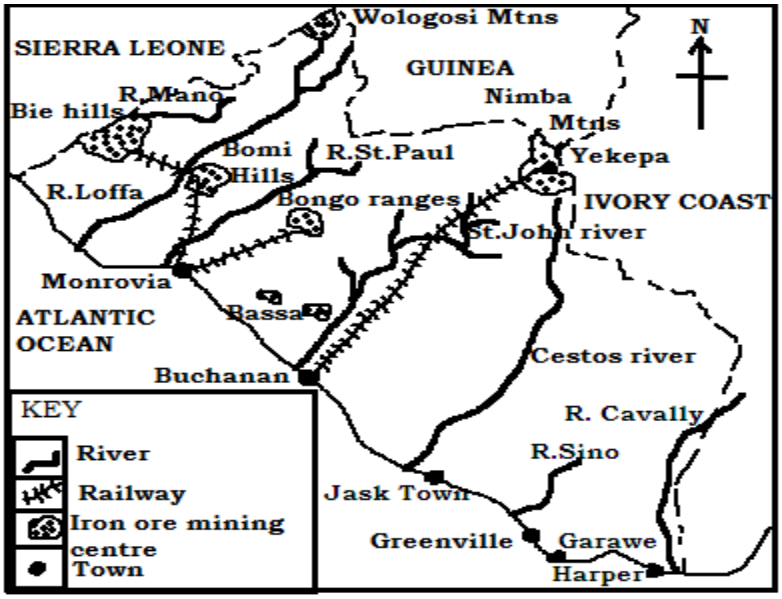
(c) **(i) How Iron ore has benefited Liberia;**

- Check on the following page.

(ii) Other Countries where iron Ore is Mined;

- Nigeria, - Angola, - Algeria, - Mauritania, - Namibia, - Botswana

A sketch map of Liberia showing selected features



(a) Name the;

(i) River marked 1, (ii) Countries marked 2 and 3,

(ii) Ports marked A and B, (iv) Iron ore producing areas marked C.

(i) River marked 1 is Cestos River, (iii) Ports; A is Buchan, B is Monrovia,

(ii)Countries; 2 is Sierra Leone, 3 is Cote D'Ivoire,

(iv) Iron Ore producing areas; C is Bie Hill/ Gobbi Hills, D is Yekopa/Nimba hills.

(a) **Conditions which have favoured iron ore mining in Liberia**.

- Presence of large deposits of iron ore allows commercial mining.
- Strategic location of iron ore at the coast allows easy access to the mines.
- Existence of iron ore closer to the surface makes mining cheaper that is use of open cast method.
- Accessibility of mining areas by rails, roads, water transport.
- Supportive government policy of granting concession to foreign investors from Germany, Sweden and USA.
- Availability of a large market for iron ore aboard in Belgium, Germany, Sweden.
- Advanced technology used in mineral exploration and extraction.
- Intensive research has led to mineral discovery.
- Large sums of capital to buy the mining machines.

(b) **Importance of the mining sector in the development of Liberia;**

- Has led to diversification of Liberia's economy thus reducing overdependence on rubber growing.
- Has led development of industries which process minerals/Provides raw materials to mineral based industries.
- Provides employment opportunities to minerals surveyors and miners from which they get income.
- Has earned Liberia foreign exchange through mineral exports to USA.
- Has promoted international relationship between Liberia and her trade partners thus attracting more foreign aid.
- Has led infrastructural development like roads from mining centres such as Bong and Yepeka.

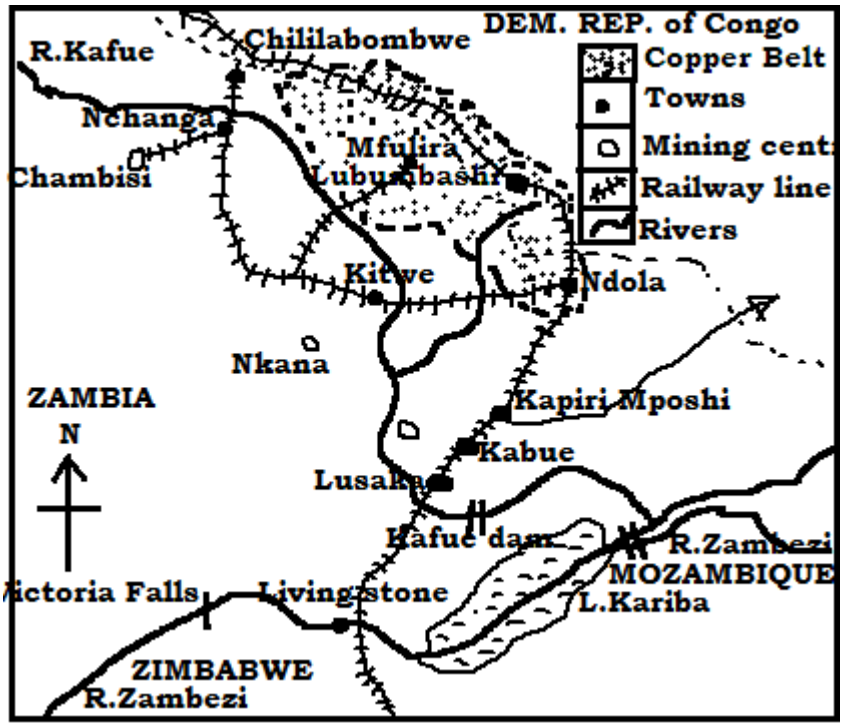
- Has earned revenue to the government of Liberia through taxes imposed on mining companies.
- Provides market to the agricultural products like food stuffs.

(c) **Effects of iron ore mining on the environment in Liberia;**

- Has led to pollution of air, land and water.
- Has led destruction of the soil structure and erosion of the soil.
- Destruction of the vegetation cover/destruction of the wild life habitat.
- Development of hollows/open pits which are breeding places for pests and diseases causing vectors.
- Has led to lowering of the water.
- Has led to emergence of towns with urban related problems like poor sanitation, slums.
- Displacement of people in the affected areas.
- Has led to landslides that destroy farmlands.
- Accidents have resulted.

COPPER MINING IN ZAMBIA

1. Study the figure below showing the Shaba-Zambia copper belt and answer the questions that follow;



(a) Explain the importance of the following to the Copper Belt.
(i) Dam D, (ii) Railway line marked E.

(a) Importance of Kariba dam to the Zambia Copper Belt;

- Provides HEP used in running mining plants and copper refining factories.
- Provides water used in the processing of copper in the copper belt.
- Controls flooding in the copper belt.

Importance of Tazara (Tanzam) to the Zambia Copper Belt;

- The railway is a major route for transporting copper since Zambia is a landlocked Country.
- Facilitates the transportation of copper machinery from abroad.
- Facilitates further mining of copper from the mining centre.
- Facilitates cheap transportation of copper from mining areas to refineries.

(b) Factors that led to the development of the mining industry in Zambia.

- Presence of large deposits of copper encourages commercial mining.
- Presence of abundant water from L.Kariba used in purifying copper.
- Relatively flat landscape allows establishment of mining infrastructure.
- Availability of large capital provided by the Anglo-American corporation Ltd
- Availability of huge HEP to run mining machines.
- Availability of developed transport network based on Railways and roads facilitates distribution of copper.
- Ready demand for copper both with and abroad like in USA and Germany.

(c) Methods used in mining copper in the copper belt;

- Tunnel/Adit method; which involves construction of tunnels to reach the underground rocks bearing the copper. After blasting the ores, they are carried by heavy trucks to the processing plants where they are crushed and processing continues.
- **Shaft method**; which involves digging vertical shafts into the ground plus tunnels into the hill side and when a copper bearing rock is reached. It is blasted loose by the use explosives and then transported along the tunnel to the shaft by light railway or conveyor belt.

(d) Problems facing copper industry in Zambia;

- Price fluctuations on the world market discourage miners.
- High transport costs since Zambia is a landlocked Country.
- Inadequate fuel for the copper refining processes and the commercial routes.
- Political instabilities around Zambia in Angola and Namibia discourage mineral extraction.
- Profit repatriation by the foreign investors limits mineral extraction.

INDUSTRIALISATION IN AFRICA

Study the table below showing manufactured goods exported by Zambia and answer the questions that follow; **Table 31**

Year	Exports (in '000' US$)
1996	168,000
1997	180,000
1998	194,000
1999	189,000
2000	163,000

2001 203,000

Adapted from: 2003 Africa Development Indicators, The World Bank, 104

(a) Draw a line graph to represent the information given in the table.

(b) Describe the;

(i) Trend of manufactured exports from Zambia between 1996 and 2001.

(ii) Conditions which have led to the trend in (b)(i) above.

(a) A line graph showing manufactured goods exported from Zambia (1996 – 2001) **(Use your graph book)**

(b) Description of the trend;

- Between 1996 and 2001 manufactured exports from Zambia were fluctuating.
- From 1996 to 1998, there was a steady increase in the volume of exports.
- Between 1998 and 1999 there was slight decrease in the volume of exports.
- Between 1999 and 2000, there was a drastic decrease in the volume of exports.
- Between 2000 and 2001, there was a sharp increase in the volume of exports.

(ii) **Conditions /Factors for the trend above;**

Factors for the positive trend/Increase;

- Increase in supply of skilled and semiskilled labour provided by the Zambia and immigrant workers.
- Increase in the deposits of copper exploited to be used in the manufacturing industries.
- Increase in government support through financing large manufacturing industries and attracting foreign investors.
- Increase in capital base provided by the foreigners increased industrial production.
- Improvement in technology incased quality of industrial goods to fit international standards.

Factors for the negative trend/decrease;

- Increase in external competition from South Africa for external market.
- Decline in power supply reduced industrial production and exports.
- Increase in profits repatriation by multinational co-operations discouraged production.
- Decline in general prices of manufactured goods.
- Decline in supply of raw materials like copper.

(c) Problems faced by the manufacturing sector in Zambia;

- Stiff competition for external market with more industrialized manufacturing countries like South Africa, China and USA.
- Inadequate raw materials like decline of copper reserves in Zambia discouraged industrial production.
- The Landlockedness of Zambia makes transportation of raw materials and manufactured goods expensive.
- Inadequate capital limits investment in manufacturing sector.

- Limited power supply, its dependence on Kariba power dam and it irregularity limits industrial productivity.
- Profits repatriation by foreign firms to their mother countries limits re-investment in manufacturing sector.
- High cost of imported raw materials increases the cost of production.

(d) Benefits of the manufacturing sector to the development of Zambia;

- The sector generates millions of jobs to workers like engineers and transporters.
- Industrial exports to Mozambique earn Zambia millions dollars of foreign exchange.
- Provides market to the agricultural and mineral products.
- Has led to development of towns/urbanization like Lusaka.
- Has stimulated development of modern infrastructure like roads.
- Has led to improved standard of living through boosting people' incomes.
- Has led to economic diversification therefore reducing overdependence on Agriculture and Mining.
- Manufactured exports have promoted international cooperation between Zambia and her trade partners.

Study the table below showing manufactured goods from Zimbabwe (1996-2001) and answer the questions that follow; **Table 32**

Year	**Export in '000 US**
1996	846,000
1997	900,000
1998	655,000
1999	640,000
2000	567,000
2001	552,000

Adapted: 2003 African Development Indicators, The World Bank, and Washington DC.

(a) Draw a line graph to represent the information given in the table.

(b) Describe the;

(i) Trend in the export of manufactured goods from Zimbabwe between 1996 and 2001,

(ii) Conditions which have led to the trend in the (b)(i) above.

(a) Line Graph **(Use your graph book)**

(b(i)Trend

(ii) **Conditions which have led to the trend in the (b)(i) above;**

For increase;

- Increase in raw materials from agriculture, mining and others.
- Increase in government through offering tax holidays.
- Increase in supply of skilled labour to operate industrial machines.
- Improvement in technology leads to high output.
- Increase in power supply to run industrial machines.

- Increase in water supply to cool machines and mix chemicals.
- Improvement in political atmosphere attracts industrial establishment.
- Improvement in transport and communication allows distribution of raw materials and finished goods.

For decrease;

- Fall in prices of industrial goods on the world market.
- Increase in competition for market from other industrialized nations like Germany.
- More restrictive trade quota and tariffs on goods from Zimbabwe.
- Increase in unfavourable government polices like expulsion of White investors/farmers from Zimbabwe.
- Increase in political instability threatens industrial operations.
- Decline in the supply of skilled labour due to poor working conditions and inflation.
- Decline in supply of raw materials to limits industrial operations.

(c) **Contributions of the manufacturing sector to the development of Africa**;

- Provides a lot of employment opportunities to engineers and transporters hence improved standard of living.
- Generates a lot of foreign exchange to the government through exports.
- Source of income for the people hence improved standard of living.
- Development of towns/urbanization at Lusaka.
- Has led to value addition for agricultural and forest products hence more income.
- Development of infrastructure like Roads, railways, air ports and waterways hence improved labour mobility.
- Has promoted international relations through trade.
- Has led to creation of skilled labour through on-job training and short courses.
- Has led to diversification of the economy hence wide income.
- Provides market for agricultural products which acts as industrial raw materials.
- Earns a lot of revenue to the government through taxes/licences.
- Provides manufactured goods to the people like fertilizers.

(d) **Problems faced by the manufacturing sector in Africa;**

- Limited capital for discourages industrial establishment.
- Dominated by foreigners who repatriate most of the profits.
- Exhaustion of non-renewable resources or raw materials.
- A lot of pollution of the environment which many cause respiratory diseases.
- Urbanization with related problems with overcrowding and poor sanitation.
- Shortage of skilled labour limits industrial operations.
- Political instability in some countries like Zimbabwe limits industrial investment.
- Competition for raw materials and market limits industrial operations.
- Shortage of market limits industrial expansion.
- Inadequate power supply limits industrial operations.

- Underdeveloped transport and communication routes limit marketing of industrial goods.
- Strict trade quotas on the world market limit industrial operation.
- Low levels of technology leads to quality products.

MANUFACTURING INDUSTRY IN EGYPT & REP. OF SOUTH AFRICA

Study the table below showing the export earnings from the manufactured goods (1999) for selected African Countries and answer the questions that follow;

Table 33

Country	**Export earnings ('000s US $)**
Egypt	2,080,000
Algeria	46,000
Rep. Of South Africa	4,622,000
Nigeria	27,000
Cote d'Ivoire	1,309,000
Zimbabwe	640,000
Total	8,724,000

Adapted; African development indicators, (1997) World Bank, Washington DC. Pg 104.

(a) Draw a pie chart to show the relative export earnings for each of the selected Countries.

(b) Name the country with the;
  (i) Highest,
  (ii) Lowest, export earnings from manufactured goods.

(c) (i) Name any **two** manufactured goods exported by either Egypt or the Republic of South Africa.
  (iii) Describe the conditions which have favoured the development of the manufacturing sector in the Country chosen in (c)(i) above.

(a) Converting the values to degrees;

Egypt = $\frac{2,080,000}{8,724,000}$ X 360^0 = 85.7^0 ≈86^0

Algeria = = $\frac{46,000}{8,724,000}$ X 360^0 = 1.9^0 ≈2^0

Rep. of South Africa. = = $\frac{4,622,000}{8,724,000}$ X 360^0 = 190.7^0 ≈191^0

Nigeria = = $\frac{27,000}{8,724,000}$ X 360^0 = 1.1^0 ≈1^0

Cote d' Ivoire = $\frac{1,309,000}{8,724,000}$ X 360^0 = 54^0

Zimbabwe = = $\frac{640,000}{8,724,000}$ X 360^0 = 26.4^0 ≈26^0

A pie chart showing relative export earnings from manufactured goods (1999) in (000s) US$

NB (Should have degrees) **(Use your graph book)**

(b) (i) **Highest** export earnings from the manufactured goods is South Africa with 4,622,000,000 US $.

(ii) **Lowest** is Nigeria with exports earnings of 27,000,000 US $.

(c) (i) **Manufactured goods exported from Egypt;**

- Textiles, - Processed food
- Chemicals, - Military equipment
- Fertilizers - Iron and steel products

From the Rep. of South Africa;

- Jewellery, - Motor vehicles - Foot wear
- Textiles - Arms and military hardware
- Wines, - Electronics,

(ii) **Conditions which have favoured the development of the manufacturing sector in RSA or Egypt (they are more less the same**)

- Presence of huge HEP to run industrial machines.
- Existence of many mineral deposits. Egypt has iron ore, manganese, phosphates and petroleum while RSA has gold, Tin and copper.
- Well developed transport network by roads, railways, air and water facilitate distribution of raw materials and finished goods.
- Highly skilled manpower to operate industrial machines.
- Cheap migrant labour for RSA from neighbouring countries.
- Availability of a ready market both within and outside the Countries.
- Availability of large sums of capital from local and foreign investors.
- Modern technology.
- Political stability.
- Supportive government policy.

(d)(i)**Problem facing the manufacturing sector in (Egypt or RSA) (They are more less the same);**

- Depletion/decline/exhaustion of mineral deposits has negatively affected the mineral based industries
- High cost of production increases the cost of industrial products.
- Uncertainties in the international market conditions due to price instabilities leads to losses.
- Shortage of industrial waster limits production.
- Dominance of foreign multinational companies/investors who at times repatriate the profits.
- Labour shortage limits industrial operation.

(ii) **Steps being taken to solve the above problems;**

- Regional cooperation to extend the market like RSA is a member of SADC and COMESA, Egypt is a member of OPEC.

- Diversifying of energy sources like RSA has nuclear and HEP replacing Coal while Egypt has both thermal and HEP.
- Establishing of related industries which use other industrial bi-products as inputs.
- Importing of labour/immigrant labour to solve labour shortage.
- Recycling of products.
- Importing of raw materials to reduce shortage of raw materials.
- Establishing of industries in already established industrial estates to reduce the costs infrastructural development.
- Decentralizing of industries to other industrial areas.
- Developing of precision industry which use little raw materials and produce expensive products.

(a) Draw a sketch map of Southern Africa and on it mark and name;
(i) The Witwatersrand (Rand),
(ii)Towns; Johannesburg, Witbank and Vereeniging,
(iii)Ports; Durban, East London and Maputo,

(a) **A sketch map of South Africa showing Rand selected towns, and ports.**

(b) **Factors favouring the development of industries in Witwatersrand.**

- Huge deposits of high quality gold, iron ore and tin used to feed industries.
- Abundant water from R. Vaal to cool industrial machines.
- Availability of large sums of capital to set up industries.
- Well developed transport in Witwatersrand based in railways facilitates the distribution of raw materials and finished goods.
- Availability of skilled and semiskilled labour provide by both the Dutch and immigrants to operate industrial machines.
- Abundant food supply to feed the industrial workers.
- Advanced technology provide by the Dutch encourages quality production.

- Ready market for industrial goods by the agricultural sector at Natal.
- Reliable power supply in form of coal in south Africa to run the industrial machines,

(c) **Problems faced by industrial development in the Witwatersrand;**

- Competition for market with the cheaply imported industrial good from Germany, China discourages industrialists.
- High cost of production makes the industrial products very expensive.
- Inadequate power supply due to reduction in coal.
- Shortage of land limits industrial expansion in the rand region.
- Profits repatriation by the foreign investors limits capital accumulation in the industrial sector.
- Price fluctuations on the world market discourage industrialists.
- Frequent labour strikes limit production schedule.
- Water shortage especially in the rand region discourages production

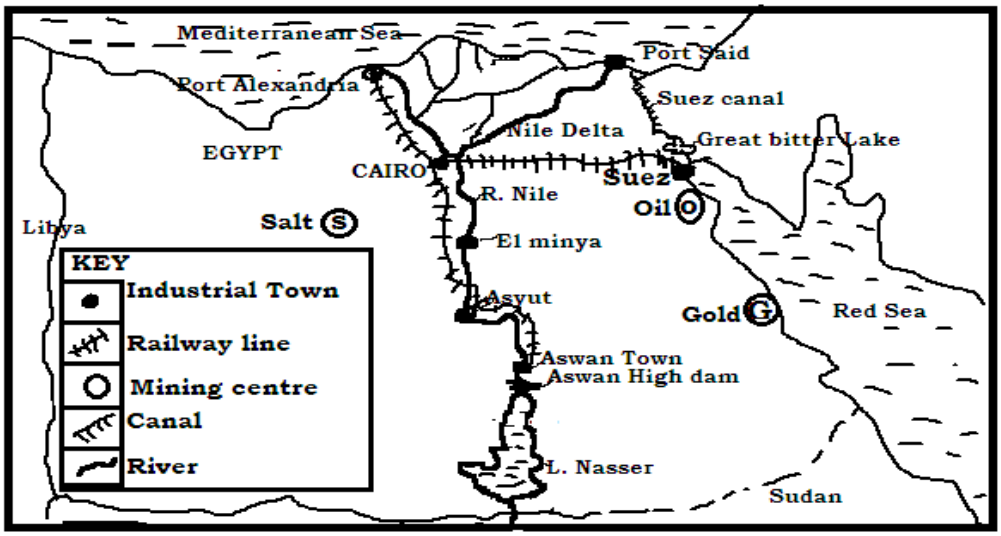
(d) **Industrial centers in Southern Africa outside Witwatersrand**;

- The western Cape,
- The Eastern Cape,
- The Durban – Pine Town region.

(a) Draw a sketch map of Egypt and on it mark and name;

(i) Industrial centres; Port Alexandria, Cairo and Aswan,
(ii) Water bodies; Red sea and lake Nasser,
(iii) The Nile delta,
(iv) The Aswan high dam.

(a) **A sketch map of Egypt showing selected industrial centres and other features.**



(b) **Conditions which have influenced the location of industrial centres in Egypt**;

- Presence of abundant water from River Nile, Red Sea which is used as a raw material and a cooling agent in industries.
- Availability of efficient transport by large seas, Suez Canal, Nile, Railway, roads allow distribution of raw material and finished goods.

- Presence of varied minerals especially Gold, phosphates, iron ore, petroleum used in industry as raw material and source of energy.
- Availability of huge electricity/power/energy for running industrial machines.
- Rich agricultural hinterland at the Nile Delta and along the Nile river valley to provide raw material to industries.
- Presence of a large population along the Nile valley provides abundant skilled and semiskilled labour to work in industries.
- Availability of a ready market for manufactured goods both domestically and internationally.
- Existence of extensive desert conditions which discourage settlement and economic activities hence encouraging industrialization.
- Availability of advanced technology, leading to production of high quality products.
- Favourable government policy that encourages industrialization.
- Political stability in Egypt has attracted foreign investors who come with capital and labour for industrial development.
- The nearness of Egypt to Europe that provides ready market for her goods.
- Intensive research has led to production of high quality goods.
- Vast land where industries were established.
- Availability of large sums of capital to invest in industrial establishment.

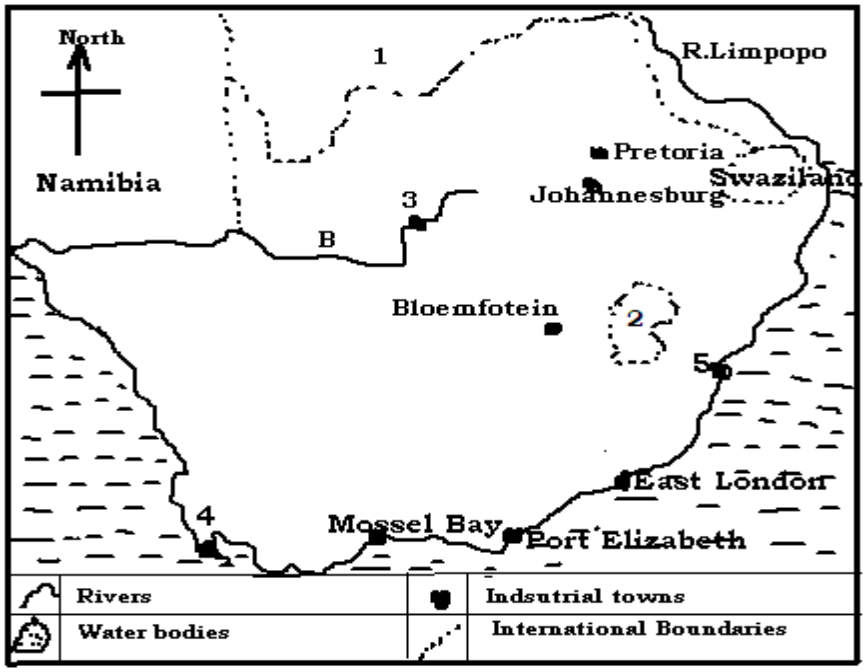
(c) **Importance/benefits of industries to the development of Egypt;**

- Source of employment to the people of Egypt.
- Supply of goods e.g. clothing and textiles, electronics, sugar others from the industries.
- Development of infrastructures like roads and railways.
- Source of foreign exchange to the Country.
- Source of income to the people/increased welfare/standard of living.
- Development of trade and economic cooperation/promotion of international relations.
- Growth of industrial towns/urbanization.
- Offers ready market to agricultural and mining sectors.
- Source of revenue to the Government through taxes imposed on industries.
- Provides agricultural inputs like fertilizers and machines.

(d) **Effects of industrialization on the Environment;**

- Pollution of air, land and water.
- Congestion of people and vehicles in areas where industries have been constructed.
- Destruction of vegetation cover/deforestation.
- Mineral excavation has led to development of pits/hollows.
- Destruction of soil structure.
- Diseases. - Shortage of land for other economic activities.
- Exhaustion of raw materials. - Slum development.
- Unemployment. - Prostitution.
- High crime rate/theft/rape/drug abuse.

Study figure of the Republic of South Africa below and answer the questions that follow;



(a) Name the;

(i) Water body marked **A,**

(ii) River marked **B,**

(iii) Countries marked **1** and **2**,

(iv) Industrial towns marked **3, 4** and **5**.

(b) (i) State any **two** types of industries found in any **one** town named in (a)(iv) above.

(a) (i) water body **A** is Indian Ocean (ii) River **B** is Orange/Vaal

(iii) Countries; **1** is Botswana, **2** is Lesotho.

(iv) Industrial towns; **3** is Kimberly, **4** is Cape Town, **5** is Durban

(b)(i) **Types of industries found in;**

- **Kimberly**; Gold refinery, Engineering, Metallurgical, iron and steel, Food processing, Mineral processing/Diamond cutting.
- **Cape Town**; Food processing, Wine making/Fruits/Vegetables, manufacturing industry e.g. Textiles like leather tanning, woolen, Ship building, Oil refinery.

- **Durban;** Chemical industry, Engineering, Ship building, textile manufacturing, food processing (Sugar cane and milling, Motor vehicle Assembly, Tyre manufacturing, Pulp and paper industry, Oil refinery**.**

(b)(ii) **Conditions which have influenced the location of industries in the Republic of South Africa;**

- A variety/Reliable source of raw materials that is minerals such as gold, copper, Diamond, and agricultural raw materials like fruits, vegetables, sugar canes, maize.
- Strategic location at the coast for easy accessibility from abroad/to foreign markets e.g. Durban, Cape Town, Port Elizabeth.
- The dry western parts of South Africa that cannot support other economic activities like agriculture thus availing large land for industrial establishment.
- Large water bodies from rivers such as Orange, Vaal which act a raw material as well as a cooling agent.
- Vast/large/expanse land for industrial establishment and expansion.
- Relatively flat land/gentle slopes for easy construction of industries.
- Skilled and semi-skilled cheap labour to work in industries from neighbouring countries like Lesotho, Botswana.
- Large/huge/adequate capital to invest in the industries.
- Wide/extensive/ready market for industrial products within and abroad.
- Well developed/Efficient/advanced transport system based on roads, air and railways linking South Africa to the local towns and exporting centres.
- Advanced/High levels of technology especially the use of machines.
- Favourable/supportive/encouraging/positive government policy to develop the industries.
- Steady supply of energy resources e.g. coal, nuclear, HEP and oil to run the industry.
- Political stability that provides a Conducive atmosphere to the investors.
- Presence of much old industries/Industrial inertia which attacks other related industries.

(c) **Importance of the industrial sector to South Africa**;

- Provides employment opportunities to the population thus improving their standard of living.
- Has earned local to the local people hence improving their standard of living.
- Has earned foreign exchange to the Country through the exportation of the products to other countries.
- Has promoted international relationship between Republic of South Africa and other foreign Countries such as Britain, Japan, and China through trade.
- Has provided market to agricultural and mining sectors thus improving standard of living of the local people.
- Growth of infrastructure such as roads, railways, schools, health centres, recreational centres thus bringing services nearer to the people.
- Has led to development of many urban centres such as Pretoria, Port Elizabeth, East London, Durban, others.

- Source of revenue through collection of industrial sectors e.g. companies and from workers pay taxes.
- Has led to economic diversification thus reducing over dependence on one sector.
- Has led to tourist attraction thus bringing foreign exchange to the Republic of South Africa.
- Provides manufactured goods to people of South African thus improving their standard of living.

(d) **Steps being taken to improve the industrial sector in the Republic of South Africa;**

- Improving transport and communication systems like roads, railways, air, telecommunication, others.
- Expanding of market outside Republic of South Africa/regional integration for easy exportation of industrial products.
- Importing of raw materials to supplement those internally produced. E.g. Agricultural and mineral resources.
- Transporting of water over long distances to supply it to the dry areas western parts through damming and storing some for industrial use during dry season.
- Diversifying of power sources e.g. coal, natural gas, nuclear power, others.
- Emphasizing supportive government policy on employment of immigrant labour, training and education.
- Carrying out automation of industrial activities to reduce the problem of labour shortage.
- Carrying out Industrial research to manufacture high quality goods.
- Attracting Local investors through loans by the republic of South Africa to invest in industries.
- Inviting foreign investors to invest in industrial sectors.
- Organizing of trade fairs/shows to market the products locally and internationally.
- Recycling of industrial wastes to reduce pollution.

(a) Mention any **three** types of industries found in any **one** industrial centre named in **Types of industries found at;**

Johannesburg;
- Chemical manufacturing, - Diamond cutting, - Food processing,
- Electronics industry, - Iron and Steel, - Car Assembly
- Textiles, Cement making industry.

Klerksdorp;
- Chemical industry, - Food processing, - Electronics industry
- Metallurgical industry

Vereeniging;
- Chemical industry, - Food processing, - Bricks and tile making,
- Iron and steel, - Engineering.

Pretoria;
- Food processing, - Electronics making, - Cement manufacturing,
- Glass making - Engineering.

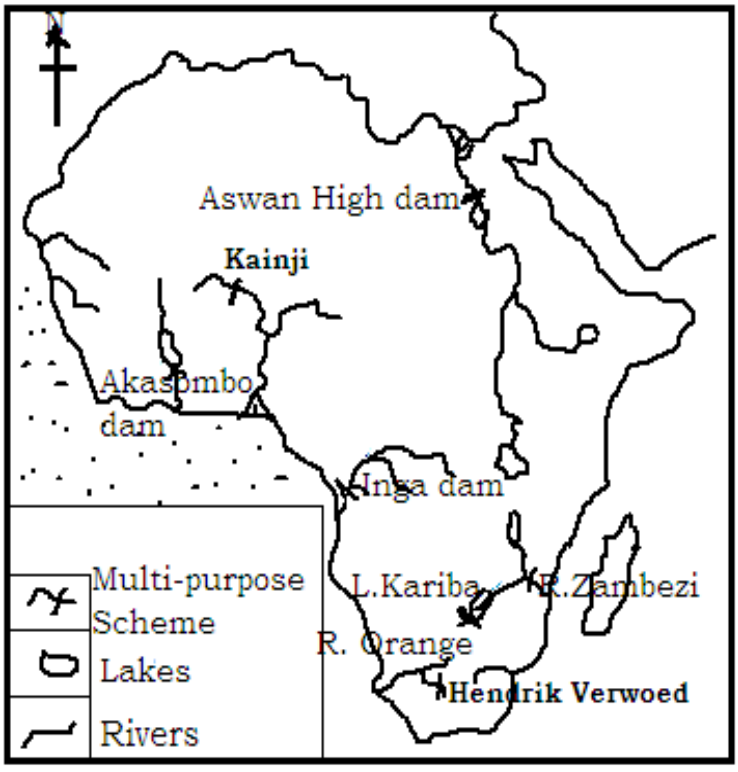
(a) Factors which have favoured the development of industries <u>around Johannesburg or other towns of South Africa;</u>

- Availability of huge HEP from Vaal dam to run industrial machines.
- Presence of Coal to produce thermal power for industrial operations.
- Existence of a variety of minerals like Gold, Coal, copper which are important raw materials to industries.
- Accessibility by roads, railways and air for easy transportation of raw materials and finished goods.
- Existence of a large population/ labour force to work in industries.
- Large/ready market for the industrial products both at home and abroad.
- Refer to those of South Africa.

MULTI – PURPOSE PROJECTS IN AFRICA

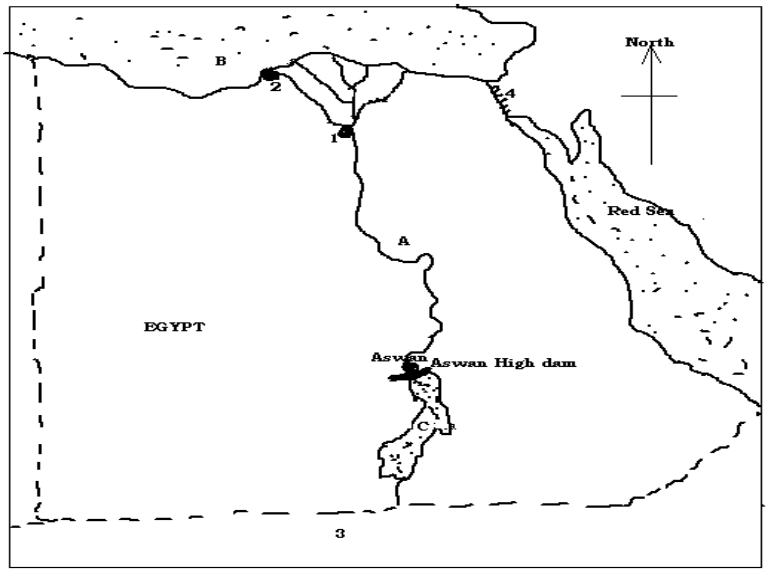
(a) Draw a sketch map of Africa and on it, mark and label;
(i) Rivers; Orange, Senegal and Blue Nile,
(ii) Multipurpose development schemes; Aswan High dam and Akasombo.
(iii) Lake Kariba.

(a) **A sketch map of Africa showing River development projects.**



ASWAN HIGH DAM PROJECT

Study figure **below**: Map of Egypt showing the location of the Aswan High Dam project and answer the questions that follow;



(a) Name the;

(i) Towns marked 1 and 2,
(ii) Country marked 3,
(iii) Water bodies marked A,B and C,
(iv) Canal marked 4.

(a)(i) Towns marked; **1** is Cairo, **2** is Alexandria. (ii) Country marked **3** is Sudan,
(iii) Water bodies marked; **A** is River Nile, **B** is Mediterranean Sea, **C** is Lake Nasser. (iv) Canal marked **4** is Suez Canal.

(b) **Factors which have favoured the establishment of the Aswan High Dam project in Egypt;**

Physical factors

- The seasonal flooding of River Nile which made it imperative/necessary to control floods.
- The existence of a hard basement rock for the construction of the dam.
- A narrow gorge (about 500m) which offered a suitable site for river damming.
- Low/unreliable/seasonal rainfall which necessitated storing of water for use during the dry season.
- Presence of fast flowing water /waterfalls for generation of electricity/ Strong head water which force turbines run fast.
- Vast/large tracts of land to accommodate the lake/reservoir upstream (lake Nasser which is 480 km long)
- Flat land for the expansion of the scheme.
- Presence of a broad valley to act as a water reservoir.
- Steady supply of water from River Nile which provides water for domestic and industrial use./ Presence of a permanent water source for irrigation
- **Human factors**
- Skilled and semi-skilled cheap labour for the construction of the dam.

- Large/Huge sums of capital provided by the foreigners to construct the dam.
- Advanced/Modern levels of technology especially the use of machinery to produce quality work.
- Supportive/positive government policy which provided conducive atmosphere to investors.

(c) **Contribution of Aswan High Dam project to the development of Egypt.**

- Flooding was drastically reduced downstream and towns and settlement along the river valley were protected/Diseases were controlled/reduced.
- Regular HEP was produced for both industrial and domestic uses.
- Increased acreage of land under perennial irrigation enabled the crops to be grown throughout the year thus increasing food to the population.
- Improved navigation of River Nile and Lake Nasser.
- Fishing activities on River Nile and Lake Nasser which provided food in form of proteins.
- Development of urban centres with developed accommodation. At Aswan, Idfu, others.
- The lake created fresh water for domestic and industrial use.
- Provision of employment opportunities thus improving people's standards of living.
- Revenue collection for the government inform of tax thus improving other sectors.
- The Aswan High Dam project attracts tourists thus bringing in foreign exchange.
- Diversification of the economy due to development of industries.
- Provision of income to workers who work in the Aswan High dam thus improving their standard of living.
- Creation of international relations through trade/tourism./ Promoted recreation activities like swimming on the lakes behind the dam.
- Development of infrastructure such as roads, hospitals, schools.
- Provision of market for the local products such as food stuffs.
- Modification of climate through evapo-transpiration.
- Unproductive desert area has been reclaimed and irrigated for cultivation thus increasing food production.
- Saved Egypt from importation and use of solid fuels like Coal, oil in thermal stations.
- Facilitated exploitation of phosphates at Kharga and Dakhala Oasis and establishment of fertilizer plant at Aswan.
- Rural electrification has been extended in many areas.
- Earns the Country foreign exchange through exportation of HEP and other products

Effects of the establishment of a multi-purpose scheme on the environment in any one Country in Africa. (E.g. Nigeria, Egypt, Zambia, DR,C, S. Africa, Zimbabwe)

- But refer to one Country above.

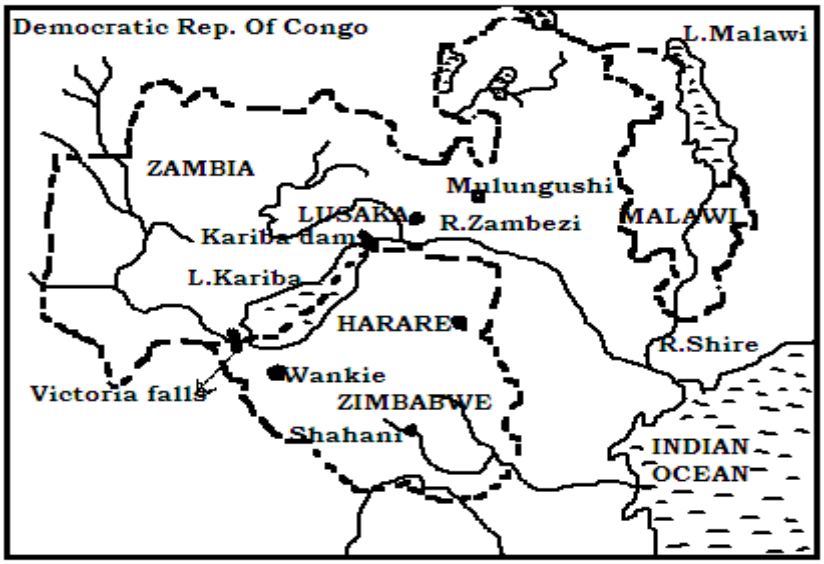
- The effects are purely negative because the positive effects have already been seen in part above;
- Displacement of people by the lake created.
- Water borne diseases like Bilharzia.
- High rate of pollution from fertilizers and industries.
- Salination process creates salt pans.
- Soil exhaustion due to poor agricultural practices.
- Urban related problems like unemployment.
- Accumulation of silt/Silting in the valleys leading to flooding.
- High costs of resettlement of the displaced people.
- Loss of biodiversity.
- Loss of silt hence soil infertility

(d) **Steps being taken to solve the problems created by the Aswan High dam;**

- Resettling of the displaced people.
- Dredging/desilting to remove silt from canals caused by dams.
- De-salination through use of fresh water to water the salts/use of lime.
- Using of artificial fertilizers/manure to improve on soil fertility.
- Spraying by using chemicals to control water borne disease and pests.
- Improving medical services/extension of health services.

KARIBA DAM PROJECT

Study the figure below: Sketch map of Kariba dam and its surrounding areas provided and answer the questions that follow;



(a) Objectives of setting up the project;

- To control flooding of River Zambezi.
- To encourage development of industries.
- To generate HEP for the Zambia copper belt.
- To create employment opportunities.
- To reduce of the importation of coal as a source of fuel.

(b) **Conditions which favoured the construction of the Kariba;**

- The presence of R. Zambezi provides constant flow/supply of water for dam construction.
- Existence of a narrow gorge ideal for the establishment of a dam that is less materials used during construction.
- Existence of a hard basement rock provided a firm foundation for the dam.
- Existence of extensive land for the construction of the dam and other infrastructure.
- Presence of a broad valley upstream to accommodate the reservoir.
- The need to control floods on the lower valley down stream
- Availability of a ready market for power from Zimbabwe and Zambia mines and industries.
- Availability of large capital provided Zambian and Zimbabwean governments.

(c) **Benefits of the Kariba dam to the people living in the area**;

- The dam provides cheap HEP for industrial and home use thus promoting industrial development in the region.
- Lake Kariba formed behind the dam is a fertile fishing ground this supplements on employment opportunities and food supply.
- The dam and Lake Kariba created a beautiful scenery thus promoting tourism industry.
- Construction of the dam reduced the government expenditure on importation of coal to provide power.
- Lake Kariba creaked behind the dam provides an important waterway/navigation between Zambia and Zimbabwe.

- The reservoir formed has promoted agriculture through providing water for irrigation.
- Export of HEP from the dam to Mozambique earns Zambia foreign exchange.
- Construction of the dam has led to diversification of the energy therefore reducing over dependence biomass.

(d) **Problems which resulted from the construction of the Kariba dam;**

- There was loss of life and property due to flooding during the construction of the dam.
- Has increased government expenditure in terms of maintenance.
- Has led to destruction of natural beauty through construction of the dams.
- Lake Kariba has increased the incidence of water borne diseases like Bilharzia and river blindness.
- Formation of Lake Kariba led to displacement of people.
- Agricultural land was lost during the process of dam construction.
- Industries that resulted from dam construction pollute the environment

VOLTA/ AKASOMBO RIVER PROJECT

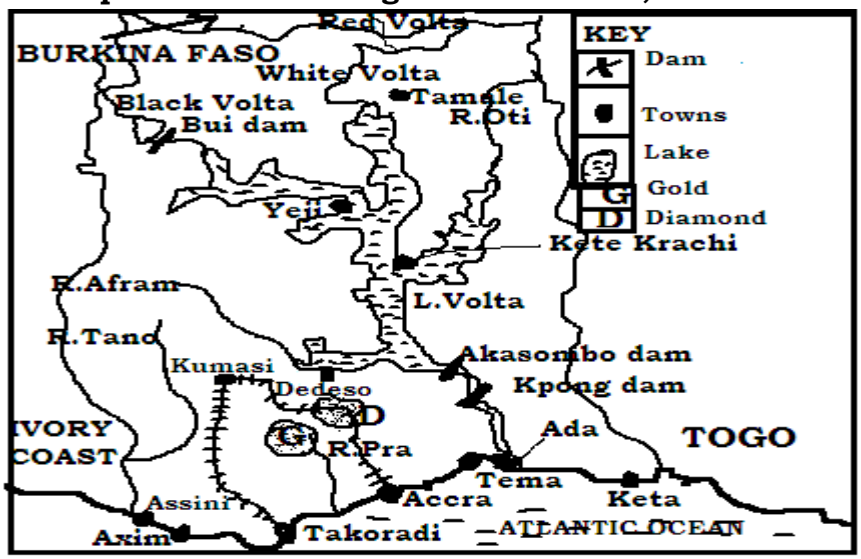
(a) Draw a sketch map of Ghana and on it mark and name;

(i) Water bodies; lake Volta and the Atlantic Ocean,

(ii) Dams; Bui and Akasombo,

(iii) Towns; Accra and Takorodi.

(a) A sketch map of Ghana showing selected Towns, Rivers and Volta dam;



Conditions/factors that favoured the establishment of the Volta river project;

Physical conditions;

- Presence of a narrow gorge to construct the dam.
- Availability of a hard basement rock on the site which offered a firm foundation for constructing the dam.
- The seasonal flooding of River Volta during the wet season and the need to store water for used during the dry season.

- The need to provide water and presence water for irrigation purpose.
- Presence of water falls to run the turbines.
- Availability of abundant raw materials to construct the dam that is rocks.

Human factors;

- Availability of large capital provided by governments of Ghana, Britain and the World Bank enabled purchasing of needed machinery.
- Modern technology used during rock filling.
- Availability of abundant skilled labour from the United States of America and Britain for the architecture and construction of the dam.
- Need to provide an inland waterway across the Volta and connecting Southern Ghana to the Northern parts of the Country.
- The need to generate hydro-electric power to replace thermal power which was too expensive in terms of foreign exchange.
- Need to control the water and preserve some water for irrigation purpose.
- Supportive government policy to develop large scale projects to promote economic growth and development.
- Low population density/Availability of large land for dam construction.

Benefits/importance of the Volta River project/Effects of the establishment of the projects on the environment in Ghana

- Has helped to control seasonal flooding of the Volta River and also ensure supply of water during dry season.
- There are large supplies of cheap power from the Volta/Akasombo dam.
- Ghana earns foreign exchange from the export of power to Togo and Benin.
- The generation of HEP has stimulated the growth of industries in the Akasombo region.
- Employs Ghanaians in electricity generation and transmission, water level maintenance thus earning then income to improve their standard of living.
- The lake created behind the dam (L.Volta) has helped to connect the South of Ghana to the North. Water transport is possible along the reservoir.
- There has been an improvement through irrigation by using Lake Volta waters.
- Has improved fishing industry on the created man-made lake behind the dam.
- The project has created more economic activities like fishing and transport hence economic diversification.

Problems that have resulted from the establishment of the river project;

- Displacement of people for example over 80,000 people were displaced during the construction of Volta dam.
- High cost of resettlement and disruption of families.
- The industries led to pollution of air, land, water and noise.
- Stagnation of water leads to outbreak of water borne diseases especially diarrhea.
- Siltation of the dams and lakes hence shallowness thus dredging of the Lake Volta.
- Fluctuations in the water levels cause unreliable power supply.
- Flooding of lakes has led to displacement of settlement and farmlands.

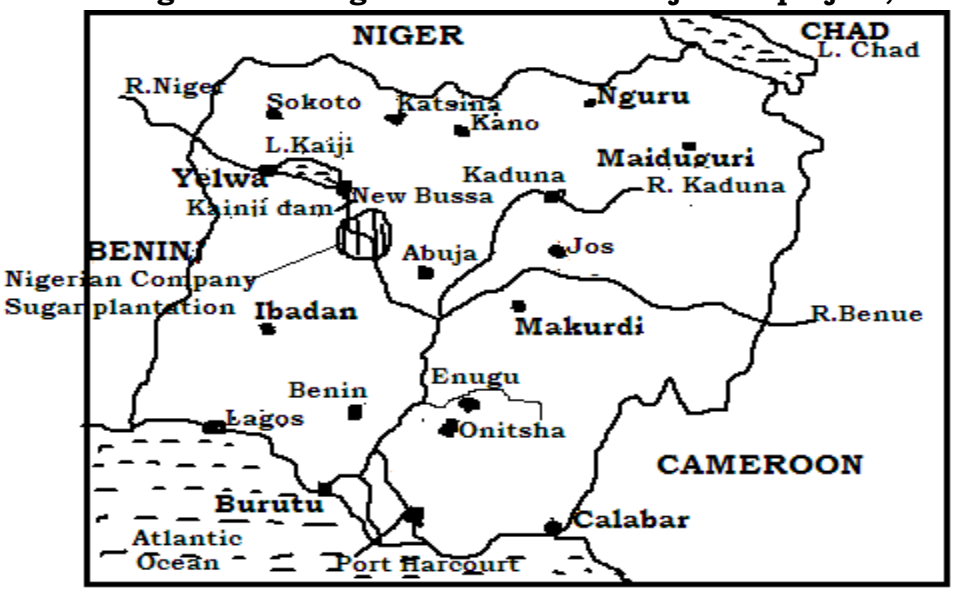
- Lake Volta, acts as barrier to communication from the east to the west thus causing remoteness.
- Loss of bio-diversity (vegetation and animals).
- Increased salination reduced land productivity.

Steps being taken to address the negative effects of the project;

- Reclaiming of more land to reduce congestion along the river banks.
- Constructing of health facilities to treat human diseases.
- Developing of resettlement schemes for the displaced people.
- Establishing of barriers to control floods.
- Applying of fresh water to farms to reduce salinity.
- Applying of fertilizers made from phosphates to restore soil fertility

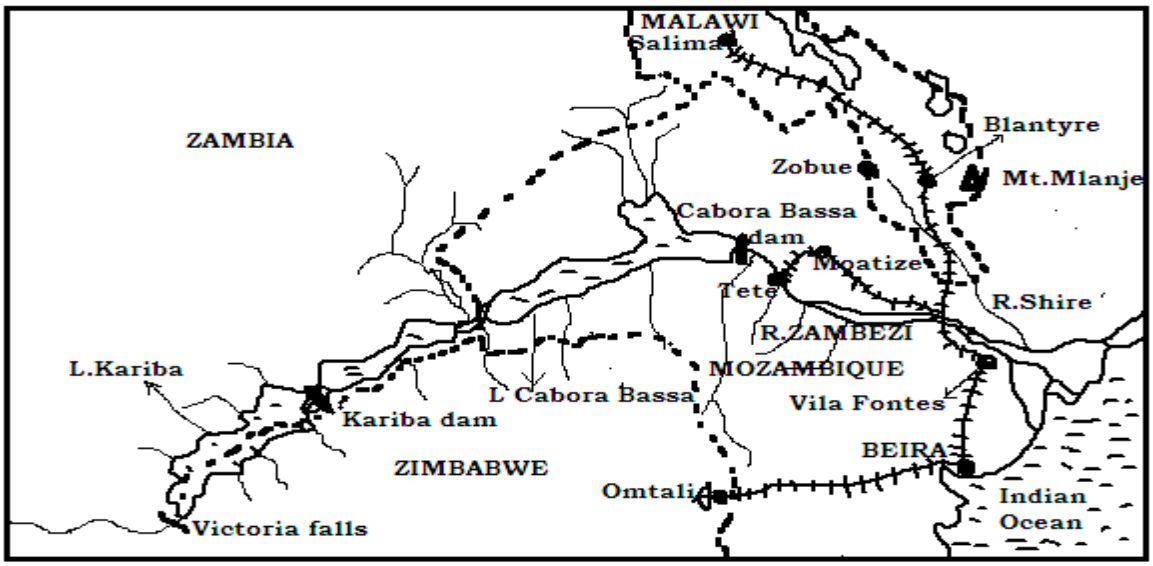
KAINJI DAM PROJECT.

A sketch of Nigeria showing the location of Kanji dam project;



CABORA BASSA DAM

Study **figure below** of the Cabora Bassa multi-purpose river development scheme and answer the questions that follow;



(b) Why was the Cabora Bassa Multi-Purpose river development scheme established?

(c)Explain the benefits of the Cabora Bassa Scheme to the people living in the surrounding areas.

(d) Outline the problems brought about by the establishment of the scheme.

Why the Cabora Bassa Multi Purpose river development scheme established;

- To provide HEP for domestic and industrial use.
- To provide water for irrigation during the dry season.
- To control floods on the lower river Zambezi.
- To increase food production through irrigation farming.
- To control water borne diseases spread by floods.
- To provide employment opportunities to people living around the scheme.
- To strengthen Portuguese political attachment to the region.
- To improve navigation facilities upstream as far as Tete.

Factors that influenced the location of the Cabora Bassa Multi Purpose Project;

- The presence of R. Zambezi provides constant flow/supply of water for dam construction.
- Existence of a narrow gorge ideal for the establishment of a dam that is less materials used during construction.
- Existence of a hard basement rock provided a firm foundation for the dam.
- Existence of extensive land for the construction of the dam and other infrastructure.
- Presence of a broad valley upstream to accommodate the reservoir.
- The need to control floods on the lower valley downstream.

Benefits of the scheme to the people living in the surrounding areas;

- Provides HEP for domestic and industrial use/purpose.

- Provides employment opportunities to people who earn income hence improving Standard of living.
- Growth of towns like Beira, Tete with related advantages like trade and commerce.
- Irrigation has led to more land area under cultivation hence increased food production.
- Creation of a lake has led to improved navigation hence easing movement of people and goods. It also provides water for domestic and industrial use.
- The Scheme is a source of exports such as HEP leading to generation of foreign exchange.
- There is fishing on the created lake which provides fish a rich source of proteins to man.
- There is diversification of energy sources leading to alternative power source and income.
- There is exploitation of minerals leading to industrial development.
- There is improved international relations with neighboring countries such as South Africa creating bilateral trade.
- Source of revenue to the government through taxes used to develop roads and schools.
- Has led to development of tourism industry that is a source of employment and local income.
- It is a research and education centre for field work and training purpose.
- People acquire skills in operating machines, fertilizers application leading to quality and quantity production.
- It has led to control of floods hence reducing destruction of property and farmlands.

Problems resulting from the establishment of the Scheme;

- Flooding of the upper areas seasonally leading to displacement of people.
- There is loss of biodiversity due to increased human activities and flooding/ Loss of vegetation covers due to dam construction.
- Siltation of the area behind the dam which requires constant dredging.
- Growth of water weeds hindering navigation on the created lake.
- Development of urban centres with associated problems like crime rate, prostitution.
- Drowning of agricultural land by the manmade lake.
- Pollution from industries/ oil leaks leading to environmental degradation.
- Spread of water borne diseases/pests like Bilharzia spread by snails.
- Displacement of people leading to high cost of resettlement.

TRANSPORT SECTOR OF AFRICA

INLAND WATER TRANSPORT IN AFRICA

(a) Draw sketch map of Africa and on it mark and name;

(i) Lakes; Nasser, Kariba and Volta,

(ii)Water bodies; Atlantic and Red Sea,

(iii) Any two rivers used for transport. (These are R. Nile and R. Congo)

A sketch map of Africa showing selected features;

(Check on the map of Africa showing lakes and Rivers).

Obstacles faced when using the rivers named in (a)(iii) above for navigation;

- Presence of rock outcrops in some parts of the rivers makes navigation very risky.
- Construction of dams like Aswan and Kariba at some points of these rivers limits water transport.
- Sharp meanders for example along river Congo make the distance longer.
- Fluctuation in water levels especially during the dry season reduces the navigable distance.
- Existence of shallow areas which discourage movement of large water vessels.
- Steep slopes which restrict accessibility to the banks of rivers in some areas.
- Floating vegetation in form of water hyacinth limits navigation along these rivers.
- Existence of waterfalls and rapids along some parts like Inga falls along river Congo, Victoria Falls along river Zambezi disrupt water transport.
- Location of some rivers in remote areas which are sparsely populated limits the use of such rivers.
- Non productive hinterland which limits settlement and infrastructural development.
- Limited capital leads to use of poor vessels which makes it slow and risky leading to accidents.
- Flooding limits the use of some rivers.
- Low levels of technology limits the development of transport facilities along these rivers.
- Limited skilled labour limits the operation of water vessels.

Advantages of using inland water transport in Africa;

- Inland water transport is relatively cheaper compared to road transport.
- It is suitable for transporting bulky goods and breakable goods.
- Low cost of maintaining the navigable rivers through minor dredging and port improvement.
- It complements the existing roads and railways connections.
- Helps in promotion of trans-boundary trade and fosters international/regional cooperation.
- There limited chances of highway robbers along African rivers.
- African rivers and lakes are free from congestion unlike the roads.

Suggest the measures that should be taken to promote inland water transport in Africa;

- Locks should be constructed to allow navigation across dams.
- Canals should be constructed to by-pass waterfalls and rapids.
- Dams should be constructed to maintain the constant water flow.
- African government should acquire loans and invest in the development of ports and improve the port handling facilities.
- Constant removal of the floating vegetation by biological, mechanical should be done.

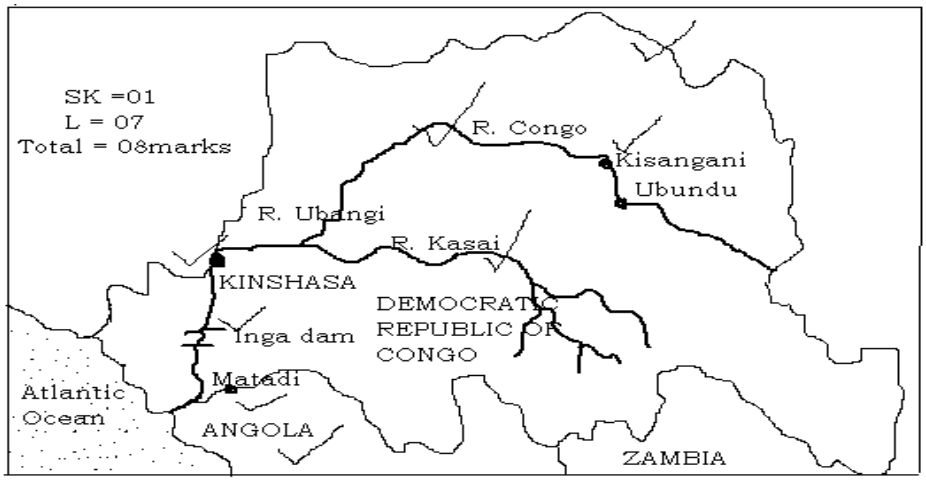
- Gates should be constructed to regulate the follow of water and ensure use of rivers through the year.
- Modern ports should be constructed to allow anchoring of vessels.
- Deepening and widening river channels to allow the sailing of large vessels.
- Containerization should be done to regulate congestion.

(a) Draw a sketch map of Democratic Republic of Congo and on it mark and name

(i) River; Congo and Kasai, (iii) Neighbouring country; Angola,

(ii) Inga dam, (iv) Towns; Kisangani, Matadi and Kinshasa.

(a) **A sketch map of DRC showing the waterway system:**



Describe factors influencing development of water transport in DRC:

- Presence of large permanent rivers like River Kasai, Ubangi, Congo and their tributaries. A larger portion of these rivers is navigable all year round.
- The area receives heavy and reliable rainfall of over 1500mmp.a/Large water bodies.
- Presence of thick forest vegetation makes some areas remote. These are only accessed by rivers.
- Availability of adequate capital from local and foreign investors for investment in water transport.
- Existence of a rich hinterland which provides goods for export like agricultural, mineral, forest products.
- Modern technology to developer the waterways.
- Gentle relief at the river banks which allows establishment of river ports.
- Abundant Skilled labour to work in the water transport sector.

Explain the role of water transport in the development of DRC:

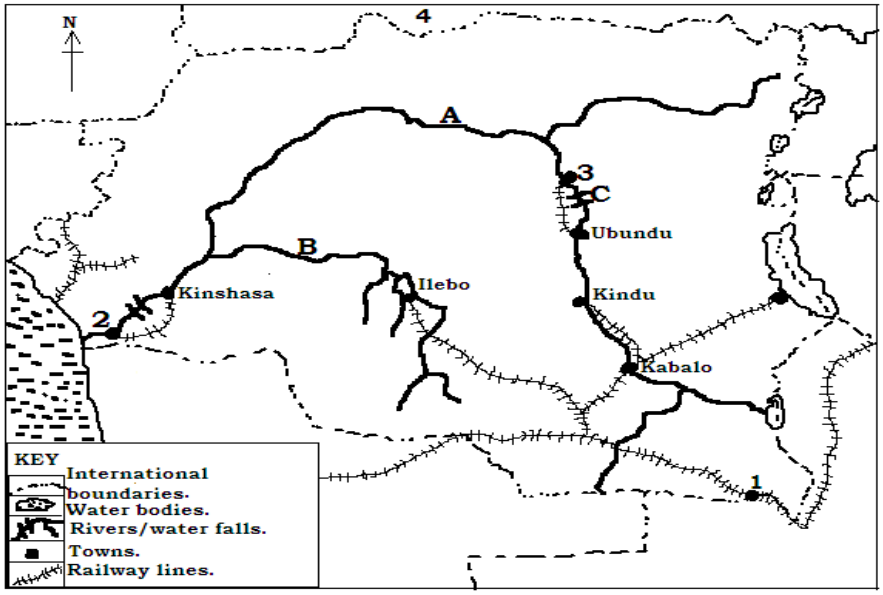
- Transportation of goods and people to market and outside DRC.
- Development of Ports like Kisangani, Kinshasa, Matadi, Ubundu, Lubumbashi.
- Provision of employment opportunities to the population leading to improved standards of living,
- Diversification of the economic activities hence reducing overdependence.
- Revenue through taxation.

- Development of tourism hence foreign exchange.
- Income generation hence improved standards of living.
- Development of industries due to easy transportation of raw materials and people.

Outline the measures being taken to develop the transport sector in DRC:

- Joining Regional cooperation to develop the transport sector jointly e.g. the Trans-African Highway.
- Extending all weather roads to formerly remote/inaccessible areas.
- Building by-passes/canals to avoid swampy areas and connecting water courses where there are unnavigable sections due presence of rapids and waterfalls.
- Heavy capital investment in roads and railway network by using internal and external sources of funds.
- Construction of bridges along rivers.
- Containerization at the ports for easy handling of goods.
- Investing in trans-shipment services.
- Calling for Peace talks to restore political stability.

Study Figure below, showing the railway system in the Democratic Republic of Congo (DRC) and answer the questions that follow.



(a) Name the;

(i) Rivers marked **A** and **B**, (iii) Towns marked **1, 2** and **3,**

(ii) Waterfalls marked **C**, (iv) Country marked **4**

(a) (i) Rivers; **A** is R. Congo/Zaire, **B** is R. Kasai,

(ii) Waterfalls **C** is Stanley/ Buyoma falls.

(iii) Towns; **1** is Lubumbashi, **2** is Matadi **3** is Kisangani

(iv) Country **4** is Central African Republic.

(b) **Factors which have influenced the development of railway transport in DRC;**

- The existence of thick/dense forests has limited railway coverage in some areas which are impenetrable hence remoteness.
- The existence of numerous waterfall and rapids along rivers has hindered navigation leading to construction of railway transport to bypass such obstacles.
- The numerous tributaries of Kasai River are not navigable leading to wide coverage of railway system.
- The availability of a productive hinterland e.g. the Kasai and Shaba region have large deposits of minerals like copper and Gold hence served with railway transport.
- The presence of a gently sloping landscape has made it easy to construct railway transport system.
- The availability of large sums of capital that is invested in railway transport provided by the government and foreign countries.
- The availability of a highly skilled labour to carry out the work of railway construction contributed to the development of railway transport in DRC.
- The availability of a positive government policy that supports the construction of railway transport in DRC.

(c) **The role of railway transport to the development of DRC**;

- Has generated employment to a number of people in DRC leading to improved Standard of living/increased income.
- Has provided a cheap means of transport for raw materials like minerals hence industrialization.
- Has led to development of urban centres/towns like Lubumbashi, Kinshasa associated advantages.
- Has led to development of infrastructure like roads connecting to other areas.
- Has generated local revenue through taxation leading to infrastructural development.
- Has generated foreign exchange which is use to finance government programmes like purchase of drugs.
- Has promoted international relations with other countries like Zambia,
- Has led to diversification of transport sector thus reducing strain on air, roads and water ways.
- Has promoted agricultural sector through connecting to farms.
- Has promoted tourism industry by easing movement of tourists to the tourist centres.

(d) **Steps being taken to improve the transport sector in DRC;**

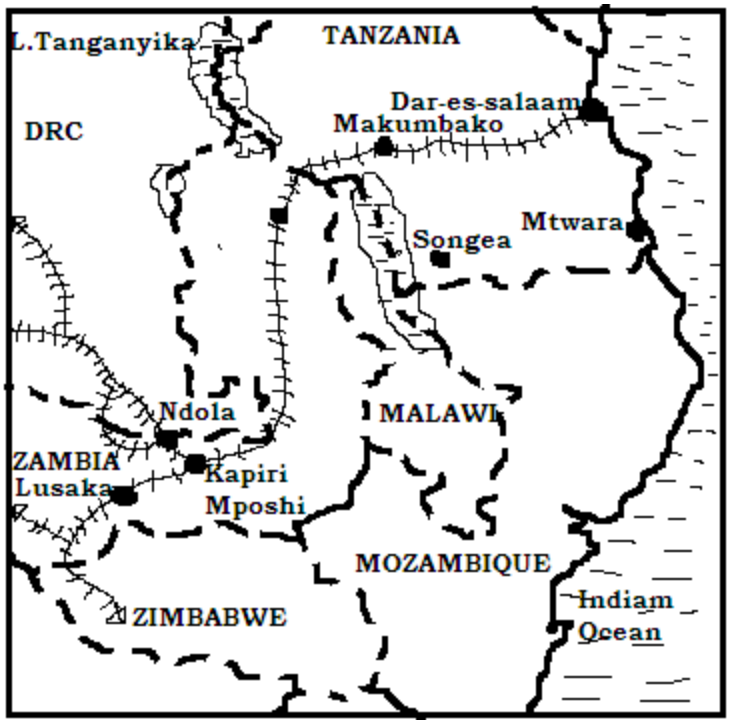
- Roads and railways are being extended to areas which were formerly remote.
- Importing of modern cranes is being carried out to facilitate easy loading and offloading of goods at the pass sections of the railway and water ways.
- Promoting of regional cooperation is being carried out by setting up Trans African High Way.
- Feeder roads are being constructed in areas that are off the major transport routes.

- Diversification of the transport system is being carried out to provide easy movement of goods and people by using any other suitable mode of transport like roads, air, and water.
- A large sum of capital is being invested in the transport sector by modernizing roads and railways to ease movement of people and goods.

RAILWAY TRANSPORT

TAZARA

A sketch map showing the extent of TANZAM railway and selected water bodies, Towns and neighbouring countries.



Role of Tazara Railway in the development of Zambia;

- It opened up the formerly remote areas in Zambia hence increasing accessibility.
- Generated employment opportunities for the population leading to better standard of living.
- Increased agricultural production in the interior leading to increased supply of raw material and food.
- Increased importation of industrial raw materials leading to industrial development.
- Eased the movement of labour to work in the mines and other sectors.
- Provided an export route for Zambia's copper leading to increased international trade.

- Growth of urban centres/urbanization like at Ndola and Lusaka along the railway line.
- Development of the tourism industry hence generating more foreign exchange.
- Increased mineral exploration and exploitation hence a wider tax base for the government.
- Promotion of internal and international trade with in Zambia and outside.
- Has led to development of infrastructure like road connecting to the railway.

Problems/Challenges facing the transport sector in Zambia;

- Vast nature of Zambia makes it difficult to connect to the national railway and road grids.
- Fluctuations/Instability of fuel prices leading to high transport costs.
- Heavy rains during the wet season lead to destruction of road network.
- Seasonality and silting of rivers in Zambia hinder the development of water transport.
- Zambian railway lacks connectivity with neighbouring Countries like Namibia due to varied gauges.
- The narrow roads lead to traffic jam leading to delays in delivery of goods.
- Physical barriers like steep slopes lead to high costs of constructing transport routes.
- Landlockedness of Zambia leads to dependence on foreign ports leading to delays in delivery of goods.
- Shortage of skilled labour in the transport sector like Pilots, Engineers makes it costly to operate.
- Frequent breakdown of frames due to outdated technology leads to delays in delivery of goods.
- High operation costs especially in buying railways wagons.
- Limited capital for investing in the transport sector.
- Frequent accidents lead to loss of lives and merchandise.
- Limited volume of merchandise makes it costly to operate.

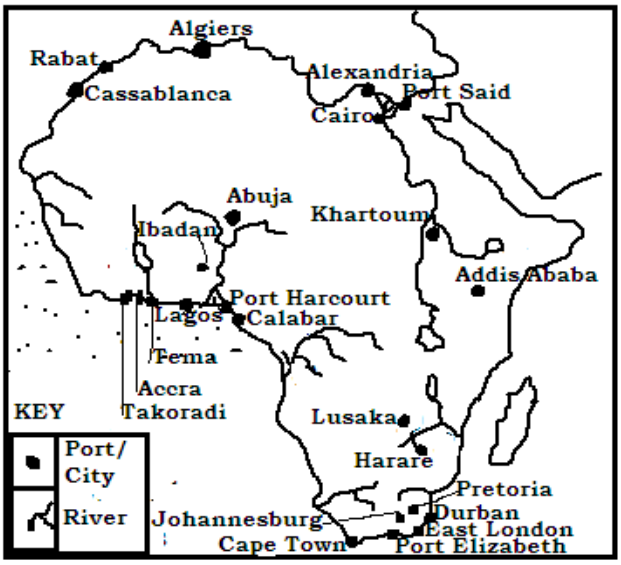
Steps/measures being taken to improve the transport sector in Zambia;

- Diversifying of transport networks to increase flexibility like use of roads, railways, air, and pipeline.
- Mobilizing of more capital from local and international investors.
- Mobilizing of more skilled labour from other countries like China.
- Establishing of road and railway network maintenance workshops and camps.
- Adopting containerization of goods for easy handling and reduce delays in delivery if goods.
- Creating awareness/educating passengers on the proper use of different means of transport to reduce accidents.

- Regional cooperation and joining of trading blocks to increase on accessibility and volume of goods.
- Installing of traffic lights on the roads to regulate traffic.
- Improving on roads using intermediate technology like tarmacadamising of roads.
- Training of more labour force locally and internationally to improve on their skills.

URBANISATION IN AFRICA

A sketch map of Africa showing selected major cities and ports.



Conditions that favoured the development of Ibadan (Nigeria) into an urban centre;

Physical;

- Gentle landscape/Flat terrain for easy construction of buildings.
- Large tracts of land for urban development and expansion.
- Fertile soils for agriculture hence emergency of an agricultural town.
- Availability of plenty of water for domestic and industrial use.

- Rich productive hinterland leading to expansion of the town.
- Availability of various energy sources for domestic and industrial use leading to urbanization.
- Strategic location for easy accessibility of Ibadan.

Human;

- High population growth rate in the Country leading to the expansion of town.
- Well developed infrastructure like roads making movement of people easy.
- Growth of industries attracting large population for labour, market leading to urbanization.
- Historical factors because Ibadan is an ancient town with historical trade links.
- Positive government policy of deliberate planning of the urban centre.
- Political stability leading to growth and expansion of the town.
- Trade and commerce attracting expansion of the Urban centre.
- Mining activities attracting large population to the urban centre.

OR

<u>Conditions that favoured the development of Alexandria (Egypt) into an urban centre;</u>

Physical:

- Presence of deep waters for anchoring of ships.
- Presence of hard basement rock for construction of port facilities.
- Low tidal range facilitating its operation throughout the year.
- Ice free conditions enabling it to operate throughout the year.
- Strategic location of Alexandria for easy accessibility leading to rapid growth of the urban centre.
- Rich and productive hinterland leading to the expansion of the port.
- Limited land for settlement in Alexandria leading to concentration of people along the Nile, resulting to urbanization.
- Gentle landscape allowing easy establishment of port facilities.
- Availability of plenty of water for domestic and industrial use.
- Mining activities attracting large population to the urban centre.

Human;

- Political stability attracts people leading to port expansion.
- Historical factors like early settlement.
- Skilled labour force to construct the port facilities.
- Growth of industries attracting a large population for labour and market.
- Well developed infrastructure like roads and railways easing movement of people to town.
- Sufficient capital to buy materials to construct the port.
- High levels of technology used in constructing port facilities.
- Trade and commerce attracting expansion of the port.
- Positive government policy of deliberate planning of the urban centre.
- Historical factors that is a centre for civilization and early settlement of the Romans.

Negative effects of urbanization on the environment in the urban centres chosen above; (take a case study)

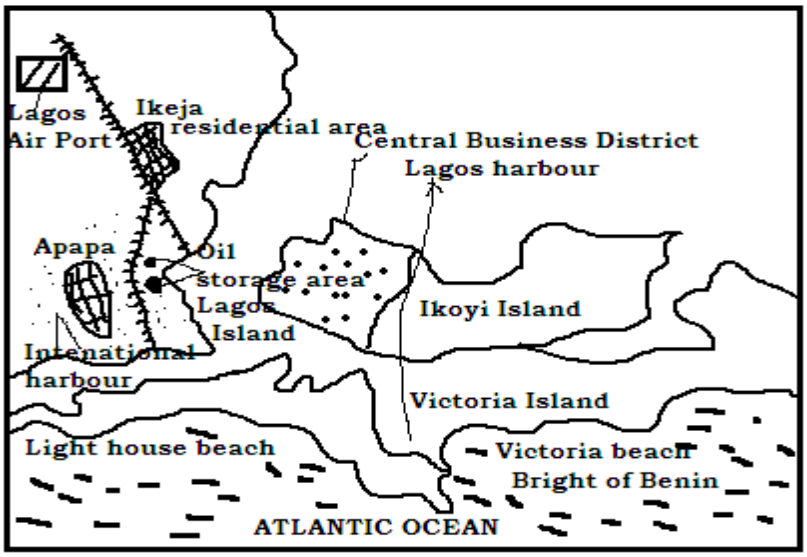
- High government expenditure to cater for the large population.
- Pollution of air, water and land leading to respiratory tract infections.
- Congestion of human and vehicle leading to delays.
- Acute shortage of land leading to overcrowding.
- Unemployment leading to high crime rates.
- Development of slums and associated problems like spread of diseases.
- Destruction of vegetation cover leading to land degradation.
- Encroachment on agricultural land leading to low production/displacement of people.
- Shortage of food leading to malnutrition/famine.

Steps being taken to address the negative environmental effects above;

- Constructing of wide roads/highways, sub ways and tunnels to ease traffic congestion.
- Building of sky scrappers/storeyed buildings to increase on the area for settlement.
- Recycling/treatment/re-use of solid waste to reduce pollution.
- Constructing of more industries to create employment.
- Constructing of low cost houses to address slum conditions.
- Enforcement of laws/legislations to correct social evils/installation of cameras to track the criminals.
- Rural transformation to reduce rural urban migration.
- Importing of food from neighbouring countries to reduce food shortage.
- Carrying out afforestation/re-afforestation/green belts to address pollution.
- Sensitizing the people about environmental conservation.

URBANISATION IN NIGERIA

(a) A sketch map of Lagos port showing its hinterland



(b) <u>Factors that led to the development of Lagos port;</u>

Physical factors;

- Strategic location that is being an EntrePort for imports and exports. / Coastal location of Lagos gives her easy accessibility.
- Presence of deep waters allows anchoring of large vessels.
- Protection from strong winds and waves by Islands like Lagos and Victoria.
- The discovery of oil in 1970s attracted mass settlement hence its expansion.
- Low tidal range allows anchoring of water vessels through the year.
- Ice free conditions allow business operation throughout the year.
- Presence of Lagos lagoon, enlarged movement facilities.
- Low lying relief/ land allow easy establishment of industrial and residential areas.

Human factors

- Developed transport facilitates mobility of labour to and from the port.
- Historical background that is started as a small slave trading centre for natives and Europeans.
- Rich and productive hinterland like cocoa, groundnuts, palm oil, rubber, hides and skins.
- Easy accessibility to the hinterland through roads, railways and water connections.
- The functions of Lagos as an industrial centre attracted more people/high population.
- Large sums of capital to invest in establishing port facilities.
- Supportive government policy towards industrialization and urbanization.
- Advanced technology used for dredging the harbour, draining the swampy area of Ikoyi.

<u>Functions of Lagos Town</u>;

- Industrial centre with oil refineries, steel plants and textiles.
- Administrative centre as it was the federal capital city of the Nigeria.
- It's a commercial centre with many business activities.
- It's a major residential centre with over 5,000,000 people.
- It's an educational centre with many educational institutional and universities.
- It's a communicational centre with many rail and road networks.
- It's a tourist centre with many tourist attractions.

<u>Problems facing Lagos Town</u>;

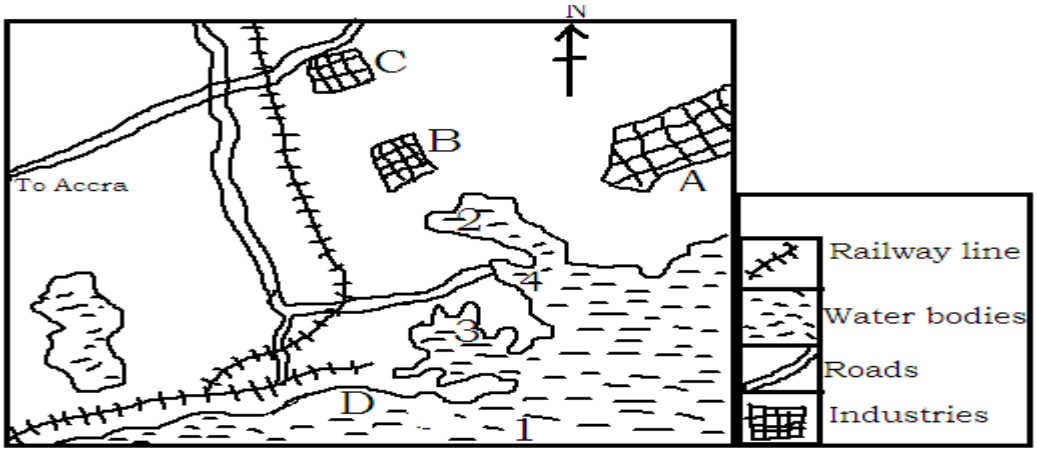
- Limited land discourages expansion of the Town.
- Traffic congestion in the town and at the port leads to delays.
- Poor housing facilities/slums/overcrowding leads low standard of living.
- Pollution of the land, water and air due to industrial establishment.
- High crime rate like prostitution, theft, and robbery.
- Silting of the harbour limits the anchoring of vessels.
- Flooding due to low lying position thus destruction of port facilities.
- Unemployment leads to low standard of living.
- Easy spread of diseases like malaria because of the swampy areas.

Measures being taken to solve the above problems;

- Carrying out containerization at the port to reduce congestion.
- Changing the capital city to Abuja to reduce congestion.
- Educating Masese to reduce on pollution.
- Building of sky scrappers to reduce land shortage.
- Treating of wastes or recycling to reduce pollution,
- Constructing of more low cost houses to reduce shortage of accommodation.
- Carrying law enforcement against pollution.
- Using of traffic lights to reduce accidents and congestion.
- Constructing of subways and flyovers.

URBANISATION IN GHANA

Study the Figure below; Sketch map of Tema Port and answer the questions that follow;



(a) Name;

(i) Water bodies 1 and 2,
(ii) Harbours 3 and 4,
(iii) Industries A, B and C,
(iv) Gulf marked D.

(a) (i) Water bodies; 1 is Atlantic Ocean, 2 is Chemu Lagoon
(ii) Harbours; 3 is Main harbour, 4 is Fishing harbour
(iii) Industries; A is Aluminum smelting, B is Oil refinery, C is Steel works
(iv) Gulf D is Gulf of Guinea

(b) Physical factors that led to the development of Tema Port;

- Presence of calm waters allow establishment of port infrastructure.
- Presence of offshore waters that permits sailing and docking of large ocean vessels.
- Presence of a rich hinterland serves the port with goods.
- Vast land allows port expansion.
- Presence of a strong basement rocks on which the port was established.
- The low tidal range that permits ships to anchor safely.
- Presence of well sheltered harbour protects the port from strong waves.
- Presence of deep offshore waters that permits sailing and docking of large Ocean vessels.

- Presence of building stones in the nearby Shai hills.

Human factors:

- Availability of large capital to developed port facilities.
- Well developed transport by roads and railways eases access to the port.
- Closeness to Volta project ensures cheap supply of hydro electric power.
- Supportive government policy of proposing port development.
- Modern technology used in construction of port infrastructure.
- Abundant skilled labour to manage the port facilities.

(c) <u>Importances of Tema Port to Ghana</u>;

- Opened up employment opportunities to many Ghanaians in various businesses and projects thus improving standard of living.
- Its s source of revenue to the government through levying taxes to various businesses on the port.
- It has opened up the interior of Ghana to the outside world and consequently trade developed.
- It has led to urbanization and its related advantages like trade and commerce.
- The port attracts tourists to the region who come in with foreign exchange.
- It has stimulated development of industries in the region that provide employment opportunities.
- It has developed infrastructure like railways lines and markets.

(d) Negative effects of growth of ports on the environment;

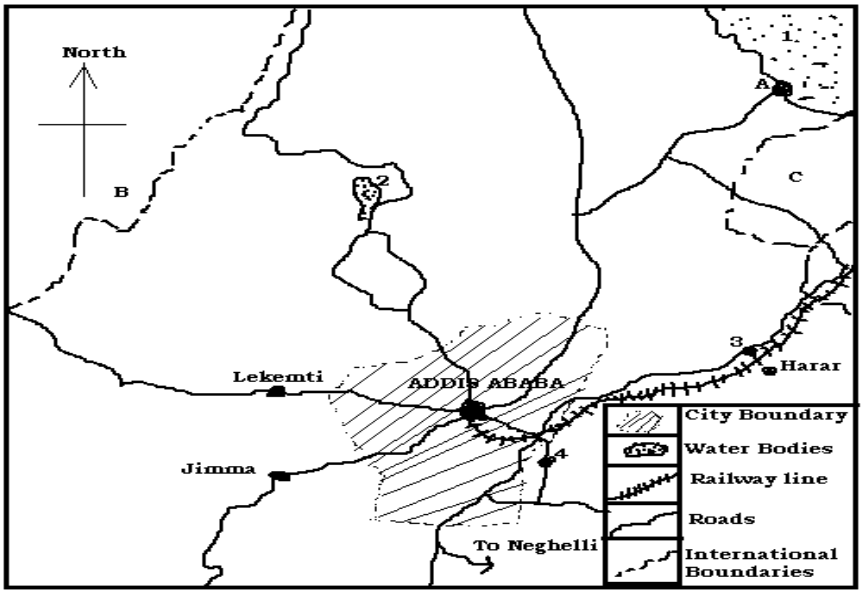
- Overcrowding leading to delays.
- Congestion at the port limits quick delivery.
- Siltation at the harbour increases the cost of dredging.
- Limited land discourages port expansion.
- Urban related problems like prostitution.
- Pollution of land, water and air.
- Easy spread of diseases due to poor sanitation.

(ii)**<u>Measures being taken to solve the problems facing Tema Port;</u>**

- Dredging the harbour to reduce siltation.
- Strengthening of police force to fight crimes.
- Improving sanitation and medical services to fight spread of diseases.
- Constructing of more housing units to the congestion in houses.
- Relocating of other economic activities to reduce congestion.
- Encouraging vertical expansion to reduce land shortage.
- Encouraging proper disposal of industrial wastes to reduce pollution.

URBANISATION IN ETHIOPIA

1. Study the figure below showing the regional setting of Addis Ababa and answer the questions that follow;



(a) Name the;

(i) Water bodies marked 1 and 2,
(ii) Port marked A,
(iii) Countries marked B and C,
(iv) Towns marked 3 and 4,

(a)(i) Water bodies: 1 is Red sea, 2 is Lake Tana.

(ii) Port A is Assab/Asseb.

(iii) Countries; B is Sudan, C is Djibouti.

(iv) Towns; 3 is Diredawa, 4 is Asselle.

(b) **Factors for the development of Addis-Ababa City;**

- Climatic conditions like the cool temperatures favourable for settlement.
- Situated in a plateau/flatland area for settlement due to easy construction of infrastructure.
- Historical factors that is it was the emperor's administrative seat.
- Rich hinterland both agricultural and mineral resources.
- Central location within Ethiopia that is easy to access from all sides.
- Efficient transport and communication by roads, railway and air hence easy to access to the Red sea.
- Large population around the Ethiopian plateau/Highlands due to the harsh environment elsewhere.
- Availability of large sums of capital to invest in urban infrastructure.
- Presence of many industries that provide employment to the large population.
- Availability of fresh water for domestic and industrial use.
- Favourable government policy of promoting urban development.
- Presence of large land for construction of settlement, roads, industries, etc.
- Availability of reliable power/energy for domestic and industrial use.
- Availability of abundant skilled labour force for development of infrastructure.
- Modern technology for the development of urban infrastructure like; sky scrappers.
- Political stability has attracted development of infrastructure.

(c) **Functions of Addis-Ababa City;**

- It is an administrative Centre.

- It's the capital city of Ethiopia.
- It is a commercial centre.
- It is an industrial centre.
- It is the Headquarter of international and regional groupings like AU.
- It is a tourist centre for is the site of the Emperor's seat.
- It is an educational centre with many schools, colleges and universities.
- It is a financial centre with banks and insurance companies.
- It is a transport and communication centre.

(d) **Effects of Urbanization on the environment in Ethiopia;**

- Pollution of the air, water and land.
- Destruction of the vegetation cover.
- Encroachment on agricultural land.
- Extensive concrete surfaces reduce water infiltration and increase water runoff.
- Congestion of people and vehicles.
- Easy spread of contagious disease.
- Poor housing facilities lead to development of slum.
- Smog leading to poor visibility.
- High crime rate.
- Rural urban migration

2. Study Table **34** below showing urban population for selected countries in Africa (2000) and answer the questions that follow; **Table 34**: Urban Population for selected African Countries (2000)

Country	**Urban Population ('000)**
Egypt	31,000
Ethiopia	12,000
Nigeria	57,000
South Africa	23,000
Zimbabwe	4,000
Total	**127,000**

Adapted from: World Resources (1998/99): A Guide to the Global Environment. Environmental Change and Human Health, World Resources Institute, P.274.

(a) Draw a pie chart to show the proportion of the population living in urban areas.

(b) Name the Country with the;

(i) Highest, (ii) Lowest, urban population.

Converting values to degrees:

Egypt = $\frac{31,000}{127,000}$ x 360^0 = $87.8^0 \approx 88$

Ethiopia = $\frac{12,000}{127,000}$ x 360^0 = $33.8^0 \approx 34^0$

Nigeria = $\frac{57,000}{127,000}$ x 360^0 = $161.6^0 \approx 162^0$

South Africa = $\frac{23,000}{127,000}$ x 360^0 = $65.16_0 \approx= 65^0$

Zimbabwe = $\frac{4,000}{127,000}$ x 360^0 = $11.2^0 \approx 11^0$

A pie-chart showing urban population for selected African countries (Use degrees in the pie chart) **(Use your graph book)**

(i) The Country with the highest population is Nigeria

(ii) The country with the lowest population is Zimbabwe

(a) <u>Conditions which have led to the growth of any one urban area in either Nigeria or Ethiopia. (Take a case study)</u>

Nigeria: Ibadan, Lagos, Abuja, Oyo, Benin, Onitsha, Enugu, Port Harcourt.

Ethiopia; Addis Ababa, Asselle, Diredawa, Gore, Dessye.

- Identification of the town. (01mk)
- Historical factors that is early settlements due to trade/commercial activities.
- Availability of a rich hinterland to provide food to the urban population.
- Low population/large tracts of land for expansion of the urban area.
- Presence of large quantities of fresh water for domestic and industrial use.
- Low incidence of pests and diseases provide a healthy environment.
- A variety of large deposits of minerals of commercial value leading to growth of the city.
- Cool climate attracts a large population to settle in town.
- Efficient transport such as roads and railways, airways.
- Supportive government policy towards establishment of urban centres.
- Many industries attract large urban population for employment.
- Modern technology for establishment of infrastructure.
- Stable supply of power such as HEP for domestic and industrial use.
- Adequate capital to set up infrastructure in the city.
- Skilled and semi skilled labour to work in the construction and urban planning.
- Political stability further creates a conducive atmosphere for settlement.
- Large market for industrial produce.

(b) (i) **<u>Advantages of urbanization in any one Country (Choose a country);</u>**

- Development of infrastructure like hospitals, schools, roads, recreational centers, power and telephones.
- Increased employment for the population.
- Creation of market for commodities and services.
- Decreases pressure on the land in the rural areas.
- Development of tourism thus foreign exchange.
- Generates revenue to the government.
- Foreign exchange is earned through attracting tourists.
- Promoted international relations.

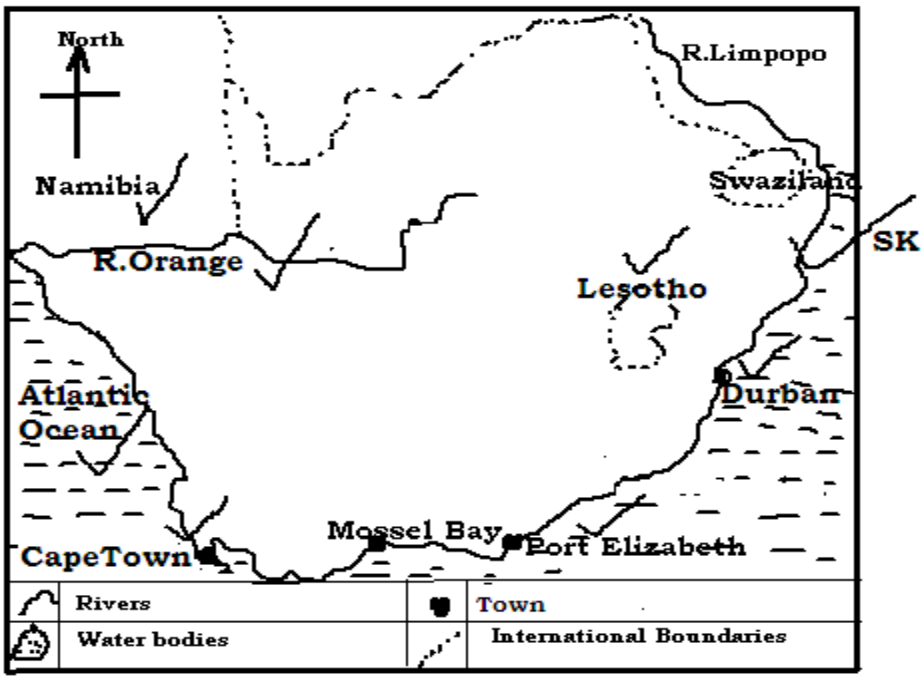
(ii)**<u>Disadvantages of urbanization in any one Country (Choose a country);</u>**

- High cost of living.
- Poor station problems.
- High rates of crimes.
- Traffic congestion/overcrowding.
- Pollution of air and land.
- Easy spread of diseases.

- Unemployment and its effects like gambling, pick pocketing.
- Loss of vegetation cover.
- Shortage of land for expansion.
- Shortage of accommodation.
- Rural-urban migration and associated evils.
- Increased government expenditure.

3. (a) Draw a sketch map of Southern Africa and on it mark and name;
   (i) Water bodies; R. Orange and Atlantic Ocean,
   (ii) Countries Namibia and Lesotho,
   (iii) Towns; Cape Town, Durban and Port Elizabeth.

   (a) **A sketch map of Southern Africa showing selected water bodies, Countries and Towns**;



- It is strategically located at the Southern tip of South Africa hence easily accessible by water to international trade routes.
- It had a rich hinterland with agricultural and mineral deposits.
- It was an area of early settlement by the Dutch, British and Portuguese which led to the construction of the Port/City.
- There was efficient transport and communication by water, roads and railway transport network.
- The existence of a large population offered a ready market and labour for the goods produced.
- The warm sunny summers and mild wet winters were conducive for the growth of crops and settlement.
- It had extensive land for the expansion of the city.
- The land was relatively flat and made the construction of the city very cheap/easy.
- It had a deep natural harbour which is well sheltered from strong waves.

- There were ice free conditions which enabled navigation throughout the year.
- It experienced a low tidal range which allowed navigation throughout the year.
- There was a positive government policy towards advanced technology used in the construction of the city.
- There was advanced technology used in the construction of the city.
- There was large capital injected in the construction of the city.
- There was large quantity of fresh water supply for use in the city from rivers like Vaal.
- Abundant skilled labour in various activities of the city.
- Political stability favoring infrastructure development in Cape Town.
- Abundant power for domestic and industrial use/Variety of different power sources.

(c) **The functions of Cape Town:**

- Administrative capital city of Republic of South Africa.
- It is a business/commercial centre with many trade activities.
- It is a communication centre with many modes of transport like railways and communication services.
- It's an educational centre with many colleges and universities.
- It's a recreational centre with many entertainment activities.
- It is a residential center with accommodation facilities.
- It is an industrial center with many industries like food processing,
- It's a financial/banking centre with many banks and insurance companies.
- It's a port that handles imports and exports.
- It's a tourist centre with many tourist potentials.
- It's a cultural centre with many cultural monuments.
- It's a healthy centre with many medical facilities.

(d) **Problems faced by people living in Cape Town;**

- There is pollution of water, land and air.
- There is accumulation of smog leading to poor visibility resulting into accidents.
- There is congestion/overcrowding at the port and within the central Business District.
- There is widespread unemployment.
- There is high crime rate, violence, prostitution.
- There is limited land for expansion.
- There is easy spread of diseases.
- There is traffic congestion in the city.
- There is high cost of living in the city.
- There is racial segregation /separate development.
- There is limited surface water due to low rainfall as a result of off-shore winds.
- Sea flooding/ Sea incursion that destroy life and property.

HIST 1

PRE-COLONIAL TRADE IN THE INTERIOR EAST AFRICA

- Before the 19th century, African societies carried out some trade among themselves.
- This was because no society produced all it needed to survive.
- This internal trade was always conducted on a barter system.

- However around the 1st half of the 19th century (1840-1850), Long Distance Trade developed.
- This involved movements of people from local to international levels all over E. Africa.

LONG DISTANCE TRADE

- It was also called pre-colonial caravan trade.
- This was the trade that was carried between the coastal merchants and the interior tribes in E.Africa.
- The traders covered very long distances from the interior to the coast.
- Long distances had to be covered in caravans of between 100-1000 men to and from the coast.
- This always took months or even a year before they would reach the coast and back to the interior.
- The main participants in the trade included Nyamwezi, Kamba, Yao, Chagga, Kikuyu, Baganda, Banyoro and the Luo.
- These traded with the Arabs and Swahili people at the coast.
- Goods from the interior included ivory, animals, Skins, Slaves, Gold, Bee wax, salt, and copper.
- They were all exchanged for goods like beads, guns, mirrors, clothes and glass which were brought by the coastal people.

Reasons for the development of the Long distance trade

- ❖ The trade developed because of several tribes that produced surplus goods which enabled them to offer some for sale.
- ❖ There was also high demand for foreign goods by African societies e.g. guns and clothes which they had to get from the coast.
- ❖ The arrival of the Portuguese at the coast in 1500 A.D also forced the Arabs to abandon the Indian Ocean trade and join the Long distance trade.
- ❖ The opening of trade routes in the interior of East Africa enabled the traders to reach all corners of East Africa for trade.
- ❖ Seyyid Said's settlement in Zanzibar in 1840 also increased the demand for slaves who were needed to work on his clove plantations.
- ❖ Availability of trade items also led to its development e.g. slaves, Ivory, Bee wax e.t.c were all available in the interior.
- ❖ The abolition of slave trade in West Africa around 1840 forced many Europeans to resort to East Africa were slave trade had not yet been abolished.
- ❖ Some interior tribes had the traditional love for traveling long distances for example the Nyamwezi.
- ❖ Division of labour among the African societies encouraged the men to get involved in trade.
- ❖ The development of Swahili as a business language made it easier for people to communicate in trade.
- ❖ The flat nature of the land enabled traders to easily move up and down looking for trade items.
- ❖ The coming of the Indian Banyans at the coast who financed traders and provided loans.
- ❖ The presence of capable leaders e.g. Mirambo, Seyyid Said, Tippu - Tip and Muteesa 1 who efficiently organized the trade.
- ❖ The introduction of cowrie shells as a form of currency also eased the transaction of business.
- ❖ The introduction of guns also improved security along the trade routes.
- ❖ Co-operation between interior tribes and coastal people also facilitated smooth trade.
- ❖ Presence of already developed coastal towns which acted as the trading centers e.g. Mombasa.
- ❖ Availability of guns helped in raiding of villages for slaves and hunting of elephants.

- ❖ The trade was so profitable to the participants leading to its development.
- ❖ Good and favourable climate encouraged trade throughout the year.
- ❖ Development in transport system e.g. use of donkeys which eased movement of traders.

Organization of the Long distance trade

- ❖ The trade involved many interior tribes e.g. Nyamwezi, Kamba, Yao, Chagga and Baganda.
- ❖ These traded with the coastal Arabs.
- ❖ The trade was organized on caravan basis.
- ❖ Each caravan would have over 1000 men armed and it included porters and medicine men.
- ❖ Goods from the interior included, ivory, slaves, gold and Iron implements e.g. axes, pangas, hoes.
- ❖ Those from the coast included beads, glassware, plates, cloths, and swords among others.
- ❖ Slaves were acquired through raids on villages and ivory was got through hunting of elephants.
- ❖ Trade was initially conducted on a barter trade system i.e. goods exchanged for goods.
- ❖ Later on, cowrie shells were introduced but these were also later replaced by small copper coins.
- ❖ Trade was controlled by interior chiefs who negotiated with the merchants from the coast.
- ❖ Trade was also conducted in trading centers along the trade routes e.g. Ujiji, Tabora and Bagamoyo.
- ❖ These trading centres also served as resting places.
- ❖ The trade also involved taxation for revenue.
- ❖ Traders from the coast paid taxes to the local chiefs in the interior before their caravans could be allowed passage.
- ❖ The medium of communication was Kiswahili because it was the business language.
- ❖ Where communication became a problem, interpreters were used.
  - ❖ The best means of transport was head porterage and the Nyamwezi provided the most skilled porters, this was because they naturally enjoyed it and they loved walking for long distances.
  - ❖ The Indian banyans were the financiers of the trade and they provided loans to the traders to go into the interior to buy goods.
  - ❖ The trade followed three main specific trade routes i.e.

1. Northern trade route; it started from Pangani and Mombasa and passed through MT Kenya and Taita hills and it went up to Lake Baringo, crossing the rift valley up to Mt. Elgon. It was controlled by the Akamba.
2. Central trade route; this was the biggest and busiest route. It was controlled by Nyamwezi and it started from Bagamoyo through Zaramo, Gogoland, and Tabora to Karagwe, Buganda, Bunyoro up to Eastern Congo.
3. Southern trade route; It was controlled by the Yao. It started from Kilwa through Malawi, Southern Tanganyika up to the Muenomotapa Kingdom in Congo.
4. There was another less significant route from Southern Sudan through Northern Uganda, Turkana land via the Kenyan highlands up to the coast. It was controlled by the Khartoumers from Sudan.

The roles played by different tribes in the Long Distance Trade

Nyamwezi

- ❖ The Nyamwezi offered market for goods from the coast.
- ❖ On their return from the coast they always came with goods e.g. glass ware.
- ❖ They lived in central Tanzania and they were 1st people to move to the coast in caravans around 1830.

- The Nyamwezi acted as porters during the long distance trade and they enjoyed walking long distances.
- The Nyamwezi also supplied commodities to the traders e.g. copper, ivory, bee wax, salt, slaves.
- The Nyamwezi also controlled the biggest and the busiest route i.e. central trade route which linked Zaire / Katanga region, Bunyoro, Buganda to the East African coast.
- They acted as translators and interpreters in bargaining or negotiations because some of them had learnt Kiswahili language through their travels and because they played a role of middle men.
- The Nyamwezi also provided accommodation and lodging facilities to the long distance traders e.g. centers like Ujiji and Tabora.
- They provided food stuffs and beverages to the coastal traders who penetrated into the interior.
- The Nyamwezi under Mirambo and Nyungu ya mawe were great organizers of the L.D.T.
- They built a large commercial empire in central Tanganyika.
- The Nyamwezi also acted as guides and guards along the central trade route.

Why the Nyamwezi got involved in the L.D.T

- The Nyamwezi lived in central Tanzania i.e. which gave them a middle man's position between the coastal Arabs and the interior tribes.
- Among the Nyamwezi society, division of labour existed i.e. the women were left at home to plant, weed and harvest while the men simply cleared gardens and then joined trading activities.
- The Nyamwezi land was gifted with resources i.e. Ivory, Iron, copper, slaves, grains and hides which were highly demanded by the coastal traders.
- The Nyamwezi occupied a region in central Tanganyika that experienced long drought and therefore couldn't sustain them through farming hence resorting to trade with the coastal Arabs.
- The Ngoni invasion of the Southern trade route led into an increase in the volume of trade on the central route and this gave the Nyamwezi prominence in the trade.
- The introduction of guns also improved Nyamwezi's hunt for elephants and slaves on top of improving security along the trade routes.
- The Nyamwezi were surrounded by weak chiefdoms which made it very easy for them to attack and raid their neighbors for slaves.
- The Nyamwezi were good at walking long distances and therefore they found no problem carrying heavy tusks to the coast.
- Nyamwezi land was flat and since the journeys were so long, this eased the movement of caravans.
- Nyamwezi were very ambitious people who would always exploit any opportunity that came their way to the maximum.
- The emergence of Mirambo and Nyungu ya mawe also helped the Nyamwezi establish themselves as prominent long distance traders.

THE AKAMBA

- In the 1850's, the Akamba had established themselves as the most active long distance traders in the whole of Kenya.
- They occupied a dry area, lived a semi nomadic life and because of the poor soils they resorted to trade.
- They started trading with their neighbours e.g. Nyika, Embu, and Kikuyu hence getting access to the coast.
- The Kamba controlled the northern trade route and their major outlets were Mombasa and Pangani.
- With the development of the L.D.T, the Kamba became very active in slave trade and Ivory trade.
- They also supplied other items e.g. Tobacco, rhinoceros horns and wax to coastal traders.
- The Kamba were also skilled in Iron working such that they produced spears and arrows poisoned with snake poison.

- The Akamba also opened bases on their land to supply food to the passing caravan traders.
- The Akamba with their middle man position of the northern route provided relevant information in form of guards and guides.
- Under leaders like chief kivoi, the Akamba were encouraged to join long distance trade.
- They built a large commercial empire between Mt. Kenya and Mt. Kilimanjaro.

THE YAO

- The Yao were found in southern Tanganyika and they controlled the Southern trade route.
- The Yao were among the 1st people to participate in the L.D.T with their neighbours and the coastal merchants.
- The Yao were good slave raiders after learning military tactics of the Ngoni.
- They became a major source of slaves to the merchants.
- The Yao also served as middlemen connecting the interior tribes around Lake Malawi especially through Kilwa.
- Most of the Yao had embraced Islam hence they established good trading relations with the coastal merchants.
- Under powerful chiefs like Mpanda and Mataka i.e. the Yao were able to set up a strong empire and this encouraged many people to participate in the trade.
- Yao also served as porters in the trade because they were good at traveling long distances.
- Some of the Yao had learned Kiswahili through their contacts with the Arabs hence they acted as interpreters and translators in bargaining between the coastal Arabs and the interior tribes.
- They also provided food stuffs, beverages to the passing caravans.
- They also provided lodging facilities /accommodation to the traders.

PROBLEMS FACED IN THE L.D.T

- First and foremost, the distance covered was too long i.e. the Journey had to be covered by foot yet the goods were to be carried on the head.
- The heavy taxes imposed on the Arabs and the interior chiefs generated into war hence making the trade unsafe.
- The Indian banyans also always charged high interest rates on the coastal merchants hence making the trade unprofitable.
- Tropical diseases e.g. Malaria, sleeping sickness claimed many lives of traders and slaves leading to the decline of the trade.
- Wild animals e.g. lions used to attack the traders on their way to the coast not until guns were introduced.
- The introduction of guns increased slave raids, tribal warfare hence making the interior unsafe for many traders.
- Communication was a big problem because of the language barrier i.e only a few people in the interior knew and understood Kiswahili.
- Hostile tribes like the Masai and Nandi also made the trade difficult because they always attacked the traders who tried to penetrate into their areas.
- The Ngoni invasion also disrupted the trade i.e. the Tuta Ngoni disrupted trade between Ujiji and Tabora while the Maseko Ngoni disrupted trade along the southern trade route.
- The geography of the interior of East Africa was scary and impassible e.g. forests, Mountains, Rift valleys, Lakes and rivers, the Nyika plateau.

- ❖ The climate of E.Africa especially in the rainy season was not favorable because it slowed the movement of slaves and traders.
- ❖ The exhaustion of some goods in the interior also proved to be a problem e.g. the Elephants for Ivory were killed in large numbers.
- ❖ The coming of the missionaries also led to the collapse of the trade i.e. they were against slave trade.
- ❖ The colonization of E.A was what finally led to the eventual collapse of the long distance because slave trade was abolished and legitimate trade was introduced.

EFFECTS OF THE L.D.T

- ❖ It led to the formation and expansion of states because they had acquired guns e.g. Nyamwezi, Buganda.
- ❖ L.D.T led to the raise of strong statesmen e.g Mirambo, Nyungu ya mawe, Kabalega, Kivoi, Mpanda and Mataka because they had acquired guns which helped them acquire economic and political power.
- ❖ Many people became rich in the interior especially the chiefs and rulers and it helped them enjoy high standards of living.
- ❖ The rise of some states also led to the decline of some other states especially those that did not have guns e.g the expansion of Buganda led to the decline of Busoga, Toro and Bunyoro.
- ❖ The introduction of guns increased warfare, slave raids and tribal conflicts in the interior that led to a lot of destruction of property.
- ❖ The captured slaves were badly treated during their transportation to the coast e.g they were whipped and not given enough food.
- ❖ L.D.T led to the decline of agriculture because of constant slave raids which made cultivation difficult.
- ❖ Long distance trade led to the spread of Islam in the interior e.g some societies like Nyamwezi, Buganda and Kamba had many Moslems due to their contacts with Arabs.
- ❖ The trade also stimulated the growth and development of towns along the trade routes e.g Tabora, Ujiji and Bagamoyo
- ❖ Long distance trade caravan routes later developed into proper communication lines and this eased the transport system.
- ❖ The massive slave raids in the interior led to heavy depopulation especially in the southern Tanganyika e.g. Yao land.
- ❖ The introduction of guns almost depopulated the wildlife e.g. elephants' population in Nyamwezi area reduced highly due to the need for Ivory.
- ❖ Long distance trade opened up E.Africa to the outside world and this attracted many Europeans who came as traders, missionaries and explorers.
- ❖ Provided alternative livelihood to societies in dry areas e.g. Nyamwezi and Kamba.
- ❖ It led to the rise of society misfits e.g. Ruga Ruga and Maviti warriors.
- ❖ Led to a decline in local/traditional industry e.g. bark cloth making.

SLAVE TRADE IN EAST AFRICA

- Slave trade was the commercial transaction of buying and selling human beings.
- In E.A Slave trade was introduced by Arabs in 1000 A.D.
- However, by 1850 slave trade was on the increase.

Reasons for the increase in slave trade by 1850

- ❖ Abolition of slave trade in West Africa in 1840 forced Europeans to divert their attention to the slaves from East Africa.

- Seyyid Said's transfer of his capital from Muscat to Zanzibar also led to the rise of slave trade. He introduced clove growing and his plantations needed slaves.
- The presence British troops on the Atlantic Ocean who constantly patrolled the Ocean which meant that the Europeans had to divert to East Africa for slaves.
- Increased demand for foreign goods like guns and mirrors by the interior chiefs also led to the increase of slave trade in the interior.
- Slaves were highly demanded world over i.e. the French had sugarcane plantations in Madagascar and Americans also had plantations in Brazil.
- The availability of caravan trade routes made it easy for slaves to be transported to the coast. e.g. the southern trade route through Yao land.
- Introduction of guns made it easy for societies to raid each other hence acquiring slaves.
- The presence of able organizers especially the interior chiefs also led to the rise of slave trade e.g. Mirambo and Nyungu ya mawe of Nyamwezi, Tippu –Tip a coastal chief, chief kivoi of the kamba and chief Mataka of the Yao.
- The interstate and intertribal Conflicts also led to the rise of slave trade i.e. these misunderstandings between societies led to the raiding of each other for slaves.
- The presence of Kiswahili as a business language also led to rise of slave trade, because it made transactions very easy.
- Lack of valuable economic potential in some areas e.g. Nyamwezi land in central Tanganyika was too dry and could not support Agriculture forcing the Nyamwezi to participate in slave trade
- The Islamic culture of not employing fellow Muslims also led to the development of slave trade. This forced the Arabs to penetrate the interior to get slaves from the pagan communities.
- The Absence of vehicles and Railways lines also led to the development of slave trade because slaves were needed to transport goods to the coast.
- The profits from slave trade were high hence forcing people like Akamba, Yao, and Nyamwezi to carry out slave trade.
- The primitive culture of some African Societies also led to the development of slave trade i.e. it was the only way of getting rid of criminals, robbers, witches and impotent men.
- The establishment of Zanzibar, kilwa, Mombasa as leading slave markets also led to the development of slave trade. These acted as collecting centers for slave traders.
- The presence of decentralized societies. This meant that people were always living in small communities hence it was easy to defeat such communities and acquire slaves.
- Decline of gold trade at the coast led the increase in slave trade. This was because the people had to look for alternative sources of survival.
- The hospitality given to foreigners by African leaders also encouraged many European and Arab traders to come to East Africa to engage in slave trade.

Organisation of slave trade

- Many interior tribes were involved in this trade e.g. Nyamwezi, Kamba, Yao, Chagga, Banyoro, Baganda.
- These constantly raided their neighbors for slaves and sold these slaves to Arabs and Swahili traders.
- Slaves were acquired through hand picking unfortunate members of the societies e.g. criminals.
- Also, massive raids were carried out in villages at night and young men and women were captured and then sold to the Arabs.
- Interior tribes were always at war with each other and the defeated society would always provide slaves.
- Middlemen were also used to acquire slaves in the interior and then transport them to the coast.

- ❖ After a slave trader had bought his slaves he would chain them together.
- ❖ Slaves were then loaded with goods like ivory and minerals on their heads.
- ❖ They would be forced to match to the coast.
- ❖ As they moved to the coast the cruel /harsh Arabs would whip them.
- ❖ Those who were weak were either left to die or killed and many of them would die before they would reach the coast.
- ❖ The survivors would be given some time to rest, feed, while some were nursed and given clothing to impress the buyers.
- ❖ The routes used in the slave trade were the Northern route dominated by the Akamba leading to Mombasa.
- ❖ The central route dominated by the Nyamwezi was leading to Dar-es-salaam then to Zanzibar.
- ❖ The southern route dominated by the Yao was leading to Kilwa.
- ❖ The khartoumers' route dominated by the sudaneese was leading to Bunyoro and Buganda.
- ❖ On reaching the coast, the slaves would be fed, clothed, nursed to attract high pay.
- ❖ After this they would be paraded for the prospective buyers.
- ❖ Buying would either be at kilwa, Mombasa, or Zanzibar.
- ❖ From here, the slaves were then transported to Europe, America and Arabia.

Effects of slave trade

- ❖ Many people were killed through the raids and others died on their way to the coast.
- ❖ The massive raids depopulated many areas in East Africa.
- ❖ Many people ran away due to fear and uncertainty.
- ❖ Slave trade caused untold suffering and miseries in many African societies' e.g. villages were burnt and people were left homeless.
- ❖ Slaves were mistreated by the buyers and this dehumanized the Africans.
- ❖ Slave trade led to the hatred between societies especially the strong societies always raided the weak ones.
- ❖ Slave trade brought a lot of wealth and profits for those who participated in it e. g. Nyamwezi, Yao, Akamba.
- ❖ Slave trade led to the growth and expansion of some societies as the strong ones always raided the weak ones. E.g. Buganda against Busoga.
- ❖ At the same time, it caused decline of other societies especially the weak ones e.g. Busoga.
- ❖ Famine and hunger set in as a result in decline of agriculture.
- ❖ Some people abandoned farming and took on slave trade.
- ❖ Slave trade led to the rise of important personalities e.g. Mirambo, Nyungu ya mawe and Mohammed Ibn Hamid (Tippu-Tip).
- ❖ Slave trade encouraged internal trade and foreign trade i.e. the slave Arab slave traders were not only interested in slaves but also other items e.g. copper, Ivory, bee wax, honey e.t.c
- ❖ Many young men grouped themselves into warrior groups as a result of slave trade e.g. the Ruga Ruga and Maviti warriors.
- ❖ Slave trade led to the colonization of East Africa this was because many whites (Europeans) came to East Africa with a purpose of abolishing slave trade.
- ❖ Many foreign goods were imported into East Africa e.g. Mirrors, clothes hence the local people enjoyed these goods for the first time.
- ❖ Slave trade led to the spread of Islam and Kiswahili language into the interior of East Africa.
- ❖ Slave trade opened up East Africa commercially to the outside world.
- ❖ This attracted the French, British and Portuguese traders to come to East Africa.
- ❖ Slave trade stimulated the growth of coastal towns e.g. Zanzibar, Mombasa, Kilwa and interior towns like Tabora, Ujiji which acted as collecting centers.

- ❖ Slave trade also led to underdevelopment of East Africa because only strong men were taken.

THE ABOLITION OF SLAVE TRADE

- The campaign of abolition of slave trade was mainly spear headed by the British.

Reasons for the abolition of slave trade

- ❖ The missionaries attacked slave trade as an inhuman act and therefore they persuaded the traders to stop slave trade
- ❖ The industrial revolution in Europe (1850) led to the introduction of machines which replaced human labour hence slaves had lost market in Europe.
- ❖ Population increase in Europe made it useless to bring in more people whose services were by this time not needed.
- ❖ The industrial revolution created a high demand for raw materials and therefore slaves had to be brought back to Africa to grow cash crops to feed the 'hungry' industries in Europe.
- ❖ Over production of goods like sugar, clothes made it necessary to re-settle slaves so as to provide market for these excessive goods produced in European industries.
- ❖ Slave strikes had become so frequent e.g. they demanded holidays on Sundays and worship rights hence there was need to abolish slave trade.
- ❖ The abolition of the Trans- Atlantic slave trade in West Africa made it equally important for the same trade to be abolished in E.A.
- ❖ Change in politics of Europe meant that more Europeans were coming to East Africa and therefore there was need to stop slave trade in East Africa so as to create peace and security.
- ❖ The issue of treaties against slave trade also led to the abolition of slave trade e.g. the 1822 Moresby treaty, 1845 Hamerton treaty and 1873 Frere treaty.
- ❖ The role of missionaries under different religious groups e.g. they set up homes for the freed slaves who were already Christian converts and this encouraged the process of abolition of slave trade.
- ❖ The role of the British navy led to the abolition of slave trade. It patrolled the Indian Ocean waters to track down traders who were using it for smuggling slaves.
- ❖ European explorers had earlier on drawn the map of the interior of East Africa which also encouraged the abolitionists to come to East Africa and stop the trade.

Obstacles/problems faced during abolition of slave trade

- ❖ Anti – slavery campaigns were only concentrated at the coast and on the Indian Ocean waters neglecting the interior which was the heart of slave trade.
- ❖ Lack of co-operation from other European countries e.g. Spain, France and Portugal etc…Which all looked at the British Anti – Slave trade campaign as selfish.
- ❖ It was a big financial burden for the Britain because she single handedly patrolled the Indian Ocean waters and compensated slave traders.
- ❖ Slavery was an accepted custom among many African societies because it was a way of getting rid of wrong doers in the society e.g. criminals and therefore African chiefs saw no problem with it.
- ❖ Hostile tribes e.g. the Yao and Nyamwezi didn't want any foreigner to cross their land hence delaying the abolition process.
- ❖ Freed slaves were also reluctant to be free because many of them didn't have any land, property and also lacked practical skills to sustain themselves.
- ❖ Wild animals also scared the few abolitionists who attempted to go into the interior mainly because East Africa was covered by thick forests.
- ❖ Physical geographical barriers E.g. Rivers, lakes, valleys etc blocked the movement of the abolitionists.

- Tropical diseases e.g. Malaria, Sleeping sickness, typhoid reduced the number of the abolitionists.
- Lack of transport and communication lines i.e. there were no developed roads leading into the interior.
- Language barrier i.e. abolitionists were not familiar with the languages of the interior so they found it hard to negotiate with the traders to stop slave trade.
- Many people had migrated to different areas meaning that when the British came in to stop slave trade they found it hard to bring together people who had scattered in different areas.

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- The Arab slave traders were always armed with guns and were always ready to fight whoever interfered with their trading activities.
- There was lack of alternative means of transport to replace human porterage which was mainly done by the slaves.
- In some societies, there was no immediate alternative economic activity because it was their only source of livelihood e.g. in Nyamwezi land where it was very infertile for agriculture.
- Slave traders were very cunning and they could always raise British \
- flag when they saw a British patrol ship approaching.

STEPS TAKEN TO ABOLISH SLAVE TRADE

- It was Britain that spear headed the campaign against slave trade in the 18th century.
- In 1772, the Supreme court of England declared that Britain didn't allow slavery in England and those who owned slaves were supposed to free them.
- In 1807, through the effects of humanitarians (missionaries) and religious leaders, the British parliament passed a law making slave trade illegal.
- In 1815, the British navy started patrolling the Indian Ocean waters so as to check on the shipment of slaves.
- In 1822, the British used their influence to sign the Moresby treaty with sultan Seyyid Said. Captain Fair Fox Moresby signed on behalf of the British.
- By this treaty, no more slaves were to be exported to India, Madagascar, Mauritius and Christian countries.
- In 1824, Captain Owen set up the Owen protectorate over Mombasa to stop slave trade activities in the area.
- However this didn't work because slave trade was carried out along the whole coast and not only at Mombasa.
- In 1845, the Hamerton treaty was signed between Sultan Seyyid said and colonel Hamerton.
- The treaty persuaded Seyyid said to stop buying and selling slaves within and outside East Africa.
- Unfortunately, in 1856 Seyyid said died and colonel Hamerton also died in 1857.
- Seyyid Said was succeeded by his son sultan Ibn Majid who was not to co-operate with the British.
- Therefore the process of abolishing slave trade came to a standstill.
- It was not until 1870 when sultan Bargash took over the throne from Sultan Majid.
- In 1873, Sultan Bargash signed the Frere treaty with Sir Batte Frère to end slavery at Zanzibar.
- All slave markets in Zanzibar were closed.
- In 1890, Zanzibar became a British protectorate.
- In 1897, the Zanzibar slave market was burnt down and this ended slavery in Zanzibar and Pemba.
- In 1919, Britain took over the control of Tanganyika.
- She speeded up the process of ending slavery in mainland Tanganyika.

- In 1921, the compete abolition process was achieved.
- Britain imposed a law against slavery and this totally marked the end of slavery.

Why did the process of abolition take so long?
- The Indian Ocean was too big to be patrolled by British navy alone.
- European super powers e.g. France and Germany were not willing the support the abolition of slave trade because they still needed the slave workers.
- Britain lacked the funds for the campaign against slave trade i.e. it was very expensive.
- British war ships were always over powered by Arab slave traders because they were always many and had guns.
- The British were not familiar with all the various inlets and outlets used by the Arab slave traders.
- The abolition treaties signed were in most cases under looked by the slave traders.
- Arab slave traders were very cunning e.g. they always used the American flag once they saw the British patrol ships approaching.
- East Africa lacked alternative means of transport to replace human porterage which was mainly done by slaves.
- Members of the British navy always suffered and died from tropical diseases e.g. Malaria.
- The freed slaves didn't have any where to go after abolition of slave trade hence the process was made long.
- Interior chiefs e.g. Nyungu Ya Mawe, Mirambo, Kivoi, Mataka had built their empires using slave trade wealth and were not ready to abolish slave trade.
- Physical barriers e.g. Forests Mountains, Rivers, Lakes etc always made the work of the abolitionists very difficult.
- There was language barrier which also delayed the abolition of slave trade.

Effects of the abolition of slave trade
- There was decline of the former slave trading states e.g. Yao, and Nyamwezi because they had lost their source of their economic power.
- There was also loss of wealth and income to those individuals and societies that greatly depended on slave trade.
- The Yao who had made slave trade their sole occupation could not settle down to do agriculture after slave trade was abolished.
- There was population increase because the human exports that had depopulated mainland East Africa had stopped.
- Agriculture improved and new crops were introduced to facilitate the transition from slave trade to legitimate trade e.g. coffee, tea and sisal, e.t.c.
- People started attending to their farm lands which they had neglected during the slave trade era and this increased food production.
- People regained their status and dignity that had been eroded by slavery and slave trade.
- Security greatly improved because slave raids that had de-stabilized the interior were brought to an end.
- The abolition increased the spread of Christianity and Western culture.
- Missionaries therefore built mission stations, schools and hospitals for the freed slaves.
- Transport was improved. The Uganda railway was built to facilitate and aid the transfer from slave trade to legitimate trade.
- The abolition also led to the increase of European penetration into the interior of E.A especially the humanitarians.

- ❖ This subsequently led to the colonization of East Africa and this led to the loss of independence by East African states.
- ❖ The abolition of slave trade led to the introduction of legitimate trade. This was the trade in natural products e.g. cotton, coffee, Tea, sisal, etc. but not people.
- ❖ Former slave trade routes later developed into proper communication lines and this increased European penetration into the interior.
- ❖ The intertribal war that were always fought to acquire slaves were minimized which brought in an era of peace and security.
- ❖ Local people hated their traditional rulers who had collaborated with slave traders i.e. there was hatred between who had participated in slave trade and those who were opposed to it.

Revision questions

1. a) What factors led to the **development** of the Long distance trade in East Africa?
b) Describe the **organization** of the Long distance trade in the 19th century.

2. a) How was the Long distance trade in East Africa **organized** between 1800-1880?
b) What **problems** were faced by the merchants in the Long distance trade?

3. a) Why did the Long distance trade **decline** during the 2nd half of the 19th century ?
b) What **impacts/consequences/effects/results** did it have on the peoples East Africa?

4. a)Describe the role played by any **two** of the following societies in the 19th century Long distance trade
(1)Nyamwezi (2) Kamba (3) Yao
b) Why did the trade decline in the 2nd half of the 19th century?

5. a) Why did the Nyamwezi get involved in the 19th century Long distance trade?
b) What roles did they play in the organization of the trade?

6. a)Why did slave trade expand in East Africa in the first half of the 19th century?
b) How was Slave trade organized?

7. a) Describe the **working** of Slave trade in East Africa in the early 19th century.
b) What were the effects/consequences/results/outcomes of this trade?

8. a) Why was Slave trade **abolished** in East Africa during the 2nd half of the 19th century?
b) Why did the process of abolition prove to be so difficult?

9. a) Describe the **steps taken** by the British to abolish Slave trade in East Africa.
b) What problems were met by the abolitionists?

10. a) Outline the **steps taken** to abolish Slave trade in East Africa?
b) What were the **effects of the abolition** of Slave trade on the peoples of East Africa?

EUROPEAN ACTIVITIES IN EAST AFRICA

- From 1884, a growing number of Europeans picked interest in East Africa.
- These came as explorers, missionaries, traders and later on imperialists /colonialists.

- Most Europeans were either sent by their home government or by Organizations e.g. the R.G.S (Royal Geographical society), C.M.S (Church missionary society) and L.M.S (London missionary society).
- Others came as individuals e.g. Sir Samuel Baker and his wife and Dr. David Livingstone.
- Most Africans received them with open hands and offered them assistance not knowing that their activities would eventually lead to loss of African independence.

EXPLORERS IN EAST AFRICA

- This was the 1st group of Europeans to penetrate into the interior of E.Africa.
- They were interested in the geography of East Africa especially the River Nile system.
- The explorers included; Sir Samuel Baker and his wife, Richard Burton, John Speke, Henry Morton Stanley, Dr. David Livingstone, James Grant, Jacob Erhadt e.t.c.
- The activities of these explorers eventually led to the colonization of East Africa.

The role played by explorers in the colonization of East Africa

- ❖ They exaggerated the wealth of East Africa e.g. they reported about the reliable rainfall and fertile soils e.g. in Buganda which attracted more Europeans into East Africa.
- ❖ They provided geographical information about East Africa which attracted Europeans into East Africa e.g. John Speke discovered the source of the River Nile.
- ❖ The explorers destroyed the wrong impression that Africa was a '' white man's grave '' which led to an influx of Europeans into East Africa.
- ❖ Some explorers signed treaties with African chiefs which were later used to colonize such areas e.g. H.M Stanley requested Muteesa 1 of Buganda to invite missionaries.
- ❖ Explorers also drew maps which were later used by the colonialist to penetrate the interior of East Africa e.g. Erhadt drew a map of East Africa showing physical features.
- ❖ They established good working relations with African chiefs e.g. Stanley with Muteesa 1 which confused the Africans who thought that all white men were good and welcomed colonialists.
- ❖ They gave information about hostile and accommodative societies which helped colonialists come well prepared e.g. Banyoro were branded hostile while the Baganda were accommodative.
- ❖ Explorers also exposed the horrors of slave trade e.g. Dr Livingstone and this aroused public sympathy among Europeans to come and abolish the trade leading to colonialism.
- ❖ The success of their adventures led to increased missionary activities in East Africa e.g. Dr Livingstone persuaded missionaries to come and stop slave trade leading to colonialism.
- ❖ Explorers under their umbrella organizations also provided funds to those who were willing to travel to Africa leading to an influx of Europeans e.g. The Royal Geographical Society.
- ❖ Some Explorers served as colonial administrators and provided labour force for the colonial government e.g. Sir Samuel Baker became a governor of the Equatorial Province.
- ❖ Some explorers built forts which were later used as administrative centers by colonialists e.g. sir Samuel Barker built Fort Patiko in Acholi and Sir Gerald Portal built Fort Portal in Toro.
- ❖ Explorers also discovered routes and navigable waters which simplified the movement of future colonialists.

CHRISTIAN MISSIONARIES IN EAST AFRICA

- This was the 2nd group of Europeans to penetrate into the interior of East Africa.
- Missionaries also came to East Africa under several organization e.g.
  - ➢ Church Missionary Society led by Johann Ludwig Krapf and John Rebmann.
  - ➢ London Missionary Society led by Dr David Livingstone.
  - ➢ Holy Ghost fathers led by Father Homer.

- White Fathers who were Catholics e.g. Father Lourdel and Brother Ammans.

Why the missionaries came to East Africa

- They wanted the spread Christianity in East Africa because many of them believed that Africans didn't know anything about God.
- Missionaries wanted to abolish slave trade and Slavery in East Africa because they considered it to be inhuman.
- Missionaries wanted to promote Western Education in order to civilize the backward Africans.
- Missionaries also wanted to create a civil society by eradicating African Cultures and customs e.g. witchcraft and Killing of twins.
- The success of earlier travels by Explorers also inspired missionaries to come to East Africa.
- Missionaries wanted to answer the call of the African desire of evangelism e.g. Kabaka Muteesa 1 of Buganda sent a letter inviting missionaries through Henry Morton Stanley.
- Missionaries were also driven by the desire to reduce the spread of Islam which they blamed for the slave trade in the interior.
- They wanted to promote legitimate trade in East Africa after abolishing slave trade e.g. by introducing cash crops like coffee and tea.
- Some missionaries came to East Africa to complete the work of Dr David Livingstone who had died in 1873 and had left a big part of his work incomplete.
- Missionaries also had the intention of improving on the living conditions of Africans i.e. they wanted to fight diseases which had made life difficult for Africans.
- Some missionaries came to East Africa for exploration and adventure e.g. John Rebmann and Ludwig Krapf.
- Missionaries also came to East Africa due to the industrial revolution which had generated a lot of wealth for overseas adventures to spread Christianity.
- Missionaries were paving way for the European colonialists through their wonderful teachings by softening the hearts of Africans.

Problems faced by missionaries in East Africa

- Language barrier i.e. East Africa had many tribes and each had its own language therefore forcing missionaries to rely on interpreters.
- Tropical diseases also made their work difficult e.g. Dr. Livingstone died in 1873 due to Malaria.
- Hostility from Islam especially at the coast because the Arabs created a big challenge to the missionaries.
- Transport was poor since there were no developed roads at the time and missionaries had to walk very long distances from the coast to the Interior.
- Missionaries also faced difficult times in the interior due to hostile tribes e.g. the Galla, Maasai and Nandi.
- Geographical barriers also caused a lot of hardships to the missionaries e.g. they had to cross lakes, rivers, thick forests, Mountains, rift valleys e.t.c.
- East Africa was very far away from Europe and therefore missionaries would not effectively communicate with their home government.
- Wild animals e.g. lions and leopards also made missionaries' work difficult for example some of them and their followers were eaten up by lions at Tsavo.
- Missionaries at times lacked enough supplies e.g. they ran short of funds, food and medicines.
- Missionary work was also hindered by their small number in East Africa yet the area was very big.

- In some cases, their porters deserted them and ran away with their property e.g. Dr Livingstone lost his property to porters on his 2nd journey to Tanganyika.
- Missionaries were also mistaken for people with military assistance e.g. Kabaka Muteesa 1 of Buganda expected them to give him guns to fight Bunyoro.
- Missionaries also had quarrels and rivalry among their different missionary groups e.g. the W'ngereza-W'faransa wars (religious wars) in Buganda.
- Some missionaries wasted a lot of time in other activities e.g. Johann Rebmann turned to exploration and adventure instead of spreading Christianity.
- Missionaries were also disturbed by the traditionalists who threatened their authority and beliefs e.g. Bishop Hannington was killed because he was believed to be an enemy.

Effects of missionary activities

- The missionaries converted many people to Christianity and up to today the majority of the East Africans are Christians.
- Missionaries built several schools in Uganda to increase literacy e.g. Gayaza high school (1905), S.t Mary's college Kisubi (1908) and King's College Budo (1906).
- Missionaries also built several hospitals and provided better health services e.g. Rubaga Hospital by the white fathers and Mengo Hospital by the church missionary society.
- Missionaries also set up technical and vocational schools to provide practical skills, e.g. in carpentry and Tailoring and such schools ware built at Kisubi, Iganga and soroti.
- Churches were built wherever missionaries went and traditional shrines were destroyed e.g. at Nsambya, Rubaga, Namirembe e.t.c.
- Missionaries also brought a culture of morality, respect for life and created a civil society e.g. the killing of twins in Bunyoro was abolished.
- Missionaries fought slave trade by preaching equality of all men before God and ended up setting up homes for freed slaves.
- Missionaries also promoted the writing of East Africa's Languages e.g. Dr Krapf translated the Bible into Luganda.
- Missionaries also introduced the growing of cash crops e.g. cotton, coffee and pyrethrum.
- Missionaries also opened up mission stations that later developed into urban centers e.g. at Bagamoyo, Tabora, Kampala and Rabai Mpya.
- Missionaries also created employment opportunities as many Africans who were trained as nurses, teachers, interpreters or translators and clergymen.
- Missionaries also introduced many new languages like Latin, German, French and English which were taught to all students in missionary schools.
- Missionaries also carried out exploration work e.g. Dr Krapf discovered Mt Kenya in 1849 and DR Rebmann discovered Mt Kilimanjaro in 1848.
- Missionaries also introduced new styles of dressing, dancing, eating, Marriage and burial which were all to be conducted religiously.
- Missionaries divided Buganda and Uganda along religious lines e.g. political parties like Democratic Party for Catholics and Uganda Peoples' Congress for Protestants.
- Missionary education produced the pioneer nationalists of East Africa e.g. Jomo Kenyatta in Kenya, Apollo Milton Obote in Uganda and Julius Nyerere in Tanzania.
- Missionaries also constructed many roads which improved the transport sector in East Africa.

Effects of missionary activities on the Africans

- Africans embraced Christianity and neglected their traditional religions.
- Africans also neglected traditional medicines and went to missionary hospitals for treatment.
- Hospitals helped Africans to fight against the tropical diseases like malaria.

- ❖ Disunity was created among Africans due to divisions along religious lines.
- ❖ Africans attained western education by joining mission schools and neglected local education.
- ❖ Africans adopted the growing of cash crops and neglected the growing of traditional food crops.
- ❖ Africans enjoyed improved standards of living e.g. improved medical care.
- ❖ Urban centers were created in areas where missionaries settled e.g. Kampala and Bagamoyo.
- ❖ Africans adopted western cultures e.g. dressing and burial which were conducted religiously.
- ❖ Abolition of slave trade helped Africans to regain their dignity and respect.
- ❖ Many Africans gained employment in the colonial government after training e.g. secretaries.
- ❖ Africans also acquired many technical skills after attending technical schools e.g. building.
- ❖ Missionary education led to the rise of African nationalism e.g. formation of political parties.
- ❖ African dropped some of their cultures and customs e.g. killing of twins in Bunyoro.
- ❖ African minds were softened due to their wonderful preachings to easily allow colonialism.
- ❖ Africans were convinced to sign treaties which eventually led to loss of their land e.g. 1900 Buganda agreement.

The role played by missionaries in the colonisation of East Africa

- ❖ Through their wonderful preachings, missionaries softened the heart and minds of the Africans who welcomed colonialism with open arms.
- ❖ They often called on home governments to occupy areas where they worked leading to eventual colonisation.
- ❖ They involved themselves in the over throw of local rulers who were resisting Europeans e.g. Kabaka Mwanga was overthrown and replaced by a ' Puppet ' Kabaka Daudi Chwa.
- ❖ Missionaries only settled in areas where their home governments had economic interests which attracted colonialists to come and take over such areas e.g. in Buganda.
- ❖ Missionaries also convinced Africa chiefs into singing treaties which were later used to colonise such areas e.g. Bishop Tucker assisted in the singing of the 1900 Buganda Agreement.
- ❖ Missionaries laid a firm economic foundation for the colonial government to survive on by encouraging the growing of cash crops.
- ❖ They helped to finance other colonial agents e.g. The Church Missionary Society in 1891 injected 50,000 pounds into the activities of IBEACO which was also used in the colonisation process.
- ❖ Missionaries divided Africans along religious lines hence creating disunity e.g. in Buganda, Kabaka Mwanga was disunited from his subjects or followers who could not unite to fight colonialism.
- ❖ Missionaries helped to abolish slave trade and this created a conducive atmosphere for European settlement in East Africa leading to colonization.
- ❖ Missionaries identified hostile and accommodative societies e.g. Buganda was accommodative while Nandi were branded hostile which helped the colonialists to deal with the people accordingly.
- ❖ Missionaries also built schools in which Africans were brain washed to believe that everything western was good hence the Africans embraced colonial rule with open hands.
- ❖ Missionary education and teachings created a class of collaborators e.g. Sir Apollo Kaggwa, Semei Kakungulu who helped in extending colonial rule.
- ❖ Missionaries also set up mission stations e.g. at Bagamoyo and Rabai Mpya which were later used as administrative posts by colonialists.
- ❖ Missionaries also encouraged the use of foreign language e.g. English and Latin and this made communication between the Africans and colonialists very easy.

- ❖ Missionaries constructed hospitals to provide health services which were later used by colonialists to fight against the burden of tropical diseases.

MISSIONARY ACTIVITIES IN BUGANDA

- The 1st missionaries to arrive were the Church Missionary Society Protestant missionaries in 1876 and these were Rev. Alexander Mackay, Rev. C.T. Wilson and Sir Gold Smith.
- In 1879, Roman Catholic Missionaries led by Fr Simon Lourdel and Brother Ammans under the white fathers arrived at Kabaka Muteesa 1's palace.
- In 1896, the Mill hill Fathers arrived who were also Catholics.
- The Verona Fathers (Catholics) were the last to arrive from Sudan in 1910.

Why Kabaka Muteesa 1 invited missionaries

- ❖ Muteesa 1 wanted to answer H. M Stanley's request for missionaries to come to Buganda and did not want to disappoint his visitors.
- ❖ Muteesa 1 also hoped that he would enhance prestige among his fellow African chiefs by inviting white men to his palace.
- ❖ Muteesa 1 was also tired of the constant raids and demands from Muslims and traditionalists and hoped that missionaries would help him solve these conflicts.
- ❖ Muteesa 1 also wanted to make strong ties with their countries of origin because they were powerful states.
- ❖ He was a modernizer who believed that missionaries were the right people to help him modernize Buganda.
- ❖ He expected to get military assistance from missionaries against his traditional enemy Bunyoro.
- ❖ He expected military help against Egyptian aggressors who were busy extending the equatorial province south wards.
- ❖ Muteesa 1 also expected military help against Sudanese mercenaries who were hired to attack Buganda from the north.
- ❖ He wanted the missionaries to teach Christianity to his people since H. M Stanley had convinced him that the faith would be good for his people.
- ❖ Muteesa 1 also hoped that his people would gain from missionaries' knowledge and technical skills.
- ❖ Muteesa 1 was also ignorant and did not know the intensions of the missionaries but simply invited them.
- ❖ Christianity had softened Muteesa 1's heart and he ended up inviting the missionaries to Buganda.
- ❖ Muteesa also expected gifts from them in form of clothes, glassware and mirrors.

THE W'NGEREZA - W'FRANSA WARS

- These were also known as the religious wars in Buganda.
- They were fought between four different religious groups in Buganda i.e. Protestants, Catholics, traditionalists and Moslems.
- They were fought between 1885 and 1900.

Causes of religious wars

- ❖ The struggle by each religious group to win as many converts as possible led to confusion within Buganda hence resulting into the religious wars.
- ❖ Each religious group was struggling to win the favor and recognition of the Kabaka Muteesa 1, hence resulting into the religious wars.

- ❖ The death of Muteesa 1 in 1884 created a political vacuum in Buganda hence leading to confusion with in Buganda.
- ❖ The differences in the teaching of the different religious groups also confused the followers resulting into the religious wars.
- ❖ Christians didn't want to be dominated by the Muslims who were also unwilling to be dominated by Christians i.e. each group considered the other to be pagans.
- ❖ Imperial rivalry between France and Britain during the scramble and partition also led to the outbreak of the wars the between Catholics and Protestants respectively.
- ❖ There was also mistrust between the different Christian groups because each group wanted to dominate political offices in Buganda resulting into the wars.
- ❖ A rumor had circulated within Buganda that while in exile at Kabula, Kabaka Mwanga was learning Anglicanism and therefore the Catholics wanted the over throw him.
- ❖ The traditionalists hated Christians because they had undermined Buganda's cultural beliefs independence.
- ❖ The involvement of IBEACO in Buganda's politics also led to these wars e.g. in 1891, Captain Lugard armed the Protestants with 500 guns to fight the Catholics.
- ❖ The pages/servants at the Kabaka's court (palace) were always questioning the Kabaka's authority which forced Mwanga to kill thirty of them leading to the religious wars.
- ❖ Mwanga's arrogance, inconsistence and unfriendly relations with missionaries also contributed to the outbreak of the religious wars.
- ❖ The Catholics also accused Kabaka Mwanga of accepting IBEACO to work in Buganda because it was mistreating the Catholics.
- ❖ Each religious group wanted very many pages at the Kabaka's palace and this resulted into the wars.
- ❖ Kabaka Mwanga's failure to control foreigners at his palace resulted into conflicts between the different groups.
- ❖ The role of Arabs who misguided Kabaka Mwanga that Christians wanted to take over his kingdom also led to the wars.
- ❖ The murder of Bishop Hannington in Busoga in 1885 following the orders of Kabaka Mwanga also angered the Christians who resorted to war in order to overthrow Mwanga.
- ❖ The killing of the Uganda martyrs at Namugongo in 1886 also caused a lot of chaos and confusion within Buganda resulting into the religious wars.

Course of the religious wars

- ➢ These were the conflicts between the Christians, Muslims and traditionalists in Buganda.
- ➢ These wars took place between 1885 to 1890.
- ➢ By 1877, the Protestant missionaries under the Church Missionary Society arrived in Buganda.
- ➢ In 1879, the Roman Catholic missionaries also arrived in Buganda.
- ➢ All these groups had come after the invitation from Kabaka Muteesa 1 of Buganda.
- ➢ These two Christian groups were soon fighting for political influence at the Kabaka's court.
- ➢ In 1884, Kabaka Muteesa 1 died and was succeeded by Kabaka Mwanga.
- ➢ By this time, Muslims who had stayed longer in Buganda used their influence to warn Mwanga that the Christians wanted to take over his kingdom.
- ➢ Kabaka Mwanga's arrogance forced him to respond by denouncing all the new religions that never respected his authority.
- ➢ In 1885, Bishop Hannington was killed in this crisis in Busoga following the orders of Kabaka Mwanga.
- ➢ In 1886, many Christian converts were burnt to death at Namugongo also following the orders of Kabaka Mwanga.

- Sensing continued instability, Kabaka Mwanga planned to chase away all the religious factions from Buganda including Christians and Muslims.
- But they discovered his plan and the religious groups combined to overthrow him.
- Thereafter, they installed Kabaka Kiwewa as the successor to Kabaka Mwanga.
- By this time, Muslims were the strongest faction and they soon deposed Kiwewa for refusing to be circumcised.
- Kalema was installed as the new Kabaka after deposing Kiwewa.
- Muslims started persecuting Christians who fled to Kabula in Nkore.
- Christians reorganized themselves and Catholics came under leadership of Nyonyintono Honerat while Protestants came under Apollo Kaggwa.
- In 1890, Christian factions deposed the Muslims and Mwanga was reinstated with a lot of Catholic sympathies.
- In the same year (1890), Captain Lugard arrived in Uganda as a representative of IBEACO.
- Lugard used protestant missionaries to influence Mwanga for a treaty with Britain.
- Thereafter, he armed the Protestants with 500 guns and this caused more fighting against the Catholics and Muslims.
- Muslims then fled to Bunyoro and Captain Lugard also followed them after realizing that Catholics also wanted him dead.
- In 1893, Sir Gerald Portal signed a treaty with Mwanga.
- In 1894, a protectorate was declared over Uganda.
- In 1897, Mwanga was overthrown and replaced by his infant son Daudi Chwa II.
- Mwanga then Joined Kabalega in a rebellion in the North and the two were captured by Kakungulu.
- In March 1900, the Buganda agreement was signed and this ended the religious wars in Buganda.

Effects of the religious wars

- The wars divided the Baganda and the whole of Uganda along religious lines.
- The wars subsequently created enmity between the followers of the different religious groups.
- They led to the formation of political parties along religious lines such as U.P.C (Uganda Peoples' Congress) for Protestants and D.P (Democratic Party) for the Catholics.
- Many people were killed during the wars e.g. 30 converts (Uganda martyrs) were murdered in 1886 at Namugongo.
- Many people who had supported the Protestants gained political offices in Buganda upon victory e.g. Semei Kakungulu and Apollo Kaggwa.
- Armed Christian groups were formed in order to defend themselves e.g. the Protestants had 500 guns given to them by Captain Fredrick Lugard.
- Political offices in Buganda were allocated along religious lines e.g. Katikiro /Prime minister was to be a Protestant where as Omulamuzi or chief justice was to be a Catholic.
- The Catholics and Muslims were sidelined at Mengo and therefore remained in political inferiority.
- Schools in Buganda were run on sectarian ground e.g. Kings College Budo was for the Protestants and st Mary's College Kisubi was for the Catholics.
- The 20 counties of Buganda were allocated on religious grounds.
- The Protestants got 12 counties, 8 for the Catholics and 2 for the Muslims.
- The Wars confused Mwanga to the extent of failing to decide on which religion to follow thus he kept on wavering his support from one group to another.
- Mwanga was later forced to exile where he accepted Christianity along protestant lines taking the name Daniel.

- The Wars also led to the eventual colonization of Uganda as Christian Missionaries especially Protestants called upon the British to take over Uganda to protect their lives and interests.
- Led to the rise of different personalities e.g. Sir Apollo Kaggwa and Semei Kakungulu.
- The wars slowed down growth of nationalism in Uganda due to divisions along religious lines.
- Christianity was wide spread within Buganda and Uganda at large.
- The wars caused massive destruction of property in Buganda.
- Buganda's traditional religion greatly declined due to wide spread Christianity.
- The confusion created by the wars led to the signing of the 1900 Buganda Agreement.
- Islam was greatly reduced in influence within Buganda.
- Many people fled to other parts of Uganda due to insecurity in Buganda e.g. fled to Bunyoro.

TRADERS AND CHARTERED COMPANIES IN E.AFRICA

- The 3rd group of Europeans to penetrate into the interior of E.A was the traders.
- They came in large numbers after the successful mission of explorers and missionaries.
- Traders basically came for commercial reasons e.g. looking for cheap sources of raw materials, new markets and new areas for investment.
- On arrival the traders formed companies and associations to operate in East Africa and most prominent ones were;
  - Imperial British East Africa Company (IBEACO) which operated in Uganda and Kenya.
  - German East Africa Company (GEACO) which operated in Tanganyika.

THE ROLE OF CHARTERED COMPANIES IN THE COLONIZATION OF EAST AFRICA

- They provided the initial skilled man power for the administration of their areas of influence e.g. captain Fredrick Lugard (IBEACO) and Captain Karl peters (GEACO).
- The traders financed the colonial administration on behalf of their respective home government e.g. I.B.E.A.CO on behalf of the British government.
- The traders fought and defeated rebellious societies e.g. IBEACO defeated Bunyoro, Nandi and Maasai while the G.E.A.CO fought /defeated the Abushiri Arabs.
- The traders also developed transport and communication networks e.g. IBEACO constructed Murram roads and even designed the plan for the Uganda railway.
- They under took businesses that generated funds that supported colonialism e.g. they encouraged people to grow cash crops.
- They constructed administrative posts, forts and garrisons which were later used by the colonial government e.g. at Old Kampala, Naivasha, Machakos e.t.c.
- They created security organs which improved on internal security e.g. IBEACO built a private army which was later used in the colonization of Uganda.
- They helped in the effective abolition of slave trade and establishments of legitimate trade.
- The Chartered companies protected Christian missionaries who were also colonial agents e.g. IBEACO'S private army always provided security to the Church Missionary society.
- Chartered companies also provided their home governments which information about the economic potential of east Africa e.g. IBEACO reported about the fertile soils of Uganda and the Kenya highlands which later attracted colonialists.
- They signed treaties with the local people that were later used by their home government to occupy E. Africa e.g. IBEACO signed treaties with the Baganda, Kikuyu and Masai.
- The chartered companies called on their home governments as a result of failure to administer e.g. when IBEACO ran bankrupt that called on the British government to take over.

- The traders only settled in areas where their colonial governments had economic interests so that it would be easy for the colonialists to settle with in East Africa.
- The rivalry between IBEACO and GEACO forced them to sign the Anglo - German agreement of 1890 (Heligoland treaty) which practically eroded the independence of E.Africa.
- Company officials strongly campaigned for the retention of their areas of influence e.g. captain Lugard Fredrick strongly supported Britain colonize Uganda because IBEACO had done all the underground work.

PROBLEMS FACED BY CHARTED COMPANIES / TRADERS IN EAST AFRICA.

- Tropical diseases e.g. malaria and Sleeping Sickness always claimed the lives of many traders making their work difficult.
- Harsh Climatic conditions e.g. too much rain, sunshine while some areas were too dry e.g. Taru desert in Kenya.
- Language barrier mainly because East Africa had main tribes which used different languages.
- Poor transport and communication in East Africa also hindered the work of the traders.
- Wild animals e.g. lions and leopards that were many at the time also made their work difficult.
- Frequent rebellions also frustrated the traders making their work difficult e.g. IBEACO faced resistance from Bunyoro, Masai, and Baganda.
- Geographical barriers e.g. Mountains, Lakes, Forests e.t.c made their movements very difficult.
- Theft of their property by the porters and guides also affected the work of the traders in the interior.
- Lack of funds i.e. the companies lacked a steady source of income to meet the costs of administration.
- Some of the African chiefs were reluctant to trade with the companies and they imposed heavy taxes.
- There was rivalry between the different companies of the Europeans e.g. IBEACO always rivaled GEACO.
- Lack of man power i.e. the companies lacked effective and good administrators because the company officials were few.
- The companies also lacked enough supplies e.g. food, drugs and clothes because it was difficult to get them from their home government.
- The companies also lacked proper communication between their headquarters in Europe and their headquarters in East Africa.
- The companies always faced strong opposition from the Swahili and Arab slave traders who were always armed with guns.
- IBEACO involved itself in the politics /religious wars in Buganda and this strained the company's budget because the wars were very expensive to fund.

SCRAMBLE AND PARTITION OF EAST AFRICA

- The word scramble refers to the rush by European powers to acquire colonies in East Africa.
- Partition refers to the division of East African territories among European countries i.e.
  - Uganda, Kenya and Zanzibar for Britain and
  - Tanganyika for Germany.

Reasons for the scramble and partition of East Africa

- Need for raw materials i.e. most Europeans nations wanted to control areas of cheap raw materials to feed their 'hungry' industries back home e.g. cash crops and minerals.

- ❖ There was the need to secure profitable market overseas for the European goods which had over flooded the European markets.
- ❖ There was need to secure areas where surplus capital would be invested i.e. the industrial revelation had generated a lot of wealth for the Europeans who wanted to set up plantations and exploit minerals.
- ❖ There was need to resettle the excess population in Europe especially the slaves who had become useless after the invention of machines.
- ❖ The strategic. Importance of River Nile also forced European powers to scramble for East Africa i.e. after Britain had occupied Egypt; she wanted to control all the countries through which R. Nile passed i.e. Uganda and Sudan while Kenya was to provide an in-let for Uganda at the coast.
- ❖ King Leopold's activities in Congo i.e. The Belgians had gained a lot of wealth from the minerals and forest resources in the Congo and this forced other European powers e.g. Germany and Britain to rush to E. A so as to exploit her resources.
- ❖ Mineral discovery in S. Africa in 1867 by the Dutch also forced other European powers to rush to E. Africa with the hope of exploiting minerals.
- ❖ The growth of nationalism in Europe created the need for international recognition and prestige among European countries i.e. a country with many colonies was considered great and superior.
- ❖ Power imbalance in Europe also created a need for colonies e.g. after the 1870—1871 Franco - Prussian war France lost her mineral rich provinces of Alsace and Lorraine. This caused her to rush to Africa to compensate for her loss and similar Germany and Britain could not sit back.
- ❖ The Berlin conference of 1884 — 1885 also increased the need for colonies by European powers i.e. it was a platform that was used to divide African territories among European super powers.
- ❖ The European powers had a desire of stamping out slave trade which they regarded as evil and a crime against humanity.
- ❖ European powers wanted to spread Christianity because they didn't want to see Africans go to hell. I.e. E. Africa was seen as a place where seeds of Christianity would be sown.
- ❖ Europeans also wanted to civilize Africans who were considered backward and barbaric and this was to be done through the introduction to western Education.

COURSE OF THE PARTITION OF EAST AFRICA

- The partition of E.A was interestingly not done in E Africa but in Europe.
- The process began after the chancellor of Germany Otto Von Bismarck called the Berlin conference in 1884 and this is where much of the paper work was done.
- The process of partition went through three main stages.
  - ➢ Berlin conference (1884 – 1885)
  - ➢ 1st Anglo – German Agreement (1886)
  - ➢ 2nd Anglo – German Agreement (1890) popularly known as the Heligoland treaty.

BERLIN CONFERENCE;

- This conference was called by Otto Von Bismarck, the German chancellor. The conference came up with the following guidelines;

- ➢ No European power was to ally with any African country to frustrate colonialism.
- ➢ It was also agreed that all European powers should eliminate slave trade in their colonies.
- ➢ Each European country had to effectively occupy it's colony by developing it.
- ➢ It was also agreed that a paper map of E .Africa should be drawn to ease the partition.

- In case a colonial power wanted to extend its influence, it had to first inform other European countries to avoid clashes and misunderstandings.
- Congo was to be left to Belgium while France was to be compensated in West Africa.
- The conference accordingly gave Germany and Britain a free hand in East Africa.

THE EFFECTS / ROLES OF THE COFERENCE IN THE PARTITION OF E.AFRICA

- The Berlin conference increased the rivalry among European powers i.e. they became more hungry for colonies.
- The Berlin conference practically divided East Africa among the Germans and the British hence doing away with the independence of East Africa.
- The Berlin conference helped in the eradication of slave of slave trade leading to the introduction of legitimate trade.
- The conference stimulated the development of Infrastructures in East Africa e.g. The Uganda railway ,Schools, Hospitals, Roads e.t.c
- The Berlin conference also speeded up to the colonization process of East Africa i.e. European powers started sending missionaries, explorers, traders e. t. c
- The conference stimulated the formation of chartered companies e.g. IBEACO and GEACO which exploited E. Africa resources.
- The conference also led to an influx of white settlers because it gave permission to the whites to start coming to Africa.
- The conference also prevented any co-operation between European power and any African states.
- The conference totally neglected the Africans yet what was going to be decided was to affect the Africans and their grand children.
- The Berlin conference also neglected tribal boundaries e.g. some tribes like the Samia and luo are in Kenya and Uganda and this created disunity among the Africans.

THE ANGLO-GERMAN CONFLICTS (1885-1890)

- After the 1884-85 Berlin conference, Britain and Germany started sending traders into East Africa.
- They were to acquire necessary raw materials for their industries and also prepare the way for colonial agents.
- Britain sent the British East Africa Association (B.E.A.A) and Germany sent the German East Africa Association (G.E.A.A).

Causes of the Anglo-German conflicts between 1885-1890

- A conflict arose between the two groups of traders over an area of about 800 miles inland from the coast.
- German East Africa Association took over the area yet British East Africa Association had reached an agreement with Sultan Bargash to trade in the mainland.
- Germany was afraid that Britain might join with the British South Africa company to force her out of Tanganyika.
- The British were also afraid that the German East Africa Association might link up with Uganda and push them out of Kenya.
- Between 1886 – 1890, there was a race for the total control of Uganda between the British and the Germans.
- In 1890, Karl Peters signed a friendship agreement with Kabaka Mwanga of Buganda which worried the British.
- Fredrick Jackson tried to secure a similar treaty for the British but Kabaka Mwanga refused.

- When it was rumoured that the German commissioner would visit Buganda, the British anxiety increased/heightened.
- Between 1887 and 1889, the Mahdi of Sudan besieged Emin Pasha who was the Egyptian Equatorial Province Governor.
- Karl Peters had that Fredrick Jackson was on the way to relieve the siege which would mean that the area would be taken over by Britain.
- However, Henry Morton Stanley rescued Emin Pasha before Karl Peters or Fredrick Jackson arrived.
- In 1888, the Imperial British East Africa Company (I.B.E.A.C.O) was given a charter/license to protect all areas of British interest.

How were the conflicts solved?
- Negotiations between the British and Germans were used to solve the conflicts.
- These involved the 1st Anglo-German agreement of 1886 and 2nd Anglo-German agreement of 1890.
- By 1886, the Sultan's area of control was limited to a ten mile coastal strip and the rest of the area was to be in the hands of the Europeans.
- The sultan also acquired the coastal towns of Brava, Kismayo and Merca.
- The German sphere of influence was to consist of the area beyond the ten mile coastal strip from river Ruvuma in the south and river Umba on the foothills of Mt. Kilimanjaro.
- The British sphere of influence comprised of the area north of river Umba and north of river Kilimanjaro.
- Modern Kenya was to be a German enclave because it was smaller than Tanganyika.
- However, the 1886 agreement did not cater for Uganda which led to another scramble.
- This resulted into the 2nd Anglo-German Agreement of 1890 popularly known as the Heligoland Treaty.
- Britain got Uganda and Uganda received Heligoland in compensation.
- The ten mile coastal strip that originally belonged to the Sultan was given to the Germans.
- The Germans gave up with their conflicts with the British after getting the coastal strip.
- Zanzibar, Pemba and Mafia were to be under the British.
- The area from river Umba was extended westwards across Lake Victoria.
- In 1894, Uganda was declared a British protectorate.
- The Uganda-Tanganyika border was extended westwards to the Congo border.
- The 1890 agreement virtually solved the conflicts between the Germans and the British.
- Effective occupation by the colonial governments ended the conflicts.

Effects of the Anglo-German conflicts
- ✓ The conflicts led to the partition of East Africa i.e. Uganda and Kenya for Britain and Tanganyika for the Germans.
- ✓ The partition of East Africa completely eroded the independence of the East African societies.
- ✓ The boundaries of the East African countries were clearly drawn to include some parts of Congo.
- ✓ New forms of administration were introduced in E.Africa i.e. indirect rule by the British and direct rule by the Germans.
- ✓ The conflicts increased tension between the Germans and the British by causing a lot of anxiety and mistrust from each group.
- ✓ These conflicts led to diplomatic relations which led to the signing of the 1st and 2nd Anglo-German agreements.
- ✓ The Sultan of Zanzibar completely lost control over the coastal strip of land to the Europeans.

- ✓ There was increased European influx into East Africa.
- ✓ Uganda developed into a protectorate colony and Kenya became a settler colony.
- ✓ The British formed a strong army of the King's African Rifles (K.A.R) to prepare for any confrontation from the Germans in future.
- ✓ Colonial economic policies were introduced in East Africa e.g. forced labour and taxation.
- ✓ Africans lost their authority to the colonial masters and became subjects.

THE FIRST ANGLO – GERMAN AGREEMENT (1886)

- After the paper work in Berlin was done, the next major step in the actual partition of E.A was the signing to the 1st Anglo - German agreement of 1886.
- At first, Britain was reluctant to sign any agreements with Germany.
- Karl Peters had signed treaties with African chiefs like Mwanga of Buganda and the chief of the Wanga society but went ahead to sign the 1st agreement with the British.

Terms of the first Anglo – German agreement

- ❖ East Africa was to be divided into two from the coast up to Lake Victoria.
- ❖ The Southern part was to belong to German and the northern part was to belong to Britain.
- ❖ The islands of Zanzibar, Pemba, Mafia, Brava, and Mogadishu, all on the Indian Ocean were to belong to the sultan the Zanzibar.
- ❖ Both German and Britain were not to interfere with the area under the Sultan of Zanzibar whatsoever.
- ❖ Claims over the Kilimanjaro district were to be settled between the two powers because Britain had arrived first in the area before the Germans.

THE SECOND ANGLO – GERMAN AGREEMENT (1890)

It was signed in July 1890 and came to be known as the Heligoland treaty.

Terms of the Heligoland treaty

- ❖ Germany was to lose the Northern area i.e. the Wanga area (Western Kenya) to the British who would in turn lose the Kilimanjaro area.
- ❖ The Islands of Zanzibar, Mafia and Pemba were to be given to the British.
- ❖ Uganda and Kenya were to be confirmed as Britain spheres of influence.
- ❖ Uganda was to become a **protectorate** while Kenya was to become a **settler colony**.
- ❖ The agreement was to mark the end of political and commercial importance of Zanzibar since it had become part of the British sphere of influence.
- ❖ Colonial rule and economic policies like taxation, cash crop growing were to be introduced.

EFFECTS OF THE PARTITION OF E.AFRICA

- ❖ The partition of East Africa completely eroded the independence of the East African societies.
- ❖ The boundaries of the E.African countries were clearly drawn.
- ❖ Many people in E. Africa lost their land to the whites who introduced cash crops e.g. coffee, wheat, sisal.
- ❖ Many people lost their lives as they tried to resist colonial rule.
- ❖ The partition marked the end of slave trade and legitimate trade was introduced.
- ❖ The partition led to the formation of chartered companies e.g. IBEACO and GEACO to exploit East Africa's resources.
- ❖ African kings and chiefs lost their authority to the whites especially in Tanganyika.
- ❖ It led to the introduction of taxes e.g. gun and hut tax.
- ❖ The partition led to the development of infrastructures in East Africa e.g. Uganda railway.
- ❖ The partition increased the rivalry between Germany and Britain.

- ❖ The partition accelerated or increased missionary work in E.A.
- ❖ The partition resulted into the separation of people who previously belonged to one tribe e.g. the Samia in Uganda and Kenya, Masai in Kenya and Tanzania, Banyankole in Uganda and Rwanda.
- ❖ The partition also accelerated tribalism as the Europeans tended to support collaborators against resistors.
- ❖ Africans that previously grew crops for their own consumption were now forced to grow crops that they could not eat e.g. coffee, tea, cotton and sisal.
- ❖ The partition ended the long distance trade and led to the fall of trading empires of Mirambo, Nyungu ya mawe and Tippu –Tip.
- ❖ The partition led to the rise of a class of African collaborators who worshiped the white man e.g. Semei Kakungulu, Nuwa Mbaguta, Sir Apollo Kaggwa, Nabongo Mumia (Wanga).
- ❖ After the partition, the colonialists began a process of developing their colonies e.g. They constructed roads and railway lines to help out in the exploitation of East Africa's resources.
- ❖ New forms of administration were introduced in E.Africa i.e. indirect rule by the British and direct rule by the Germans.

METHODS USED BY THE BRITISH TO ESTABLISH THEIR RULE IN UGANDA.

- They used a number of methods / tactics / Techniques to achieve their goal of colonizing Uganda.
- In most cases, the method used always depended on each society's attitude.
- In most cases, more than one method was used.
- ❖ Singing of treaties; The treaties were later used to claim effective occupation e.g. 1900 Buganda agreement, 1901 Ankole agreement and 1902 Toro agreement.
- ❖ Use of force; in areas that were hostile to the British, direct military confrontation was used e.g. in Bunyoro and Acholi Land.
- ❖ Use of collaborators; These were opportunists who were used by the British to spread colonial rule to other areas e.g. Semei Kakungulu was used by the British to extend colonial rule to the Eastern parts of Uganda e.g. Busoga, Bukedi, Budaka, Bugisu and Budama.
- ❖ Divide and rule; This was used in areas where two or more unfriendly societies were encouraged to remain hostile to each other e.g. the British supported Buganda against Bunyoro.
- ❖ Intimidation and threats; These were used to scare off would be resistors e.g. Kabaka Mwanga of Buganda and Omukama Kabalega of Bunyoro were exiled at the Seychelles island on the Indian Ocean.
- ❖ Ineffective rule; This method was used in areas where the British were not in a hurry to take over e.g. Karamoja region.
- ❖ Use of Missionaries: - These softened the hearts of Africans with wonderful preaching and they managed to convinced African chiefs to sign treaties e.g. in Buganda.
- ❖ Use of traders (chartered companies); they used IBEACO and it did a lot of ground work for the British e.g. it defeated rebellious societies, encouraged war between protestants and catholic in Buganda. All this created disunity among Africans which made colonialism easy.
- ❖ Use of explorers; these established good working relations with African chiefs and also provided the geographical information which was later used by the colonialists.
- ❖ Construction of military forts; These were set up in areas which had hostile communities e.g. Fort Patiko in Acholi land, Fort Portal in Western Uganda, and Fort Lugard in Old Kampala.
- ❖ Construction of infrastructure; These were for consolidations of colonial rule and for effective occupation of their areas of influence e.g. Uganda Railway.
- ❖ Gun - Boat diplomacy; through this, the British would simply parade their weapons to scare off African resistors e.g. in areas like Busoga.

- Use of treachery / carrot stick diplomacy; In some cases, the British pretended to be friendly to the Africans only to turn around later e.g. they befriended Kabaka Mwanga but later sent him to exile.

EXTENSION OF COLONIAL RULE IN UGANDA

- In July 1890, the Heligoland treaty was signed between the British and Germans.
- It was to define the boarders of Uganda, Kenya and Tanzania.
- In 1894, Uganda was declared a British protectorate which confirmed British control over Uganda.
- In December 1895, the Busoga chief Wakholi signed an agreement with the British to bring Busoga under the British protectorate.
- In March 1900, the Buganda agreement was signed and it confirmed and Buganda as a British Protectorate.
- In June 1900, the Toro agreement was signed with Omukama Daudi Kasagama to confirm Toro as a British protectorate.
- In August 1901, the Ankole agreement was signed with Prime Minister Nuwa Mbaguta and this made Ankole part of the protectorate.
- No agreement was signed with Bunyoro because of Kabalega's hostility to the British.
- The British used mercenaries from Buganda, Busoga, Sudan to crush Kabalega's resistance.
- Buganda agents like John Miti was sent to Bunyoro to help the British in administrating.
- During the same period, the British were also using collaborators e.g. Semei Kakungulu to extend colonial rule to Eastern Uganda.
- By 1901, Kakungulu had annexed Bugishu, Bukedi, Budama, Teso, Budaka and Kumam areas.
- The British who had neglected Northern Uganda started opening up posts e.g. in Gulu in 1910, Lango in 1910, and Kitgum in 1912.
- In 1913, the British crushed the Lamogi rebellion and they established their rule in Acholi land.
- In 1913, military rule was established in Karamoja.
- By 1914, West Nile region was annexed to the British protectorate from Sudan.
- By 1920, almost the whole of Uganda was under British rule except for Karamoja which was still under military rule.
- Karamoja only became part of the British protectorate in 1926**.**

PROBLEMS FACED BY THE BRITISH IN THEIR EXTENSION OF COLONIAL RULE.

- There were so many revolts/ rebellions against British rule e.g. Lamogi rebellion in Acholi (1911 – 1912) Nyangire rebellion in Bunyoro (1907) and Nyabinji rebellion in Ankole.
- In societies where there was no central authority e.g. in Northern and eastern Uganda the British faced a problem of creating such authority.
- The Kiganda model of administration failed miserably because most areas did not have centralized governments.
- Most of the Baganda agents that were used by the British were simply opportunists e.g. Semei Kakungulu, Sir Apollo Kaggwa.
- There was language barrier because each tribe in Uganda had its own language yet a few people by that time had learnt English.
- Poor transport and communication facilities i.e. Roads to Northern and North Eastern Uganda were very poor.
- They faced a problem of introducing a uniform economic activity in Uganda e.g. Ankole rejected cash crop growing.
- Religious wars that were fought in Buganda created confusion and insecurity in the protectorate.

- ❖ Diseases like malaria and sleeping sickness made in work to the colonial administration very difficult.
- ❖ They failed to understand the cultures of the people of Uganda and this led to resistance from the local people.
- ❖ The cost of administration was very high e.g. they had to pay the collaborators e.g. Semei Kakungulu.
- ❖ Lack of manpower also hindered the work of British administration e.g. they only had 40 trained white personnel to supervise the whole of Uganda.
- ❖ The Baganda who first co-operated with the British later turned against them and started making their work difficult e.g. in 1896, Kabaka Mwanga ordered for the killing of the 30 Uganda Martyrs.
- ❖ With the growth to Nationalism in Uganda, political parties were formed which always demanded for independence e.g. D.P and U.P.C.
- ❖ The 1900 Buganda agreement caused more problems because it gave land that had previously belonged to Bunyoro to Buganda.

COLONIAL ADMINISTRATIVE POLICES

- ➢ After acquiring territories in East Africa, the British and Germans used different methods to administer.
- ➢ The British used **Indirect rule** while the Germans employed the **Direct rule** system.

NATURE OF INDIRECT RULE

- This was a colonial administrative method that was used by the British during the period of colonialism particularly in Uganda.
- On top of the administration was the colonial secretary, who was based in London.
- He was the minister in charge of colonies.
- Below him was the governor based in the respective colony.
- For Uganda, Entebbe was the Headquarter.
- Below the governor were the provincial and district commissioners heading every province.
- These took orders from the governor and worked under his close supervision.
- All the above mentioned posts were strictly reserved for the British or Whites.
- Blacks or Africans were involved in administration at the lower levels.
- The county chiefs (Ssaza chiefs) followed in line and took orders from provincial commissioners and passed them on to the sub-county chiefs (Gombolola chiefs).
- Below the sub county chiefs were the parish chiefs (muluka chiefs), who would in turn pass on the orders to the sub parish chiefs (Omutongole).
- Below the sub parish chiefs were the village headsmen (Abakulu be kyalo) who would then pass on the orders to the common man.
- All the chiefs from county level up to the village headsman formed a Chain of command.
- Indirect rule was based on the assumption that every area had to be centralized like Buganda.
- When the system failed in Northern and Eastern Uganda, the British used Buganda agents e.g. Semei Kakungulu to introduce the Kiganda model of administration in those areas.
- The local chiefs were in charge of tax collection, mobilizing people for public work and presiding over local courts of law.
- The whites would only come in case of resistances from the Africans and they were also in charge of planning the economy of the colony.

WHY THE BRITISH APPLIED INDIRECT RULE IN UGANDA

- The system was economically cheap i.e. it needed very few whites and the chiefs were paid very little or nothing at all.
- The British feared opposition from Africans because they believed that the traditional chiefs were respected by their subjects.
- The British wanted the Africans chiefs to act as shock absorbers, in case of any opposition from the Africans it would appear as if the orders came from Africans .
- The British admired the Kiganda model of administration; hence they did not want to destroy the traditional systems of governance.
- The traditional chiefs understood their people better e.g. in terms of Language, customs and culture.
- This system had already been successful elsewhere e.g. India, Egypt and Nigeria hence they needed to use it in Uganda.
- The system of indirect rule was intended by the British to preserve and protect and develop the Africans' political and social institutions in order to prepare the Africans for independence.
- Indirect rule was used to reward societies which had collaborated with the British e.g. Buganda was left with its independent institution.
- The British also wanted to look unique because they never wanted to use the same system as their enemy, the Germans who used direct rule while the French had used assimilation.
- The African chiefs were also considered to be immune to the African problems e.g. Diseases, wild animals, harsh climate e.t.c.
- Uganda was too big yet whites were very few and therefore could not administer the whole of Uganda.
- Some areas were too remote with poor roads, no hospitals, no schools and therefore the British feared for their lives in such areas.
- The existence of the centralized system of the administration also called for the use of indirect rule because the British didn't want to create new centers for power.

EFFECTS OF INDIRECT RULE

- The system created a class of ambitious Africans who were more than willing to do anything to please the British. These later became collaborators e.g. Semei Kakungulu, Sir Apollo Kaggwa.
- The system encouraged tribalism because each society was administered at tribal level and therefore unity against foreign rule was difficult.
- The British tended to favour Buganda over other areas because they greatly admired the Kiganda model of administration compared to other regions' systems of administration.
- Indirect rule enabled the British to effectively exploit Uganda's resources e.g. the Africans were forced to grow cash crops, provide labour on European farms and pay taxes.
- Serious education for the Africans was totally neglected and many were given elementary education. As a result, many became clerks, secretaries, office messengers and interpreters.
- Indirect rule created a class of conservative Africans who were totally against any new idea and these felt so comfortable under British rule. E.g. Semei Kakungulu.
- Indirect rule saved Uganda from becoming a settler colony because there was no need for the British to come, dominate and finally settle here because the African chiefs were doing the job well.
- Indirect rule brought religion into the politics of Buganda and Uganda at large. E.g. in Buganda, the Katikiro (prime minister) had to be a protestant.
- Indirect rule tended to favour Protestants compared to other religious groups in Uganda.
- The system dehumanized and demoralized African chiefs i.e. many were not pleased with the changes but they had no option or to lose their leadership posts.

- ❖ The African chiefs earned themselves hatred, dislike and disrespect from their subjects who looked at them as traitors who had "sold" them to the British colonialists.
- ❖ Indirect rule greatly affected the spread of Islamic faith because many people became Christians as the British tended to favour Christians particularly protestants.
- ❖ Indirect led to the loss of land by the Africans as a result of the British introducing the forceful growing of cash crops.
- ❖ Indirect rule led to the a lot of suffering on the side of the Africans as many were left in poverty after losing their land to the British, paying heavy taxes and receiving poor education systems.
- ❖ Indirect rule led to the outbreak of resistances against the whites as a result of the Africans getting fed up of forced cash crop growing, payment of heavy taxes and loss of independence e.g. Lamogi rebellion in Acholi land.

BRITISH COLONIAL ECONOMIC POLICIES

- ➢ After acquiring and establishing their rule in Uganda and Kenya the British carried out a number of economic and social policies which helped them maintain their stay in East Africa.

The economic policies included the following;

- ❖ Agriculture: the British introduced compulsory growing of cash crops in order to make Africans meet their own costs of administration e.g. Kenneth Borup introduced cotton in 1905.
- ❖ Taxation: the Africans were introduced to a new system of paying taxes in cash form, a system that was totally new to them. Hut and gun tax became compulsory.
- ❖ Industrialisation: the British destroyed traditional industries to make Africans totally dependent on European made goods. They only set up small processing plants like ginneries to reduce on the bulk of raw materials for export.
- ❖ Forced labour: Africans were forced to provide labour on large plantations, and in the construction of roads, railways, ports and harbours.
- ❖ Land alienation: Africans lost a lot of their land to the white settlers in the Kenyan highlands and to the construction of transport lines, schools, hospitals yet no compensation was made.
- ❖ Transport: Several murram roads were constructed within Uganda and vehicles were introduced. The Uganda railway was also constructed from Mombasa and it reached Kampala in 1931.
- ❖ Education: the education given to the Africans was based on the western syllabi and did not provide solutions to African problems. Missionaries were at first in charge but later on, the colonial gov't took over.
- ❖ Health: better health services were introduced and missionaries did a commendable job. E.g. the white fathers built Nsambya hospital, the CMS built Mengo hospital.
- ❖ Introduction of a currency: this was introduced to replace the old system of barter trade. First cowrie shells were used then Indian rupees and later coins. These were later followed by banking.
- ❖ Urbanization: trading centers, towns and big cities were all developed especially along the railway lines. E.g. Mombasa, Nairobi, Nakuru, Kampala, Tororo, Mbale and Kasese.
  N.B Where the Africans gained from the colonial economic policies, it was by accident and not design.

Effects of the British colonial economic policies

- Due to urbanization, the Africans were segregated against and they were in most cases required to be in the rural areas to grow cash crops. E.g. in Kenya, restrictions were issued through the Kipande system or national identity cards for only the Africans.
- The introduction of a currency system meant that Africans started paying taxes in form of cash which was very new to them.

- Africans became prisoners on their own land through forced cash crop growing, forced taxation policies and restricted movements in their own motherland.
- Africans became increasingly dissatisfied with the colonialists and they started demanding for their independence through rebellions e.g. Mau Mau rebellion in 1952, Nandi resistance in 1895.
- Literacy was wide spread through the introduction of western education but it was not of any assistance to the local people because they only trained as clerks, secretaries e.t.c…
- People in Uganda started growing crops that they were not going to eat e.g. cotton, coffee, tea.
- With the development of many roads and the Uganda railway, many areas were effectively exploited by the British e.g. Buganda, Busoga, Bugisu and Kikuyu land in Kenya.
- Africans lost a lot of their land to the white settlers who introduced cash crop growing e.g. in the 1900 Buganda agreement, the Baganda lost the crown land to the British yet it was the most fertile.
- Heavy taxation and land alienation forced many Africans to suffer with poverty because they had to work very hard to pay the taxes yet they never had land to grow their crops for sale.
- Improvement in the transport sector meant that business was improved in the protectorate because it eased the movement of raw materials and business men.
- Traditional industries like bark cloth making, greatly declined as the Africans were forced to depend on European made items like clothes.
- Better medical services were provided with the construction of hospitals like Nsambya and Mengo and this reduced on deaths as a result of tropical diseases e.g. malaria, sleeping sickness.
- Africans were taught new farming systems like plantation farming which replaced the traditional system of subsistence agriculture. Dairy farming was also introduced in the Kenya highlands.
- Africans got jobs on European farms, public road works and on the Uganda railway and this helped some to improve on their standards of living.
- Many urban centers sprung up as a result of development of schools, Uganda railway, hospitals e.g. Kampala, Nairobi, Eldoret, Kisumu, Mbale, and Tororo.

ESTABLISHMENT OF GERMAN RULE IN TANGANYIKA

Just like British rule, the Germans established their rule by using several methods which included;

- Use of force; this involved direct military confrontation with societies that tried to resist German rule e.g. the Hehe, Abushiri, Ngoni, Maji Maji were all defeated through use of force.
- Treaty signing; Karl Peters, a German trader and imperialist was instrumental in signing of agreements e.g. he signed with chiefs of Usagara, Uzigua and Usambara.
- Use of collaborators; these were used to spread German rule in Tanganyika e.g. Chief Marere of Sangu and Mangi Mandela of Kilimanjaro.
- Intimidation and threats; these were used to scare off those who wanted to rebel. Resistors were severely beaten, beheaded, or hanged e.g. even after chief Mkwawa of the Hehe had shot himself, the Germans cut off his head and sent it to Berlin (Germany).
- Use of traders and trading companies; e.g. Karl Peters and his trading company-GEACO. These funded the German administration and provided the initial man power.
- Development of infrastructure; several transport networks were constructed like roads and railway lines in order to conform to the doctrine of effective occupation and to enable German consolidation of colonial rule e.g. in 1891, a railway line was built connecting the coast to lake Tanganyika.

- Use of Christian missionaries; through their wonderful preachings, they softened the hearts and minds of the Africans which made them ready for colonial rule. E.g. the Berlin III missionaries.
- Use of explorers; these were used in the initial stages of colonialism e.g. Jacob Erhadt drew a sketch map of East Africa and Dr. Livingstone reported about slave trade and all these called for European need to come to East Africa.
- Construction of military posts; these were mainly put up by Karl Peters and they totaled to eight e.g. in Uluguru, Usagara, Uvinza and these were later used by German administrators.
- Divide and rule; this was mainly used in areas where Africans were rivaling each other for supremacy e.g. Karl Peters used Arabs to fight Abushiri soldiers who were fellow Arabs.
- Use of gifts and Incentives; such were used in areas where collaborators helped the Germans extend colonial rule e.g. Chiefs of Usambara, Usagara were all given gifts to accept colonial rule.
- Use of treachery; this system was used in a way that the Germans pretended to befriend African chiefs but later turned against them e.g. Karl Peters signed treaties of friendship with chiefs of Uvinza, Usambara but later the Germans replaced them with the Akidas and Jumbes.

DIRECT RULE IN TANGANYIKA

- This was the German system of colonial administration that was used in Tanganyika.
- Direct rule involved the Germans directly in the administration of their colony.
- Under this system, the traditional chiefs lost their power and authority to the Akidas and Jumbes, who were Africans but of Asian origin from the coast.
- The system was dictatorial and ruthless and hence it led to a lot of resentment from the Africans.

WHY THE GERMANS APPLIED DIRECT RULE

- The Germans believed that it was the only system through which they could effectively administer Tanganyika.
- They also believed that it was the only way that they could effectively exploit resources within Tanganyika.
- The Germans had used force to take over many parts of Tanganyika and therefore soldiers had to be used so that Africans wouldn't easily revolt.
- The Germans wanted to impose their superior culture over the Africans and this would involve imposing their culture and legal system.
- The Germans were also a proud people and therefore used this system to stand high and above the Africans.
- The Germans had suffered early revolts and therefore had to bring in the harsh Akidas and Jumbes to tame the Africans.
- In many societies, there were no chiefs and where they existed they were not faithful or powerful enough and therefore the Germans had no one to entrust authority with.
- They opted for this system because they had enough manpower to man all departments and thus saw no need to recruit Africans in colonial administration.
- The Germans also feared the expenses of training Africans before they could takeover administration because this could strain their budget.
- The Germans were very selfish and didn't want to share the exploited resources with the Africans and that is why they used direct rule.
- The Germans also used direct rule because of their inexperience in colonial administration because they had just started acquiring colonies.

❖ The Germans also feared using indirect rule that was being used by their rivals (British) because this was going to increase rivalry and competition among them.

HOW DIRECT RULE WORKED/THE NATURE OF DIRECT RULE

- At the top was the Governor who was the head of the colony, stationed at Dar-es-salaam and in most cases a soldier
- The Governor had wide powers and authority and was directly answerable to the colonial minister in Berlin (Germany).
- In 1904, there was the Governor's council that was set up to advise the Governor.
- For efficient administration, the Germans divided Tanganyika into districts and by 1914, they were twenty two.
- Each district was under a district officer called Berzirksamtmann, with a police force and a small army to maintain law and order.
- District officers acted as judges and appointed chiefs to preside over courts and administer punishments on their behalf. They were also the highest court of appeal.
- Districts were further divided into counties, which were further split into sub-counties and sub-counties into villages of 20,000 to 30,000 people.
- Areas that showed hostility to German rule, were put under military rule e.g. by 1914, the two districts of Iringa and Mahenge were under military rule because they were chaotic.
- The Governor, district officers, and members of the Governor's council were all whites. Therefore the whites dominated the top positions and the Africans were left to rule at the lower levels.
- Below the district officers were the Swahili Arabs called Akidas and below the Akidas were the Jumbes who were in charge of the villages.
- Akidas and Jumbes were in charge of tax collection, supervision of cotton schemes and public works. They were also supposed to appoint and dismiss junior chiefs and presided over over local courts of law.
- Many local chiefs were stripped of their powers and were replaced by Akidas and Jumbes and in areas where no chiefs existed, the Germans just appointed the Akidas in place.
- These turned out to be very harsh and brutal to fellow Africans and in the end, they made German administration very unpopular.
- German administration was characterized by mal-administration, cruel methods of tax collection and forced labour on road construction communal cotton growing.
- Areas that co-operated with the Germans, they were left with their local chiefs e.g. in Nyamwezi land but these chiefs were made Akidas and therefore served the Governor.
- In some areas, puppet chiefs were put into authority to promote German interests e.g. in Usambara after the death of chief Samboja and in Unyanyembe after the death of chief Isike.
- In their administration, the Germans were arrogant, and isolated themselves from the Africans which caused a lot of rebellions from the Africans e.g. maji-maji revolt.
- This system of administration attracted many German settlers who also influenced the colonial government policy against Africans.
- In some areas where the societies were organized, the Germans used some indirect rule and left the Africans to rule e.g. among the Chagga.
- German rule came to an end in 1919 when the League of Nations granted Britain authority over Tanganyika because Germany was being punished for causing World War 1 (1914 - 1918).

Effects of direct rule in Tanganyika

- ❖ Many African chiefs were stripped of their powers and replaced by the harsh Akidas and Jumbes.
- ❖ Africans who were co-operative and loyal to the Germans were appointed as Akidas.
- ❖ Direct rule brewed wide spread rebellions as people rose up against the harsh Akidas and Jumbes rule. E.g. Maji-maji revolt, Abushiri revolt and Hehe rebellion.
- ❖ There was a rise in African nationalism because many people started organizing themselves into revolutionary movements to struggle for independence.
- ❖ Heavy taxation was introduced e.g. a hut tax 3 rupees and taxes were brutally collected as the German tried to fully exploit the Africans and maximize profits.
- ❖ There was forced cash crop growing introduced by the Germans e.g. they started forced cotton growing, which irritated the Africans.
- ❖ Africans lost large chunks of land to the German settlers who introduced plantation farming.
- ❖ People including chiefs were brutalized and humiliated as they were publicly flogged and beaten by the harsh Akidas and Jumbes.
- ❖ African cultures and customs were eroded and abused by the Akidas e.g. they always raped women when their husbands were working on cotton farms and they would also enter mosques with dogs.
- ❖ People were always in a state of suffering as there was wide spread discontent and resentment against the Akidas and Jumbes and generally the whole German administration.
- ❖ Christianity was wide spread as traditional beliefs and Islam greatly declined as a result of shrines being burnt and churches widely built by German missionaries.
- ❖ There was heavy loss of lives and destruction of property as the Germans tried to suppress the many rebellions.
- ❖ Africans were forced to work for long hours on European farms and road works where they received little or no pay at all.
- ❖ Infrastructures were widely developed in Tanganyika to aid the exploitation of resources e.g. roads and railway lines were built.
- ❖ Famine broke out due to the unsettled life of the Africans and the German neglect of growing of food crops in favour of cash crops.
- ❖ African traders like the Nyamwezi were driven out of trade by the Germans who became the main trade controllers.
- ❖ Western civilization was promoted as a result of many schools that were constructed by the Germans.

BRITISH ADMINISTRATION IN TANGANYIKA
(Changes introduced by the British after 1919)

- ➢ Having lost World War 1 (1914 - 1918), Germany was forced to surrender her overseas colonies to the League of Nations.
- ➢ Tanganyika became a mandated territory and the League of Nations mandated Britain to administer Tanganyika on her behalf in 1919.
- ➢ They began their administration of Tanganyika by appointing Sir Horace Byatt as a new British Governor and he was assisted by four members of the executive.
- ➢ In his administration, Byatt retained the Akidas and Jumbes and generally the whole German administration.
- ➢ He was later accused of failing to put Tanganyika back on a serious recovery track and he was thus replaced by a new governor, Sir Donald Cameron in 1925.
- ➢ Cameron embarked on developing Tanganyika and he started by instituting indirect rule to close the gap between the people and government, which had been created by the Germans.

- In 1926, he established the Native Authority Ordinance and set up legislative councils on which Africans were represented.
- Africans were empowered to collect taxes, administer justice and carry out some administrative duties e.g. they were made secretaries for the native affairs to supervise themselves.
- In 1926, Cameron established the Tanganyika Legislative Council comprising of thirteen official and seven unofficial members, to formulate new laws governing Tanganyika.
- However, Cameron frustrated Africans by not including them on the Legislative council yet settlers were included and Africans only participated in politics at a lower level.
- This later provoked the young mission educated people to rise against the British rule. This brought in many problems for the British who even failed to get labour when they badly needed it.
- The colonial government had to come in and regulate wages for the Africans to be protected at work.
- In order to win the support of the Africans, Cameron gave them land which had belonged to settlers and settlers were also stopped from buying big chunks of land to set up estates.
- Cameron also encouraged Africans to grow cash crops on their own shambas to improve their standards of living e.g. the Chagga grew Arabica coffee on the Kilimanjaro slopes while in Bukoba, they grew Robusta coffee.
- Transport was developed i.e. roads and railway lines were extended to productive areas e.g. the Tabora – Mwanza and Dar-es-salaam – Kigoma railway lines were built and repaired.
- Cameron also introduced poll tax on top of the hut tax that had been introduced by the Germans except that it was now collected by African chiefs and slightly reduced rates.
- Trade was developed within Tanganyika and with outside countries and Africans fully participated. E.g. the Dar-es-salaam – Kigoma railway line promoted trade with Belgian Congo.
- Cameron also developed the mining industry e.g. in Musoma, Mwanza and Geita, gold deposits were exploited and this increased government revenue.
- The British also developed the education sector and increased government funding of education e.g. in 1925, a department of education was set up and many schools were constructed.
- Ex – servicemen, who had participated in World War 1, were resettled and their problems were looked into. E.g. they were given land that previously belonged to white settlers.
- Slave trade that had persisted in Tanganyika was finally brought to an end in 1922.
- The young mission educated elites were allowed to form political parties e.g. the Tanganyika African Association (T.A.A) formed in 1919.

CRE

THEME 3 LIFE

SUB THEME 1. HAPPINESS

Happiness is the state of being satisfied or contented. It can also be defined as a state of pleasure and joy in life.

Happiness is usually shown by excitements, laughter, smiles, praises etc. It depends on how one feels, what he does and what others react towards it.

IS HAPPINESS A RESULT OR A GOAL?

- Happiness is not a goal i.e. becoming happy after achieving something. It is a result of being happy after achieving something.
- It is a result of satisfaction and contentment.
- It is as a result of living a good health, being physically fit.
- It is also as a result of living humanly i.e. living in good and conducive relationship with others, sharing, helping and advising each other.
- Happiness is also a result of having trust in God. A person who puts all his faith in God and does everything in reference to God can never fail to be happy.
- Happiness is also a result of having a peaceful and relaxed mind.

N.B:

- Happiness is not a goal since a goal is for the future whereas happiness is for the present i.e. we want happiness now not in the future.
- Happiness is not a goal because it is not in our full control. No one can be cocksure that he will be happy next year or next month.

In conclusion therefore, happiness is not a goal to be achieved but a result of satisfaction.

HAPPINESS IN THE PRESENT SITUATION

(A PERSON REGARDED AS HAPPY TODAY)

Today a person regarded as happy is one who possesses the following.

1. A happy person is one who has a job.
2. One who has a nice house in the area where he is born.
3. A person who has a sound healthy family with children.
4. One with many friends who care for him and there available when he/ she is in joy or problems.
5. One who gets what to eat everyday.
6. One who is able to pay tax in time to the government authorities.
7. One who enjoys high standards of living e.g. one with a powerful radio, T.V, computer.
8. One with many clothes like shirts, dresses.
9. A happy person is one who is famous and well known.
10. One with all the basic needs of life.
11. One who upholds the Christian values.
12. Today the cultural values have an attachment to happiness e.g. in 1993 when the Baganda, Batooro, Basoga, were happy when the government promised the revival of traditional leaders.
13. Happiness today is also attributed to having achieved a set goal i.e. an individual becomes happy after he has achieved something.
14. To many young people, happiness means attaining material values and possessions e.g. money, girlfriends.
15. Today a person's happiness varies according to age, sex and opportunities e.g. what excites an old man may not excite a young person.

SOURCES OF HAPPINESS TO THE YOUTH

1. The youth become happy when they have faithful lovers i.e. boyfriends and girlfriends.
2. Others become happy by eating good food for example girls feel happy when they are taken to chicken to night.
3. Some become happy when they are in possession of decent dresses, shoes etc.
4. Some youth would become happy by attending to parties such as school leavers' party in which they eat and take photographs.
5. Some become happy when they go out for parties. This is very common to girls who are often taken out by their boyfriends.
6. Others feel happy when they are in possession of smart phones (touch screen) mobile phones which easily accesses social sites.
7. Other young people become happy when they are given gifts like flowers, watches etc.
8. Some holidaymakers feel happy when they go for evening walk while putting on tight gin trousers and holding novels in their hands.
9. Some become so happy when they play and watch games like football, wrestling etc.
10. Yet others feel happy when they go to church to praise their God. It becomes more interesting if there is music in that church.

HOW CHRISTIANS ACHIEVE THEIR TRUE HAPPINESS

1. Christians achieve true happiness by living together with their enemies as we love ourselves.
2. True happiness can be achieved by regarding ourselves as sons and daughters of God; because Christians belong to God's kingdom.
3. They receive happiness in life by forgiving and reconciling with those who would have wronged us.
4. True happiness is achieved by believing in the life, death and resurrection of Jesus Christ.
5. It's achieved through doing charity work like helping the poor, elderly and orphans.
6. Some Christians feel happy by participating in holy sacraments like Baptism, Eucharist and Matrimony.
7. Others achieve happiness by accepting persecution for the sake of Jesus' ministry.
8. Some become happy by struggling to live holy life instead of accumulating materials things.
9. They also become happy by praying to God who is believed to be listening to them.
10. Others achieve happiness by following the laws of God such as equality of all people in society.
11. While the rest achieve happiness by being honest, loyal and kind to others in society.

DIFFERENCES BETWEEN CHRISTIAN AND TODAY'S WAYS OF GETTING HAPPINESS

1. To Christians, happiness is achieved through preaching the good news of Jesus while today it's through attending political rallies to win voters.
2. To Christians, happiness is achieved by sharing material things like food, clothes while today it's through owning wealth it individually.
3. Christians achieve happiness through prayer and fasting while today it's through attending parties where food is served and there is dancing.
4. To Christians, happiness is attained though holy sacraments like baptism while today it's through attending social parties like birth day and graduation parties.
5. To Christians happiness is through performing miracles while today people achieve happiness through theft and other illegal ways.

6. To Christians happiness is through missionary journeys while today people achieve happiness through adventurous trips.
7. To Christians happiness is achieved through forgiving one another while today people achieve happiness through revenging to their enemies.
8. Christians are happy when they are worshiping their almighty God while people today get happiness by praising gods of nature.
9. Baptism of new babies brings happiness to Christians while dedication of young ones to local gods causes happiness to present people.

WHY UGANDANS TODAY HAVE FAILED TO GET FULL HAPPINESS

1. Ugandans fail to achieve true happiness because of the circumstances they are living in; for example a child who is living with step parents.
2. Some people fail to achieve happiness due to natural calamities for example landslides in Mbale.
3. Some fail to achieve happiness due to inability to produce children especially among women.
4. Some are failing to achieve happiness in terms of material possession due to laziness. They have remained poor and stagnant in development.
5. Others have failed to achieve happiness because of physical disabilities; for example the lame who cannot access whatever they wish to do.
6. Some people are finding it hard due to political instabilities such as wars in their localities.
7. Some are unable to achieve happiness due to unhealthy competitions in the community for example among business men.
8. Other fail to achieve happiness because of lack of knowledge about something. They are always behind schedule.
9. Bad practices like witch craft, murder also denies people from realizing true happiness.
10. The presence of weak government laws also denies some people from realizing true happiness. For example some laws allow the rich to oppress the poor.
11. Some don't realize true happiness because of abandoning God for other gods who instead bring them suffering.

THINGS STUDENTS CONSIDER TO BE THEIR SOURCE OF HAPPINESS IN SCHOOL

1. Coming from rich family where a father has a good job, pays school fees in time etc.
2. Being free from punishment, sickness, performing well in class. etc.
3. Having enough pocket money to sustain one in school.
4. Being disciplined to the extent being recognized by the teachers.
5. Being loved by teachers because of following the school routine.
6. Having many good friends within and outside class.
7. Having entertainments like discos and outings in the school.
8. Owning good items like mobile phones, school bags, dresses etc.
9. Belonging to a winning house in a certain school.
10. Winning zonal tournaments in sports like football, basketball etc. by one's school.
11. One's school performing well at S.4 and S.6 national examinations.

INSTANCES WHICH MAKE SOME STUDENTS UNHAPPY IN SCHOOLS TODAY

1. Bad administration which does not respond to the needs of students.
2. Poverty in some students who may not even have money for breakfast
3. Hatred among students moreover for no reason.

4. Unfavorable school rules which may lead to unfair dismissals of students.
5. Lack of enough teachers when students have paid all the due school fees.
6. Inadequate school facilities like classrooms, spacious dormitories etc.
7. Struggle for power among prefects.
8. Lack of self-control. Girl students may befriend teachers or fellow students.
9. Generation gap i.e. they have different interests from those of their teachers.
10. Sexual harassment by teachers or old students especially boys.
11. Parents not visiting their students in schools
12. Poor school programs punctuated with many activities with less time for resting.
13. Corporal punishments like canning, slashing etc.

MAIN FEATURES/ CHARACTERISTICS OF A HAPPY FAMILY TODAY

1. A happy family is one that is able to have children.
2. A happy family is one where the family members love and care for one another.
3. It is one where members are able to get their basic needs like food, shelter, clothing and school fees for the children.
4. A happy family is one where children are morally brought up (disciplined)
5. It is one where members are God fearing, pray together.
6. It is one which has parents and all children alive and without any sickness.
7. It is one where all children have attained their highest level of education and they are employed.
8. It is one where all the daughters are officially married in the church.
9. It is one where other people refer to it as an example for their well- being.
10. It's one which enjoys leisure together without parents enjoying at the expense of the children

HAPPINESS IN AFRICAN TRADITIONAL SOCIETY

In the African traditional society happiness meant the following;

1. Having friends or being on good terms with others. For example family bonds were highly respected and maintained as one way of maintaining society happiness.
2. Happiness meant being in possession of material things like land, cows etc. for example in Western Uganda among the **Bahima** one would be happy if he owned a big herd of cattle.
3. Happiness was realized when one's wife was fertile. If she was capable of producing many children then the husband was judged as one who is happy.
4. Happiness meant having good harvest. This meant one was in position to feed all his family members as well as disposing off some food.
5. Happiness also meant being victorious in war. Whenever Africans waged wars against their neighbors and attained victory they became so happy for that.
6. Happiness was realized from social influence that is if one became a chief, medicine man or clan head he would become so happy.
7. Happiness also meant living to old age. Anyone who was who saw around four generations that is around 120 years, to have seen great grand-children he/she was considered a happy person.
8. Having fertile land was very pleasing in the ATS. People who settled on that land would get better yields hence giving them happiness.
9. Being on good terms with ancestral spirits also brought happiness. That is why sacrifices were made to please the spirits.

10. Happiness also meant attending to social parties like beer parties. After work they would go for beer parties to relax their minds, win friends, dance and play their instruments.
11. Happiness meant being free from misfortunes like illness and death of relatives. Therefore one would be capable of planning for something and realize it.
12. Having many wives was a source of happiness to the Africans and this was a requirement to promotion and leadership in society.
13. Happiness meant one having wisdom from God and ability to judge cases wisely.

QUESTION:

(a) What was the understanding of happiness in African traditional society?

(b) How were the ideas in (a) above understood by the early Christians in the early church?

OCCASSIONS WHEN PEOPLE HAPPILY CELEBRATED IN AFRICAN SOCIETIES

1. **Beer party**; this was celebrated after a particular task or work had been completed.
2. **Traditional welcome of twins**; here they sacrifices and feasted as a way of trying to cleanse a misfortune.
3. **Enthronement of a king;** it was associated with many rituals and feasting.
4. **Victory in war;** it guaranteered security against loss of life and was happily celebrated.
5. **A good harvest;** here they offered sacrifices as appreciation for God's blessings.
6. **Circumcision;** here they celebrated passage of the young ones from one stage to another through joyful ceremonies.
7. **Child birth;** they celebrated by welcoming one in the society.
8. **House warming**; they could celebrate entrance into a new house.
9. **Last funeral rite**; here they celebrated for having achieved a new heir in the family replacing a deceased relative.

MOMENTS OF UNHAPPINESS IN TRADITIONAL AFRICAN SOCIETIES

1. Diseases which killed people such as sleeping sickness in 1890's in central Africa. This was a moment of unhappiness to many Africans who lost relatives.
2. False accusations of wizards and the witch which would make the accused unhappy.
3. Failure to get an animal after a day's hunt would make one very unhappy because of the stress they would have accumulated.
4. Failure by some women to produce children would make such men and women miserable all through.
5. Natural disasters like earth quake, drought and landslide which would make people unhappy. For example people in Mbale have been unhappy due to landslide on Elgon.
6. Presence of inter- tribal wars in which innocent people lost their lives would make other unhappy.

7. Death of one's animals like sheep, goats and cows would make the owner unhappy to the extent of shifting to farthest place.
8. Presence of harmful spirits which would kill or torment people would make others very unhappy.
9. Divorce of women in marriage would make marred men very unhappy especially after one had paid bride price.
10. Poor harvests were seen as a curse and thus a cause of unhappiness among Africans.
11. Being on bad terms with one's ancestral spirits also rendered him unhappy and thus required the person to be purified.
12. Failure of people's sons and daughters to find marriage partners would make their parents unhappy.

HAPPINESS IN CHURCH HISTORY

1. In the early church happiness was got through renouncing their wealth. For example the monks and nuns openly gave their properties to the poor and the church.
2. It was achieved through charitable works for example the works of the monks to the poor and widows of the time.
3. They achieved happiness through building church structures from where they would meet to worship their God.
4. Happiness would be achieved through leading celibate lives like the life of monks and nuns.
5. Others got happiness through praying for those in problems, for example **Ignatius of Antioch** was good in this aspect.
6. Baptism also brought happiness because it initiated the new converts into God's family.
7. Through living life of solitude / isolation in the wilderness used to make the monks in monasteries very happy.
8. Through fasting early Christians achieved happiness. They would deny themselves food and drinks.
9. Through fellowships they would achieve happiness. This helped them to share certain experiences and encouraged one another.
10. Bible studies would be their source of happiness. This equipped them with the truth about God.
11. Participating in Holy Communion which involved breaking the bread and taking of wine. This made **Cyprian Bishop of Cathage** happy in his work.
12. Miracles performed in the name of Jesus made early Christians very happy for having laid hands on the people and they were cured.
13. Happiness was achieved through getting church marriages by some Christians
14. Others achieved happiness by joining church choirs and clubs.

QUESTIONS

How did Christians in the early church achieve happiness?

WAYS THROUGH WHICH MONKS SHARED THEIR HAPPINESS WITH OTHERS

1. By living life of quietness, gentleness and silence thus sharing peace with others

2. By giving out a great part of their wealth to the poor.
3. They composed songs, hymns which brought happiness to those who listened to them.
4. By preaching the gospel to others so that they could share the happiness found in the gospel.
5. By caring for the sick, old and those suffering, this brought joy to others.
6. In spite of persecutions or adversity –imprisonment and torture, they had courage and this made people to accept the gospel.
7. They lived in the monasteries in the desert from where they welcomed strangers and travellers
8. They introduced education and trained other people how to read and write which helped other people read the scripture.
9. They were involved in trade and selling of products to other people.

PEOPLE IN THE EARLY CHURCH WHO WERE HAPPY IN SPITE OF THEIR SUFFERING/ADVERSITY

1. **Apostles like St. Paul** preached the Good News to **Anthens and Rome** and was persecuted. For example he was stoned and taken to prison; despite of this, he continued to preach. Acts 27.
2. **Peter** was also put in prison, summoned by the **Sanhedrin** to stop preaching but he continued to preach.
3. **Ignatius** was the first Christian slave but was happy because he had faith in Jesus Christ. He later became a Bishop in Syria.
4. He was murdered by a gang of brutal soldiers but was full of joy.
5. **Ignatius** wrote thanks giving letters to Christians who visited him before he was murdered.
6. **Ignatius** also composed songs of praise to God and preached the gospel.
7. **Silas and Paul** were imprisoned but later continued to sing praises to the Lord.
8. **Barnabas** was persecuted but he continued to preach the gospel.
9. **James** was imprisoned but continued to preach God's News Acts 12:1.
10. **Dorcus** was a widow but found happiness through extending charity services to fellow widows and other people. Acts 9:3ff.
11. **Stephen** in prayed and forgave people but he was eventually stoned to death.

PERSONS WHO ACHIEVED HAPPINESS IN THE EARLY CHURCH

A. ST AUGUSTINE OF HIPPO;

1. St. Augustine was born at Thagata in the province of Numidia on 13th November 354 AD and died on 28th August 430 AD.
2. Augustine got religious influence from his mother Monica who was so devoted to God.
3. He read and listened to the good Christian literature and thus he was inspired by the story of St. Anthony.
4. He found joy in teaching Oratorio and philosophy.
5. When he converted into Christianity he acknowledged that Jesus was a son of God.
6. He shared the word of God and this brought him happiness.
7. He became so joyous when he was baptized in 387 AD. At the age of 33.
8. He preached the good news which gave him more joy and made many charities in form of feeding people.
9. He never mourned when his mother died since he knew there was hope for better joy after her death.

10. He condemned injustices which denied man happiness in life and the bad form of leisure like watching nude women.
11. He was happy to learn the songs of praise of Jesus' name.

IGNATIUS OF ANTIOCH IN SYRIA;

1. He was the first Christian slave but happy because of his faith in Christ.
2. He later became a Bishop of Antioch in Syria.
3. He was murdered in Rome by a gang of brutal soldiers but was a happy man of God.
4. He wrote thanks giving letters to Christians who visited him before his murder.
5. He aimed at attaining freedom out of slavery and physical torture of the time.
6. He wanted to liberate people from sins of the world.
7. He attained his happiness through songs of praise to God.
8. He endured suffering for the sake of Christ.
9. He prayed for unity and love in the church.
10. He preached the gospel of Christ to non- Christians of the time.
11. He read the scripture and visited Christians while waiting to be killed.

Question: ***As a student of CRE, what lessons do you learn from the happiness attained by Ignatius during his time?***

ASPECTS OF UNHAPPINESS IN THE CHURCH HISTORY

1. The early church was full of restrictions or don't which deprived people happiness; e.g. don't drink, smoke etc.,
2. There was moving of long distances to remote places which was unpleasant and tiresome thus made missionaries sick and died before time.
3. Some slaves who had become Christians continued to live under the pain of slavery because had no material possession.
4. There was severe persecution to the early Christians from Nero of Rome.
5. Some Christians gave up things they enjoyed to bring happiness and eventually became unhappy e.g. abandoned their beer parties.
6. There were challenges and opposition from the educated Greek Philosophers against Christianity.
7. The nuns and monks lived in desert places where life was not pleasing.
8. Missionaries were sometimes deprived of happiness through the problems they faced in Africa, such tropical diseases and hostile animals.
9. Many African Christians had to end their polygamous marriages to obey Christianity. Here they lost their original happiness.
10. The Uganda martyrs were facing persecution and they were denied happiness. Eventually they were killed.

HAPPINESS IN THE BIBLE

HAPPINESS IN THE OLD TESTAMENT

1. In the creation story when God completed the creation exercise, he was filled with happiness because everything was good (Genesis 1:31).

2. Adam got happiness when he was given Eve as his wife and companion (Gen. 2:23). Before this Adam was lonely and unhappy.
3. Producing children brought happiness to Sarah the mother of Isaac as well as Hannah the mother of Samuel.
4. The liberation of the Israelites from Egypt after 400 years of suffering brought happiness to the Israelites. (Exodus 12).
5. The day that marked the forgiveness of people's sins (Day of Atonement) in Israel brought happiness upon those whose sins were forgiven.
6. The feast of tabernacle (celebration of harvests) in Israel also brought happiness to all people.
7. When David killed Goliath the whole country was overjoyed because Goliath was widely feared in Israel.
8. The day King David brought the covenant box in Jerusalem people were so happy. King David danced almost naked before his people. (2Samuel 6:16)
9. The Israelites became so happy when they received a temple for God worship.
10. When Elijah's God sent fire that burnt his Sacrifice, all the people present became happy for that miracle. 1kings 18:39
11. At the end of Job's suffering, God brought happiness to his family and friends.
12. Prophet Isaiah brought happiness to the Israelites when he gave them news about the coming of the messiah. Isaiah 53
13. The Israelites became so happy after coming back from exile life in Babylonian and their kingdom was restored.

The OLD TESTAMENT UNDERSTANDING OF HAPPINESS

QUESTION:

With examples, show the Old Testament understanding of Happiness.

1. Happiness was understood as possession of material things as land, cattle, goats and sheep.
2. It was understood when one conquered his enemies; for example David was happy when he defeated Goliath.
3. Getting healed from serious disease, for example Job became so happy when he was healed of his sickness.
4. Happiness was also attained when the people did God's will. For example when the Israelites made a covenant with him at Mt. Sinai.
5. Some people like prophets became happy because of serving God e.g. Samuel.
6. Having children made some mothers happy for example Hannah the mother of Samuel.
7. Liberation from suffering such as the Israelites who were saved from the Egyptians.
8. Celebration of feasts like Passover day often made the Israelites happy.
9. King Solomon became so happy when he built and dedicated a temple for the God of Israel.
10. God's presence also made the Israelites happy; e.g. David danced before the covenant box.
11. Having a companion/ wife would make one happy e.g. Adam became happy on receiving Eve.

UNHAPPINESS IN THE OLD TESTAMENT

1. The fall of man in Genesis 3 shows the beginning of man's unhappiness in the world. Man was chased away from the Garden of Eden.
2. Adam's family had terrible moments of unhappiness when Cain killed his brother Abel (Gen.4)
3. The building of the tower of Babel brought unhappiness in the people when they were confused not to communicate and understand each other (Gen.11)

4. The life of slavery imposed upon the Israelites in Egypt for 400 years was a moment of unhappiness to them.
5. The Israelites' demand for the earthly king was a moment of unhappiness to Prophet Samuel because it meant rejection of God as king of Israel.
6. When God's covenant box was captured by the Philistines the Israelites became unhappy because they lost God's blessings during that period.
7. Samuel also became unhappy when the first king of Israel- Saul consistently sinned against God.
8. King Saul also became unhappy because of jealousy when he learnt that David had been made a new king to replace him in Israel.
9. Unhappiness was also seen in Samuel when David committed the sin of adultery with Bathsheba.
10. King Solomon brought unhappiness to God when he started worshiping the gods of his wives and God promised to take the kingdom away from him.
11. Unhappiness was also realized by God and Naboth's family when King Ahab and his wife decided to kill Naboth and thereafter took his vineyard.
12. God's punishments to the Israelites brought unhappiness to the people especially those who were exiled in Babylonia.

CAUSES OF UNHAPPINESS IN THE OLD TESTAMENT

QN: **With examples, explain the causes of unhappiness in the Old Testament**.

1. Failure to obey God's instructions; for example Adam and Eve disobeyed God's laws and were sent away from the Garden of Eden.
2. Jealousy caused unhappiness; Cain killed his brother Abel and this made him a wanderer.
3. Acts of slavery made the Israelites unhappy for a period of 400 years because they were oppressed.
4. Presence of bad leaders made the Israelites unhappy especially during the era of Eli and his sons.
5. Barrenness brought unhappiness in some people such as Hannah the mother of Samuel.
6. Death also caused unhappiness. For example when King David lost his son with Bathsheba he was filled with unhappiness.
7. Over taxation and forced labor also caused unhappiness; this was seen during the days of king Solomon who was hash to the people.
8. Poverty also caused unhappiness in Israel; the poor of Amos' time were denied justice in courts of law and some sold for a pair of sandal and piece of silver.

Question:

How did the fall of man bring about unhappiness?

- Mankind lost God's good company.
- Man lost God's providence
- Man lost God's love
- Man was punished by God sentenced to death.
- Man and woman became enemies for the first time.

- Man and other creatures became enemies.
- Mankind became naked- lost God's protection
- Woman has to produce out of pain
- Man was chased away from Eden.
- Woman became subordinate of man.
- Even the soil was cursed to develop thorns and become barren.
- Man started sweating for what to eat.

HAPPINESS IN THE NEW TESTAMENT

The New Testament shows that Jesus is the source of happiness to his followers and this can be seen in the following ways;

1. Jesus has divine love and is a perfect representation of God. He brought love so as everyone would have joy and happiness.
2. Jesus removed the law which was a burden to man and could not give to him happiness, e.g. the law of Sabbath.
3. Jesus offered himself as a sacrifice on behalf of the sinful man. For this reason Jesus brought happiness to man.
4. Through Jesus all Christians are assured of redemption and deliverance. Therefore he is the hope to enter God's kingdom where happiness is found.
5. Through Jesus all Christians entered into a new covenant with God through the blood Jesus shed on the cross.
6. Jesus introduced a new baptism of the Holy Spirit which provides spiritual renewal to his followers.
7. He showed concern to the children and brought happiness to his followers. Therefore Jesus advocated for the rights of the weak and voiceless.
8. The New Testament shows that Jesus interacted with different people like the rich and poor, Jews and Gentiles etc. this means his happiness is universal.
9. The humility of Jesus to accept to serve others instead of being served; makes him to be a source of happiness to man.
10. The followers of Jesus are assured of resurrection after death. This is the greatest happiness to all those who believe in Jesus.

New Testament teaching on happiness

1. Jesus teaches that true happiness is not in material possession or in following the Law of Moses but it is in the fact that God loves us.
2. The New Testament shows that happiness lies in ones obedience of God and following him alone.
3. The New Testament indicates that happiness comes from one's love for his neighbors and at the same time love for God.
4. It teaches that having hope in life after death among all Christians.
5. It teaches that happiness means having love and trust in God the almighty.

6. Christians believe happiness is having fellowship with others through Eucharist and unity in Christ.
7. True happiness means having love, respect and mercy upon our fellow Christians.
8. The New Testaments maintains that happiness means repenting of his sins to allow reconciliation take place.
9. Happiness among the married upholding the marriage vows and keeping the stability of their marriage.
10. Happiness is being born again. One who proclaims Jesus as his true savior is said to be happy.
11. Christians believe that happiness means believing in the beatitudes i.e. being humble, peacemaker etc.
12. Happiness comes from accepting the Good News and sharing it with others.

The sources of happiness according to the New Testament

1. Happiness is derived through receiving and accepting the gospel Luke 19.
2. Happiness is attained through being on good terms with others.
3. It's achieved through being kind to others and taking care of those who need care.
4. Happiness can be achieved through involving in worship and prayer.
5. It is achieved through acceptance of the sacraments like baptism and Holy Communion.
6. By being spiritually poor in order to know more about God.
7. By living a life of self-denial and carrying one's cross for the sake of God's kingdom.
8. By involving in fellowships and church services.
9. Happiness can be achieved by mourning for the sake of the kingdom of God.
10. By accepting to be persecuted for the sake of God's kingdom.
11. Happiness is derived through calling upon God's intervention in our lives.
12. It comes by involving Christians in the promotion of peace in the world.

JESUS' TEACHING ABOUT HAPPINESS IN THE BEATITUDES/SERMON ON THE MOUNTAIN (Mt. 5:1-10)

In the beatitudes is found the summary about the fundamental attitudes of those who accept the Good News of the kingdom of God. It can be seen in the following ways;

1. Firstly happy are the poor in spirit. The poor in spirit know and accept that that they need God and other people that they cannot rely on themselves.
2. Jesus also teaches that happy are the meek or gentle. The meek do not seek to dominate others but to allow others to be themselves.
3. Jesus teaches that happy are those who mourn for others. Those who mourn have experienced suffering and therefore can understand it and comfort others as well.
4. According to Jesus those who are hungry and thirst for justice are happy. These want to love and serve God and others; they want to destroy whatever makes the life of others difficult.
5. Happy are the merciful because they tolerate and forgive others easily.
6. The pure in heart are happy because they try to break down the barriers which divide people.
7. Happy are the persecuted because of the right cause because they are happy.

WHY IT'S DIFFICULT TO ACHIEVE HAPPINESS BY FOLLOWING THE BEATITUDES

1. Some people think they need to acquire material wealth in order to achieve happiness yet the beatitudes teaches about spiritual achievement for one to be happy.
2. Some people want to be self -sufficient so as to be happy yet beatitudes teach that one has to remain trustworthy to God in order to be happy.
3. Unanswered prayers would affect the Christian faith in God thus making one not to be spiritually rich.
4. The persecution of Christians by non-believers would make Christian life hard and thus denying them chance to have happiness.
5. Lack of time can prevent Christians from mourning with others, yet beatitudes teach that happiness comes from consoling others.
6. The attitude of mind your business discourage Christians from mourning with others.
7. Love for power and status can prevent some Christians to be meek in order to have happiness as beatitudes teach.
8. Some bad policies of the government like over taxation can prevent a business Christian from being just which in the end will deny one happiness.
9. Living in a permissive environment can make a Christian lose the purity of the heart and thus prevent him from getting happiness.
10. Prolonged suffering and illness makes one to hate God thus not getting happiness in the end.
11. Man's revengeful nature can affect a Christian desire to work for peace, thus preventing one from getting full happiness.

SUBTHEME 2:

UNENDING LIFE

The term unending life means eternity or everlasting life. It's the life after death or life beyond this material world (earthly life).

THE COMMON CAUSES OF DEATH TODAY

The concept of death is the permanent end of life. Today there are quite a number of factors which lead to death below are the following;

1. Disease like Malaria, Typhoid, Cholera and Cancer are the main cause of death in the world. For example influential people like **Philly Bbongole Lutaaya** died of prolonged Malaria brought by HIV.
2. Accidents like on the road, lakes and plane crashes, as well as electrocution have also killed many people. For example the popular rally driver **Khugi** met his death in road accident.
3. Poisoning through food and drinks also cause death. This is done by malicious people in society.
4. Maternal mortality; death of mothers and children in the hospital during child birth.

5. Abortion; this is where many young and old women die during the expulsion of the unwanted pregnancies.
6. Committing of suicide or self- murder; this is deliberately deprivation of one's life through hanging, jumping from storied building etc.
7. Armed robbery where robbers put people on gun point and kill them if they hesitate to comply to their request.
8. Domestic violence; this where an aggressive husband or wife kills his partner; for example **Lydia Draru** killed her **husband Major gen. James Kazini**.
9. Social disputes or disagreements; for example when one annoys another he/she can pick an axe, pang or spear and to kill another.
10. Natural calamities like earth quake storm and floods.
11. Old age; when one's body-system becomes tired and worn out.

HOW PEOPLE TODAY REACT TO DEATH

Generally all people have the following responses of the concept of death in society.

1. People fear death; that is why whenever one gets any illness he/she runs for medical treatment.
2. Death creates sadness, hence weeping when one dies is experienced.
3. It makes people repent for their sins to prepare to life after death.
4. It also makes people pray intensively for the dead person so as he/she may easily go to heaven.
5. Other people respond to death by cursing God after losing their dear ones.
6. Some people feel happy on the death of their close relatives especially those who would wish to share the property of the deceased.
7. Some people ensure that they enjoy life while still living for example eating good food, enjoying dances etc.
8. Some people prepare for death by booking burial services ahead of their death.
9. Other people react to death by making wills before they die whereby they show the distribution of property to their relatives.
10. Burial services are organized and digging of the grave is made where the dead will be made to rest all his/her time.
11. Some people visit witch doctors, diviners and medicine men to find out the causes of one's death.

MODERN IDEAS ABOUT LIFE AFTER DEATH

People today have different ideas about death which include the following;

1. Many people today believe that one's physical death marks the end of his/her entire life.
2. Others think that heaven and hell are the religious ideas simply to scare people to be good before they die.
3. Scientists doubt whether there is life after death because they believe in what they see.
4. Others think that life after death is a mental therapy aimed at saving people from the worries and how to spend life after dying.

5. Life after death is sheer hope and expectation of a new life after this earthly life.
6. Some people believe that life after death is a consolation to people who have been defeated by the challenges of the world.
7. Some people believe that the idea of life after death is a threatening factor used by preachers to bring people to the church.
8. Many youth have a belief of enjoying themselves as much as they could because there is no more enjoyment after death. They believe that life ends here on earth.
9. Some people attribute one's death to his /her conduct in daily life. If a person was good then he/she gets a better unending life and vice versa.
10. To some people current life matters most, what will come afterwards is a non-issue to them.
11. They claim that life after death was for people in the past who lacked scientific knowledge on many things.

WHY PEOPLE DOUBT UNENDING LIFE TODAY

1. It's doubted because no one has ever died and resurrected in the contemporary society.
2. Preachers just want to threaten people to behave well in society.
3. People doubt it because even preachers feel sorrow and weep when their close relatives die implying that such dead people are going to miss the good life on earth.
4. Unending life is a belief for the poor and weak who have nothing to do; this makes others doubt its existence.
5. People doubt it because there is no life after death and one should enjoy life now.
6. Unending life is a matter of belief and faith but has no naked truth behind it.
7. Scientists only believe in things which they observe in laboratories, hence doubting the concept of life after death.
8. Scientists believe that if a physical body dies, it decomposes and does not have more life again.
   QUESTION'
   Why do many people today doubt the idea of unending life?

UNENDING LIFE IN TRADITIONAL AFRICAN SOCIETY

Africans believed in the concept of the **"LIVING DEAD OR CONTINUITY OF LIFE** and they have the following ideas;

1. They described death as simply a transitional occurrence. For example the Baganda in Central Uganda called a dead **OMUGENZI** meaning departed. This means that there is life after death.
2. It was believed that even the dead continued to enjoy the aspects of life amongst themselves. That is why they are buried into the same burial ground.
3. The living dead were always venerated and respected and their names are held in high regard.
4. The living dead were part of the African societies. They were believed to be mediators between God and other living people.
5. The dead were known to be more powerful than the living. This is because they were in spiritual world. For example the Bemba in Zambia would whisper important messages to the dead before burying them.

6. Shrines were built by the living people for the worship of the ancestral spirits of the dead.
7. The spirits of the dead were appeased with food, drinks and roasted meat; thus showing there was life after death.
8. The living dead were believed to appear to some of their close relatives in form of dreams, visions or getting possessed with the spirit of the dead.
9. Africans would give names of their ancestors to their children. This was a solution to death as the dead would be replaced by children.
10. The dead were consulted through diviners or medicine men. Therefore they could make some decisions.
11. The dead were buried with their property to show that life continues after death. For example they would be buried with spears, hoes etc.
12. In some traditions like Busoga and Acholi the dead would be buried in the compound or houses to show that they are still part of that family.
13. Their grave yard would be cleaned and kept quiet for fear to disturbing them where ever they were resting.

HOW THE DEAD ARE NOT DEAD IN THE AFRICAN SETTING

QUESTION:

Using examples show that to the Africans the dead were not dead.

1. The dead in Africa did not die for ever because they were re-born through their children.
2. Africans buried the dead with their properties like the Egyptian kings were buried with their favorite wives, properties and servants to use I the next world.
3. The dead were used as messengers for example the Bemba whispered messages in the ears of the dead to take it to the spiritual world.
4. The dead were buried in the compounds showing that they are still members of the family for example the Samia in Eastern Uganda and Basoga.
5. They shared meals with the dead especially the first harvest. This was common among the Banyankore in western Uganda.
6. The Baganda in central Uganda buried the dead in bark cloth to provide warmth to the dead.
7. Fire was lit outside the home to find way to the next world e.g. among the Bakiga.
8. The Baganda women would pad themselves to prevent the spirit entering her and preventing them from getting another man.
9. Shaving hair of the dead and mourners as a sign of mourning and a decent send off.
10. Buried the dead in evenings so as to wish them good journey to the next world

CAUSES OF DEATH IN THE AFRICAN TRADITIONAL SOCIETY

1. Witch craft or uttering some destructive magical words to someone due to jealousy or hatred.
2. Immoral acts would lead to someone's death for example one can be murdered, raped etc.
3. Disrespect of sacred places of worship in the African traditional societies would lead to suffering and death.
4. Violation of oath would also lead to death because oaths were religiously binding.
5. Breaking of blood pacts or "**omukago"** would bring about death of the offender or betrayer.
6. Curses from senior relatives caused death for example one's father, mother or aunt.
7. Violation of taboos or religious customs caused death, e.g. insulting elders, incest etc.

8. Punishments from ancestors could also bring about death because the god were responsible for people's life.
9. Insulting god was also responsible for death because God was the sustainer of life.
10. Being antisocial would also bring about death in the African society.
11. Inter-tribal wars like those which existed between Buganda and Bunyoro.

With examples, show how the Africans expressed sorrow upon losing their dear ones.

- By crying and weeping e.g. among the Baganda
- Suspending daily activities like cultivation for a given period e.g. the Acholi would suspend them for 3days in event of a man's death and four days for a woman.
- By smearing their bodies with white clay e.g. Masai people of Kenya.
- Breaking the pots in the house of the deceased e.g. the Masai to show that the life of a family member has come to an end.
- By suspending bathing and washing until the period of mourning was over. E.g. among the Baganda, they would spend around four days without bathing as a sign of mourning.
- Suspending sexual intercourse for some time. E.g. the Samia
- Lighting fire the whole night e.g. the Basoga would light fire in the courtyard for the whole night so as to give light to the mourners.
- By trimming off the bodily hair as a symbol that death had occurred and another life was yet to start e.g. the hair of the orphans would be trimmed off by their grandmothers in Buganda.
- By dressing in particular fashions e.g. in Buganda the orphans had to tie banana fibers around their waists as a way of mourning.
- By abandoning their homesteads and shifting elsewhere e.g. the Masai would do this because such a home was now associated with misfortune.

RESPONSIBLILTIES OF THE LIVING TO THE DEAD / ANCESTORS

- The living would venerate the ancestors/dead i.e. offered prayers through them.
- The sacrificed and poured libations for them as a sign of acknowledging them.
- The named their children after them.
- The ancestors were invited for social functions like funeral rites, weddings etc.
- The living taught their young ones about their ancestors.
- The living obeyed instructions of the ancestors for fear of bad repercussions.
- They appeased them
- They built them shrines where ancestors rested from.
- The living could take care of the burial grounds where ancestors were made to rest.

DIFERENCES AND SIMILARITIES BETWEEN CHRISTIAN AND TRADITIONAL AFRICAN WAYS OF PREPARING PEOPLE FOR LIFE AFTER DEATH

- In African setting there was fulfilling of the social obligations like marriage and producing children while today people dedicate themselves to God's work like Nuns.
- In ATS they offered sacrifices to gods and spirits while today people prepare for life after death by leading a holy life based on Christian teaching.

- In ATS punishments were administered to wrong doers while today Christians practice forgiveness and repentance.
- In ATS life after death was prepared for by giving food to the dead while today Christians simply go for Eucharist.
- In ATS there was accumulation of wealth as a requirement for life after death but today to go to heaven one is required to be poor in material wealth but rich in faith.
- In ATS it required appeasing and consulting ancestral spirits while Christians need to have the Holy Spirit to have life after death.
- Christians pray through Jesus Christ while in ATS people prayed through spirits.

SIMILARITIES

1. Both emphasize living a morally upright life if one is to have unending life.
2. Both require dedicating one's life to God
3. In both names of the good people/ ancestors are given to the children
4. In both performance of good works like caring for the sick and poor is emphasized.
5. In both good relationship with God and others is important.
6. In ATS shrines are built but Christians too build churches.
7. Both respect religious leaders.
8. Both call upon good members who died to help them in difficult times.
9. In both there is giving of help (alms in the church) and food stuffs in the ATS.

Question.

(a) ***Describe the relationship between the living and the ancestors in traditional African societies.***

Answers;

1. *To the Africans the dead were referred to as the ancestors- the dead were not dead, they were the living dead.*
2. *The family had its roots in the generations through the dead ancestors. they shared drinks and meals with the dead through libations (pouring water down) or throwing food down.*
3. *The dead were buried near the homesteads because they were still regarded as part of the family.*
4. *Grave yards were kept clean in order to promote a good relationship with the dead.*
5. *Shrines were built where sacrifices for the ancestors were made from.*
6. *The ancestors were venerated through acts of worship like praying through them and giving them sacrifices.*
7. *The names of the ancestors were called upon during family occasions like initiations, marriages etc.*
8. *Ancestors acted as mediators between the living and God that is why the living would always pray through them.*

9. *Names of the ancestors / dead were given to the newly born children as one way of remembering their dead ancestors.*
10. *Belongings of the dead were inherited by the living*
11. *The dead would appear to the living in dreams to give them any emergence information.*

(b) ***How does the Christian teaching help people to have hope in life after death?***

Christian teaching can help Christian have hope in life after death in the following ways;

1. *It can be done by teaching God's love for us; for God loved the world, and whoever believes in him may not die but have an eternal life.*
2. *Christianity teaches that eternal life begins here and now through acceptance of Jesus, John 3:11-16.*
3. *By believing in the resurrection of Jesus; he conquered death by resurrecting to life.*
4. *By encouraging Christians to have communion with God and with fellow men*
5. *Through loving God and our neighbors, by living in openness to God and neighbors.*
6. *By having fellowship and caring for those in need e.g. the story of the rich man and Lazarus luke16:19-29.*
7. *By sharing Eucharist which is a sign and source of eternal life.*
8. *The fact that Jesus raised the dead was a sign that Jesus has power over death. E.g. the raising of Lazarus should encourage Christians that one time they will also overcome death.*
9. *By encouraging Christians to have trust and faith in God who gives eternal life.*
10. *Jesus' resurrection gives hope in life after death for all who believe in him.*
11. *Christians should know that death is a get way to eternal life.*
12. *Jesus said that he was going to prepare for us eternal life in his father's kingdom, John 14:1-3.*
13. *Christianity teaches that all those recorded in the book of life will resurrect.*
14. *The second coming of Jesus Christ is an assurance that eternal life will be brought for the faithful people.*
15. *The vision of dry bones in Ezekiel 37:1-12 assures Christians of life after death.*

UNENDING LIFE IN CHURCH HISTORY

Church history has the following views about life after death;

1. The Egyptians regarded death as a cross-over to another stage of life; that is why they buried the dead with their property.
2. The Greeks believed that man's soul was immortal (cannot die). They believed that the dead continued to live outside the earthly body.
3. The Romans who listened to the gospel feared God as a harsh judge. Therefore they prepared so well for unending life.
4. The monks and nuns gave up the worldly pleasures in preparation for heavenly unending life.
5. The Roman Catholics believed in frequent long prayers for meditations and penance (self-punishment) in order to have eternity.
6. The members of the Anglican church believed that unending life can be attained through having faith in God.
7. The Jews expected a messiah who would give them a better unending life.

8. The apostles who were trained by Jesus believed in resurrection of every one since Jesus overcame death.
9. Christians in the middle ages after the death of Jesus did not fear death anymore and they knew that they were already experiencing eternal life. This was common with St. Francis of Assisi.
10. In the modern church history missionaries came to Africa and taught people that whoever never heard a gospel would go to hell.

PREPARATION FOR ETERNAL LIFE IN CHURCH HISTORY

1. Christians in the early church attended fellowships through which they shared experiences in their journey to unending life.
2. Christians were called upon to remain committed to their prayers.
3. The church encouraged Christians to repent in preparation for unending life.
4. They reflected agape love to one another. They lived in a community full of God's love.
5. The early Christians participated in Holy Eucharist as they remembered the death of Jesus and his second coming.
6. They regularly worshiped Jesus Christ and lifted up his glory.
7. The early Christians prepared for this life by sharing with the poor members of the church like widows, orphans etc.
8. Christians developed a compassion heart by doing charitable works and helping the needy.
9. Christians preached the gospel of hope for unending life because Jesus died and resurrected. The same resurrection was expected.
10. Christians in the early church endured all sorts of trials and persecutions as they prepared for eternal life.

BIBLICAL TEACHING ON UNENDING LIFE

THE OLD TESTAMENT

The Old Testament understanding of life after death can be seen in the following ways;

1. The Israelites believed that when a person died he went to unknown place called **Shoel** which was full of total darkness without happiness. (Ecclesiastes 9:5)
2. Many Israelites had fear for Shoel for example king Hezekiah cried for mercy when he learnt about his death (Isaiah 38:2)
3. The Israelites covered up their fear for death by eating as much as they could so as to enjoy life before it could be taken. (Ecclesiastes 3:12-13)
4. Among the Israelites it was believed that everyone was a mere visitor and it was through death that one would get unending life.(Eccl 12:5)
5. The Israelites had hope that God who had been faithful to man during earthly life cannot abandon man at death. (Psalm 73:21-26)
6. Prophet Isaiah taught that the unending life God would give to his people would be full of joy and happiness. (Isaiah 25:9)
7. It was believed that the righteous deeds (good actions) would earn one better unending life (Proverbs11:19)
8. Prophet Isaiah called upon the Israelites to repent such that God would give them salvation of eternal life. (Isaiah 30:15)
9. In Daniel 12:2 there is an explanation of resurrection of the dead Israelites at the judgment day. The faithful people would be saved and unfaithful get punished.

10. The departure of the Israelites to Canaan was equated to unending life. There would be another promised land in Heaven where there would be unending life.
11. The Israelites believed that they would get eternal life in heavenly city of Zion where they would sing and rejoice (Isaiah 15:11)

THE NEW TESTAMENT TEACHINGABOUT UNENDING LIFE

1. In the New Testament there is hope for victory after death. This was done by Jesus who conquered death when he resurrected into everlasting life.
2. The miracle of Jesus raising the dead showed that God has power of death. For example in John 11:32 when Jesus resurrected Lazarus.
3. In the New Testament Jesus is identified as the only way to eternal life John 14:6.
4. The eternal life in the New Testament is for every one without any discrimination unlike in the Old Testament. It's for Jews and gentiles, men and women etc. Ephesians 6:8
5. Jesus taught that if one wants to have happiness in eternal life, he should be humble, merciful and work for peace.
6. The New Testament teaches that eternal life begins here and now because eternal life means fellowship with God and loving our neighbors. Luke 10:25-28
7. Jesus encouraged his followers to share with the poor by works and charity so as to increase their eternal life.
8. The Holy Communion is a sign of eternal life. It's a sign of fellowship and love 1corinthians 11:24-25
9. Life after death in the New Testament is about rewarding the faithful Christians 1corinthians 3:8
10. Jesus taught that the worldly riches can be a big barrier for one to enter life. He said that it is hard for a rich man to enter the kingdom of God. Mark 10:7-23
11. The New Testament teaches that judgment day will mark the end of earthly life. when that day comes; Jesus will be the judge Mt. 24:36
12. Jesus taught that the names of the people to get eternal life will be recorded in the book of life Luke10:20.

WHY THE JEWS DOUBTED JESUS AS AWAY TO UNENDING LIFE.

- The Jews said that Jesus came from a poor village of Nazareth, thus making people to doubt him as their messiah to bring them salvation.
- Jesus was a son of a carpenter and had a humble background.
- Jesus accepted to be baptized by John the Baptist thus identifying himself with the sinners of the time.
- Jesus was tempted by Satan which belittled him to the level of an ordinary man.
- Jesus suffered from hunger as he preached the gospel thus showing that he was human and could not lead followers to eternal life,(Mark 11:12)
- Jesus performed miracles and told his followers not to tell others this indicated that he was fearful and thus not son of God to bring salvation to others.
- Jesus associated with sinners e.g. prostitutes, tax collectors etc. instead of hating them.

- Jesus presented himself as a universal messiah yet the Jews expected a messiah for the Jews only.
- Jesus encouraged people to pay taxes to the Roman government; this made people doubt his ability to bring salvation to them.
- They taught that Jesus would have an army of angels to defend him, but he was arrested in the garden of Gethsemane.
- They expected a messiah to liberate them from the Roman government which Jesus did not do.
- Because Jesus died on the cross like a criminal, the Jews doubted his ability to bring salvation them. He was killed together with other criminals so they doubted him.

HOW A CHRISTIAN SHOULD PREPARE FOR UNENDING LIFE

Christianity expects its followers to observe the following virtues in order to attain unending life.

- Eternity (unending life) can be achieved by Christians today through regular repentance of sins.
- Christians can also attain unending life by taking up baptism which takes away their inherited sin.
- They can also be assured of unending life by remaining committed to their prayers.
- They should prepare for it by attending fellowships to encourage one another in case of challenges in life.
- They also prepare for unending life by regularly worshiping God.
- Through charitable works like helping the poor, widows, sick orphans etc.
- Through extending love for one another as brothers and sisters in faith.
- Through attending Eucharist feast every time they are for mass.
- Through preaching the word of God to others.
- Through observing God's command of paying tithe.
- By using the gifts of the Holy Spirit properly like the gift of speaking in strange tongues as well as interpreting the message for other, singing and healing others.
- By teaching people to believe in one true God.
- By conveying the Good news of eternal life through evangelism.

QUESTION

(a) What ideas of unending life that prophet Isaiah presented to King Hezekiah? (Isaiah 38:9-20)

- Isaiah told Hezekiah that unending life of the faithful is full of joy and praises, thus the king should not fear death.
- He told him that there was no need to fearing death; because Hezekiah had feared it.
- He told him that God is the source of rescue and eternal life.
- Isaiah said that the fear of death makes people restless without sleeping.
- He said that God forgives sinners who repent like Hezekiah.
- It teachers that people with life can praise God but not the dead.
- He said that God needs people to be faithful to him in order to get unending life.
- Isaiah assured the king that there is hope of victory over death.

- Prayers can bring restoration of hope for those who lose it e.g. Hezekiah.

(b) Show how the teaching of the New Testament can give hope to the desperate AIDS victims.

- Aids victims should know that since Jesus resurrected everyone who dies will as well resurrect, (John 11:25).
- They should know that Christians suffer but in the end they will get their glory in heaven.
- One can repent and wait for the judgment day on which he will be set free.
- One should commit himself to prayers, worship, bible study etc.
- They should know that heaven is the last destination and that the earth in only a resting place.
- One can suffer but there is a reward of eternal crown just like Jesus suffered on the cross.
- The soul is immortal i.e. the body dies but the soul continues to live.
- The Christian has to simply trust and obey God in order to get happiness in eternal life.
- A Christian can expect spiritual victory after the end of earthly life.
- God has immeasurable love for mankind and cannot abandon one even in time of fear.

VENERATION OF THE DEAD CHRISTIAN IN THE CHURCH TODAY

Veneration means remembering the departed Christians in respect and honor of their contributions when they were still alive. Veneration is done in the following ways;

- Veneration is done by dedicating prayers to the dead Christians for example through memorial services.
- It's done by burying some Christians in the church grave yard especially the priests.
- It's done by dedicating special days in the year to remember Christians who died for example 3rd June is dedicated for the Uganda Martyrs.
- By participating in religious journeys or pilgrimages as Christians remember the dead for example the pilgrimage to Namugongo martyrs' shrine.
- By dedicating names of the departed Christians to some churches e.g. St. Paul's cathedral Namirembe, St. Augustine's chapel – Makerere.
- It's done by composing songs to praise the good works done by the departed Christians e.g. songs of the Uganda martyrs like "***Bewayo abaana***……"
- By giving names of the departed Christians to the newly converted Christians e.g. Peter, Agnes, John etc.
- It's also done by giving names of departed Christians or saints to church institutions like schools, hospitals, roads etc. e.g. Bishop Cipriano Kihangire S.S, ST. Francis of Assisi hospital Nsambya etc.
- The church has also set up organizations under names of strong Christians in remembrance of their services for the church. For example cardinal Emmanuel Nsubuga foundation.
- Sometimes the church organizes special talks or lectures in memory of the departed Christians.

Explain the similarities and differences between the Christian and traditional African beliefs about life after death

Similarities

- Both believe that death is a point when the spirit separates from the body.
- Both have a belief that death is not the end human life. Life continues even after death.

- Both Christian and African tradition believes in the invisible universe or the world of the dead/spirits.
- They both believe that life after death depends on the ways one conducts himself in the earthly life.
- They both honor and while praying they mention names of the saints and martyrs e.g. St. Paul pray for us, while traditionalists call names of the departed ancestors.
- Both make offerings or gifts to the ancestors to show their loyalty. Christians collect gifts in memorial services while traditionalists give food and drinks.
- In both the dead are remembered by giving their names to newly born children.
- Both Africans and Christians offer prayers for the dead in hope securing for them a good unending life.
- They both build shrines for the ancestors e.g. the shrine in peoples' homes just like the Christian shrine at Namugongo for the martyrs.
- Both have a belief that the departed play a mediatory role for the living. Catholics for example pray through Holy mother Mary, Judah etc. and traditionalists use spirits of ancestors.
- They both venerate or respect the ancestors by acts of worship, giving sacrifices and construction of shrines.

Differences

- In African traditional society, Africans would be buried with some of their property like food, beer, spears etc. while Christians believe that new life starts after earthly life.
- People in traditional Africa believed that when one died, his spirit lingered around them but Christians go heaven or hell.
- Christians believe that the faithful who died have their names recorded in heaven unlike Africans (Rev.21:27)
- Christians believe that the spirits of the dead are guided by the morals standards of the living but Christians believe that spirits are guided by the Holy Spirit.
- To the Africans the spirits of the dead would appear to some close relatives for special instructions, but Christians believe the dead's spirit disappears for good.
- While Africans believed in re-incarnation where the dead are re-born in the children through physical characteristics, Christians however, believe that one dies forever.
- Africans believe that the dead are more powerful than the living; however, Christianity only says the dead can act as their mediators to reach God.
- The idea of hell or heaven is missing in the African context, however, to Christians it's more pronounced.
- Christians believe in sacraments like baptism and Holy Communion in order to attain eternal life but Africans believe in one's traditional customs.
- While Christians believe in the judgment day, Africans on the other hand believe that one was judged by traditional customs.

QUESTION;

(a) Explain the different views about life after death in church history.

(b) How did the Christians in the early church prepare for their unending life?

SUBTHEME III

SUCCESS

Success is the opposite of failure. It is the achievement of ones aims and goals. This depends on the society and an individual because aims, goals and priorities are not the same.

HOW PEOPLE TODAY UNDERSTAND SUCCESS.

Question;

(a) How do people in Uganda today understand success in life?

(b) In what ways does the New Testament teaching about success differ from that of modern society?

1. People today believe that one's closeness to God is a sign of success for example people like priests, cardinals, sheiks and pastors.
2. The expansion of the church is seen as a sign of success to the clergy. The Catholic Church attained success with the expansion of Namugongo martyrs' shrine in 2015 ahead of Papal visit in Uganda.
3. People today understand success in form of good marriage, when married partners live in harmony with mutual love and respect.
4. Bearing of children is also seen as a sign of success. Children are seen as gifts in marriage and they make marriage firm.
5. Living in a big posh house or owning many houses is also interpreted as a sign of success, e.g. ***Sudhir Rupareria*** is considered successful because of owning many arcades in Kampala.
6. Attaining high education level right from ordinary, advanced, first degree, master's degree and PHD.
7. Winning competitive elections at different level like presidential, parliamentary elections etc.
8. Passing exams either Primary leaving exams, UCE OR UACE. Normally whoever passes examinations is judged as a successful candidate.
9. Eating good food like chicken, fish rice chips etc. is sometimes seen as a sign of success, because some people who are not successful may not afford such dishes.
10. Promotion at different places of work is also understood as success for such people. For senior army officers gain promotions from lower ranks to higher ranks like ***lieutenant*** to ***lieutenant colonel***.
11. Accepting Christ (being born again) is counted as a sign of success by many people who cherish Christianity.
12. Bearing children and having them married either customarily or through the church both boys and girls.
13. Long living that is being able to live up to the ripe age of seeing many events unfolding themselves in society.
14. Winning competitions or awards of the season e.g. **Lionel Messi of F.C Barcelona** is counted successful because he has won almost all competitive trophies of the world in football.
15. Being popular like local musicians such ***Chameleon***, ***Rehema Namakula*** etc.

HOW AN INDIVIDUAL CAN ATTAIN SUCCESS

1. One should make genuine goals which are achievable in life (SMART) i.e. Simple, Measurable, Achievable, Realistic and time Bound.
2. There is need for co- responsibility and interdependence with one another in community.
3. There is need for patience as success doesn't come overnight.
4. There is need for hard work and determination in order for an individual to achieve the set goals.
5. To attain success, an individual should pray for God's intervention in one's programs.
6. There is need to be disciplined and respect all persons in positions of authority; discipline is the key to success.
7. There is need to avoid self-pride and accept any kind of job opportunity available.
8. There is need to uphold and respect professional ethics in order to attain a successful life.
9. There should be serious fight against corruption to pave way for success.
10. One has to be creative and ambitious to discover all his hidden potentials.

THE LIMITATIONS TO A SUCCESSFUL LIFE TODAY

(Causes of failure)

These include,

1. Suffering from an incurable disease e.g. AIDS, cancer can limit ones success.
2. General laziness where one may not have a desire to work, can limit success.
3. Not trusting in God has made many not to succeed in their lives. God is the source of all good things.
4. Having a natural disability for instance blindness can affect one's success.
5. Natural calamities for instance earthquake, floods, do limit people's success today.
6. Sometimes being in bad terms with the ancestral spirits can limit our success. In Africa traditional ancestors do bless and therefore should be respected.
7. If one is poorly behaved, this can limit one's success for instance in terms of getting a job.
8. Making wrong choices in life sometimes result into frustrations and hence lack of success.
9. Unemployment today has limited people's success, consequently poverty.
10. Failure to be positive in our lives greatly limits success.
11. Failure to win elections especially by those vying for political positions like presidency e.g. ***Rt. Col. Kiiza Besigye*** who has tried the presidential seat for four time in Uganda.
12. Dependence burden sometimes can make one overloaded with challenges throughout his lifetime and this in the end limits one's efforts to break through.

EVILS THAT HAVE COME UP AS A RESULT OF SEARCHING FOR SUCCESS TODAY

1. There is too much corruption such as bribery, embezzlement and nepotism.
2. There is too much child sacrifice by those looking for wealth and constructing storied buildings.

3. Companies and industries are producing substandard or poor quality goods so as they can earn high profits.
4. Political leaders abuse term limits in their constitutions and others acquire power by use of force so as they can gain fame, wealth and money.
5. There is a lot of witch craft and malice as some people today bewitch others in order for them to win business favors and promotions at the expense of others.
6. There is too much theft, robbery and conning all aimed at bringing success for a few people.
7. Examination malpractices in schools are all aimed at good performance so that a school gets good results.
8. There is sexual harassment especially at work place. Some women use sex to gain promotions or jobs so as they may become successful.
9. Immorality like prostitution and pornography has come up as a way of acquiring success.
10. Environmental degradation like cutting down of forests and reclaiming of swamps all aims at success.
11. False prophets in the country who mislead people also aim at getting financial success.
12. Increased gambling like sports betting also focuses at making success on both people.

SUCCESS IN TRADITIONAL AFRICAN SOCIETY

Question;

(a) What was the traditional African understanding of success?

(b) What are the similarities and differences between the traditional African understanding of success and that of Jesus?

In African Traditional all the goals set for an individual or society were aimed achieving success. These could be reflected in the following;

1. They counted themselves successful if they were in good terms with the ancestors because they believed such spirits blessed them.
2. Faithfulness to the observance of traditional values, norms and customs, was considered a source of success for example good behaviors, circumcision.
3. Having much wealth in African Tradition was a sign of success since it brought admiration from others.
4. A man who was most respected in a society due to his reputation was regarded as successful.
5. Performing a heroic action in the African society, reflected success.
6. Having many friends was also a sign of success in life. This was especially true if one did not have enemies.
7. Having many wives was another aspect which reflected success. This is because it would be an assurance for production of children.
8. Many children assured success. The more children one had, the more prestige one held.
9. In African tradition leisure time was a significant activity which symbolized success.
10. Settling on a fertile land was another sign of success. This could bring successful agricultural yields.
11. Success was also attributed to a family which made a good harvest of food. This ensured food security to family members in times of famine.

12. Honoring blood pacts/bond would lead to the success of an individual or a family. This was because it introduced peace, love and unity among those involved.
13. Success meant being able to share with others for example Africans would share agricultural crops like yams bananas or beer.
14. Among Africans success meant undergoing initiation rituals or stages like circumcision among the Bagishu, body tattooing among the Lugbara and visiting the bush among the Baganda.

WHY PEOPLE IN AFRICAN SOCIETY WERE SUCCESSFUL.

- They encouraged the spirit of brotherhood and discouraged individualism and selfishness.
- The Africans taught the young to work right from childhood.
- They respected for elders hence their success in life.
- They worked together especially at harvest time and at brewing of local beer.
- They discouraged unnecessary competition which helped them to assist one another.
- They hardworking people. This is reflected in their limited time for leisure.
- They practiced polygamy hence there was plenty of labour force leading to abundant harvest.
- Unexplained success was questioned by the community. One had to give an account of his or her success.
- They respected their traditions and customs hence they were assured of their blessing.
- They depended much on God.
- Africans were loyal and honest.

SIMILARITIES AND DIFFERENCES BETWEEN THE AFRICAN TRADITION AND TODAY'S UNDERSTANDING OF SUCCESS

Similarities

1. Both look at having wealth as a way of being successful.
2. Both emphasize that for one to be successful, he or she must be hardworking.
3. In both, having many friends is a sing of success.
4. In both, respecting religious values is a sign of success.
5. In both, having children who are well behaved, healthy is a way of being successful.

Differences

1. In African tradition, human dignity was a sign of success but to wealth comes first i.e. people are accepted for what they have.
2. In African tradition, one was considered a success just because of being prosperous not at the expense of others can be success.
3. In African tradition, having many children and wives was considered to be success but to day more emphasis is put on few children and family planning/
4. Similarly much as having many wives was a sign of success in the African Tradition, to day some take the issue of having many wives as unfaithfulness and therefore not success.

5. In African Tradition, polygamy was a sign of success to the married while today the stress is put on monogamy.
6. In African Tradition, being in good terms with ancestors was looked at as success while today a person is considered to be successful if you are in good terms with God.
7. In African Tradition, fulfilling cultural demands i.e. values, norms and customs was a source of success. Today ne is successful if he/she fulfills religious obligations e.g. keeping the Ten Commandments.

FORMS OF FAILURES IN AFRICAN TRADITION

Failure in the African Tradition was manifested in the following ways;

1. If a woman failed to produce children {barrenness}, she was considered a failure.
2. An impotent person was of age and was unmarried was a failure because marriage in the African Tradition was compulsory.
3. Some societies for instance among the Bakiga, producing twins was a bad omen and a curse hence a form of failure.
4. In the African Tradition, failure could be registered when one was struck with a strange disease.
5. If a family lost a member, this caused a lot of sadness especially if the member was still young hence a failure.
6. If a boy failed to raise the bride price, so that he could marry, this could be referred to as failure.
7. In some societies e.g. among the Bagishu, a person who was not circumcised was considered a failure.
8. In most African societies failure was also seen when someone failed to marry especially a man. This was interpreted as a big loss on his family and entire clan.
9. Being on bad terms with spirits and gods was a sign of failure. This would manifest itself in form of losing battles, sickness and many misfortunes.

CAUSES OF FAILURE IN THE AFRICAN TRADITION

Failure in the African Tradition was attributed to the following;

1. Witchcraft where one could be bewitched to suffer a certain failure.
2. Failure to fulfill certain traditional customs such as circumcision.
3. Failure to appease the living dead (spirits), this would make them bring curses in the African tradition.
4. Punishments from the ancestral spirits also caused failure.
5. Laziness which made one e.g. not to raise the required bride price, would make one be considered a failure.
6. Failure in African Tradition was caused by jealousy and envy which forced them to bewitch others.
7. Bad conduct which usually resulted into failure of the concerned individual to achieve a desired goal.
8. Not respecting the elders especially parents led to failure as these could curse young ones.

Question.

Explain the successes that were expected from an African Traditional family?

An African Traditional family would be expected to;

- Have children.
- A lot of wealth e.g. land, cattle etc.
- Be on good terms with ancestors.
- Have well behaved and healthy, energetic children.
- Be in good terms with the rest of the community i.e. having many friends.
- If it respected the cultural norms and values.
- It was expected to pass bring up morally upright children.
- It was expected to help young ones develop and utilize their talents.
- It was expected to share with neighbors.
- To defend the interests of the society where it's part.
- Impart skill in the young ones for self- reliance in future.

SUCCESS IN THE CHURCH HISTORY

The story of the church is a story of success basing on the following aspects;

1. The Christian church has the largest number of followers. The church has successfully preached the gospel and has therefore expanded in size.
2. The church established strong fellowships where all Christians would gather to share experiences and challenges in life.
3. Christianity has the most outstanding buildings, good music, portraits which express people's commitment to God.
4. The church has successfully translated the scripture from foreign languages to local ones. This strengthened the Christian faith.
5. Christianity has been in existence for a long period of time more than any other religion. Its existence dates as far back to the death and resurrection of Christ.
6. The church in Africa has been able to produce saints and martyrs e.g. Daudi Okello, Kizito etc.
7. The church had an upper hand in the abolition of slavery until when it was finally abolished in 1807 by William Wilberforce.
8. Many people have embraced various sacraments e.g. baptism, matrimony which have improved on their spiritual life.
9. Through establishing schools like Gayaza high school, the church has helped in the fight against illiteracy and ignorance in Africa.
10. It has helped in the provision of good health to the people through establishment of hospitals e.g. Mengo hospital, Rubaga, and Nsambya hospital.
11. The church has managed to encourage unity, peace and harmony among people.
12. The church was successful in fighting for the rights of women by giving then equal rights with men in the church, mixed schools etc.
13. It has shaped up the morals of people.

FAILURES IN CHURCH HISTORY

1. In the course of preaching the gospel, sometimes the church emphasizes hell which scared off the believers. This distorted the purpose of preaching God's love.
2. The nuns and monks of the early church were not exposed to the outside life because they were often confined in monasteries.
3. Some Christians in the early church continues owning slaves. This gave a bad image of the church.
4. At some point the church turned away from the set goals to material possession. For example the nuns and monks got involved in money making ventures especially in North Africa.
5. The church supported colonialism with its associated evils like oppression, exploitation and taking away people's land.
6. There was torture caused by the use of spiritual gifts e.g. some Christians boasted over others and this hindered the work of the church.
7. Christianity was seen as a prohibitive religion i.e. it was full of "don'ts". This made the church to lose its early coverts.
8. There was disunity among the early Christians. There was no uniform teaching among Protestants and Catholics.
9. Church history witnessed many religious wars between Catholics and Anglicans especially in Buganda. This worked against the progress of the church.
10. African cultures like dance and wear were despised as Satanic and this too stopped many Africans from joining the religion of the whites.

SUCCESS REALIZED BY THE MISSIONARIES

The following are the successes realized by the missionaries out of their activities in Africa.

1. They spread the good news.
2. They made successful missionary journeys to different parts of the world.
3. They built churches e.g. Rubaga, schools like Namilyango College, hospitals like Mengo hence they were successful in putting up infrastructural development.
4. They were successful in fighting against diseases like malaria, bilharzia etc.
5. They introduced new songs used in Christian worship.
6. They helped to make the church grow tremendously.
7. They were successful in the field of agriculture when they introduced crops like coffee, cotton etc.
8. They fought their opponents and using God's power they were successful.
9. They were successful in enduring opposition, suffering and torture during their preaching.

PROBLEMS THAT HINDERED MISSIONARY SUCCESS IN AFRICA

1. Missionaries faced many oppositions from Africans and traditional leaders who thought they had come to over throw them from their thrones e.g. Kabaka Mwanga from Buganda (Uganda).
2. Some missionaries were killed in the process of spreading the good news, e.g. **Bishop James Hannington** who was killed at Nyondo hill in Busoga.
3. Missionaries found it hard to make the Africans abandon their traditional beliefs and worship.

4. In areas where Islam had gained firm roots e.g. in West Africa, missionaries experienced great opposition.
5. Some new converts later on deserted their new religion and back slid.
6. There was disunity among different missionary groups and this acted as an obstacle to the missionaries to achieve their success.
7. Some missionaries were looked at by Africans as self-seekers, exploiters and were largely rejected by Africans.
8. There was a problem of language (language barrier). Some Africans did not know English, Latin, French, which were the main languages spoken by the missionaries.

SOME SUCCESSFUL PEOPLE (CHRISTIANS) IN THE CHURCH HISTORY

1. **The Uganda martyrs**; They remained loyal to God and refused misguided loyalty by traditional leaders like the Kabaka.
2. **Perpetua and Felicity**; They were from North Africa and were martyred shortly after becoming Christians. They died courageously and joyfully than denying Christ.
3. **Cyprian**; He gave up his carrier in law to become a Christian and later he became a bishop. Ten years later he was martyred for his faith in Christ.
4. **Anthony**; He was an Egyptian who quested for God in the desert and lived a poor life in the cave. It's why by him that monasticism started.
5. **Charles de foucauld**; He lived in a purely Christian life among Moslems in North African and he had no followers.
6. **Martin Luther king**; He worked for the oppressed blacks in America and he was assassinated for it. He therefore promoted justice and challenged Christians to work for justice.
7. **Norman Leys**; He was sent away from Kenya because he wrote against oppression of the colonial government to the Kenyans.
8. **Mother Maria**; She was a Russian nun who was put in the concentration camp during the Second World War (1939 –1945). She took a place of a woman who was supposed to be executed. She died on a Good Friday.

WHY THE FOLLOWING ARE REGARDED AS SUCCESSFUL

A. **Charles de foucauld**;

He lived in the nineteenth century among Moslems in North Africa. He felt that he was called to serve the poor imitating Jesus of Nazareth. Today he is remembered as the founder of the little brothers and the little sisters of Jesus. He is regarded as the most successful person because;

- He chose to live a poor life like Jesus Christ.
- He managed to silently remain loyal to his faith as he was living among Moslems.
- Charles had no followers to begin with but today he is looked at as the founder of the little brothers and little sisters of Jesus.
- Charles also had a good relationship with people he lived with. He is known for the love he had for his people similar to Christ's love for mankind.
- He also had a prayerful and righteous life.

B. **Mother Maria;**

Mother Maria was a Russian nun who lived in the period of the Second World War. She registered the following success,

- She surrendered to death when she was put in a concentration camp during the 1939- 45 wars.
- She offered to be killed instead of a woman was to be executed.
- She is known for being a courageous woman who never feared death.
- She died on Good Friday in 1945 a day that coincided with Jesus' death.
- Because of her faith she was known in the concentration camp as that wonderful Russian nun.

C. **The Uganda martyrs;**

They achieved the following success;

- They refused to practice anti-social behavior like homosexuality among themselves.
- They accepted to die in their faith of Christianity thus disobeying Kabaka Mwanga.
- They took up baptism in Jesus' name.
- They obeyed the ten commandments of God as given in the bible.
- They always prayed to God in face of problems.
- They stood firm in their faith in spite of being threatened to be killed.
- They preached the gospel in spite of the problems.
- They kept trusting and praising God as they faced death.
- They died because of the faith they had for their God.
- They became living examples to others.
- They converted others to Christianity.
- Christianity has been promoted and they are looked at as the pillars Christianity in the region.
- Many churches have been built and named after them
- Many believers regard them as saints.
- There is a special day for them on the Uganda calendar e.g. Martyrs' day 3rd June.
- The martyrs remained loyal to God even though they were murdered to death.
- They were very courageous thus not fearing death and were very happy to be persecuted because of their faith.

ACHIEVEMENTS OF THE CHURCH IN AFRICA

QUESTION

"The church claims to have made many successes in East Africa"

(a) Describe the achievements (successes) of the church in East Africa in the field of;

I. Education.
II. Medicine
III. Evangelization

(b) What problems has the church encountered in trying to achieve its successes?

I. EDUCATION

In the field of education the church has registered the following successes;

- The church has established many schools like Namilyango College etc.
- It has imparted morals in children.

- It has provided scholarships to needy students through its organizations like **Kulika** in the Catholic Church.
- It has provided learning materials e.g. books disks etc.
- It has led to attainment of higher levels of education.
- It has taught people against oppression of children especially orphans and girl child.
- It has campaigned for girl child education.
- Through educating the people, the church has tried to stop wars among countries
- It has helped people to abandon the barbaric African cultures like twin murder.
- It has provided employment opportunities to teachers at all levels.

II. HEALTH

In the area of health the church has achieved the following;

- It has constructed hospitals like Nsambya, Mengo etc.
- They have provided counseling services to the sick.
- It has provided material things in form of food, clothing etc.
- It has provided employment opportunities to medical people like doctors, nurses and midwives.
- It has taught and preached against African medicine hence turning African minds for western medical services
- It has provided free drugs to patients.

III. **EVANGELIZATION**;

- The church has converted so many people to Christianity.
- The church has been able to provided saints e.g. the Uganda martyrs.
- It has provided catechetical instruction to new Christians which strengthened their faith.
- It has discouraged injustices and created peace e.g. **Bishop Janan Luwum.**
- The church has built many seminaries where priesthood is taught e.g. Kisubi, **Lacor**, as well **Mukono** theological college.
- The church has introduced scripture study and many books have been written about Christianity.

PROBLEM S ENCOUNTERED BY THE CHURCH IN TRYING TO ACHIEVE ITS SUCCESS

- Disunity amongst the church itself due to fighting for rich position ,scares new converts and those who have not been converted to joins the church
- The church has faced opposition from cultural tradition beliefs and cultural leader such as witchdoctors
- There are many false prophets who have preached ill doctrines to the people eg Kibwetere in Kanungu
- Political instabilities in some part of E. Africa e.g. Northern Uganda which puts the church activities on a stand still
- The church still lacks enough man power so as to execute its duties well in some parts of E. Africa

- The church has been disturbed by the power of Satan among people. This is evidenced in different immoral activities e.g. child sacrifice, homosexuality, prostitution etc.
- The church lacks enough funds to run its activities e.g. in rural areas where transport may be a problem.
- Many people are turning away from God due to false teachings brought about by false prophets, demanding job opportunities etc.
- Poor governance in the church which brings about disunity amongst the Christians e.g. discrimination between the poor and the rich where the rich are favored at the expense of the poor.
- Wrong Christian literature for example false bibles which may bring confusions amongst Christians.

BIBLICAL TEACHING ON SUCCESS

THE OLD TESTAMENT

1. In Genesis 2, God finally came to the end of the creation exercise. God successfully completed the creation and declared that 'it was all good.'
2. In Genesis 1:28 God gave man the task of developing the earth. Therefore man to successfully work to develop the world.
3. In Exodus 3 God successfully liberated the Israelites from slavery in Egypt which brought hope for God's people.
4. The Ten Commandments given to the Israelites successfully brought justice and peace among the children of Israel.
5. God's covenant with the Israelites at Mt. Sinai made the Israelites become God's people. This was a success to God's people.
6. God also successfully helped the Israelites conquer the land of Canaan which was flowing of milk and honey.
7. Israel as a newly established state was blessed with new leaders like Moses and Joshua who helped God to administer his country.
8. The belief in one God (monotheism) was adopted as a basis of success among the Israelites.
9. Success was achieved in offering of sacrifices which won for the people God's good will and blessings.
10. Among the Israelites child bearing was counted as a measure of success. That is why Sarah and Hannah were blessed with babies.
11. Making pilgrimages to holy places like Jerusalem temple was also counted as a measure of success among the Israelites.
12. Prophets of God helped in guiding the people towards reaching success. They condemned evil and promoted the law of God.
13. Success was also seen in terms of repenting sins people would have committed against God.
14. According to the Old Testament, true success was seen in loving God and fellow men. The book of Deuteronomy teaches that the greatest law is the law of love of God and neighbor.
15. Prayers and offering sacrifices were also seen as success because in this way the Israelites considered themselves as pleasing God.

SUCCESS WHICH MOSES BROUGHT IN ISRAEL

1. Moses brought freedom to the Israelites whom he liberated from the Egyptian slavery.
2. Moses was a mediator between God and his people. He acted as a link especially at the making of the covenant at Mt. Sinai.
3. At Mt. Sinai Moses brought the Israelites in God's presence when the people entered into a covenant with God.
4. Moses was a chief priest and he successfully led them in prayers as well as offering sacrifices for them.
5. He successfully offered to the Israelites the Ten Commandments which served as their guide in life.
6. Moses successfully played the role of a prophet of the Israelites. As a prophet he managed to guide all the Israelites in light of God.
7. He introduced a new culture for the Israelites which was composed of circumcision, sacrifices etc.
8. He introduced religious days on the calendar of Israel such as the Passover day, national day of repentance etc.
9. He was a successful soldier who led the Israelites into wars against their enemies.
10. He was a founder of the Israelite nation and thus brought unity among the Israelites.

EVILS MET IN THE OLD TESTAMENT AS PEOPLE LOOKED FOR SUCCESS

1. Adam and Eve sinned against God as they tried to become as wise as God is.
2. Cain killed his brother Abel as he tried to be loved by God.
3. The builders of the tower of Babel became confused and later misunderstood each other as they tried to build their tower up to heaven.
4. The Israelites made a golden calf in their attempt to fellowship with God at Mt. Sinai (Exodus 32)
5. Some Israelites became Baal worshippers in their attempt to become rich and powerful.
6. Some Israelites like King Ahab made alliances with pagan kings in his attempt to become powerful and successful in the region.
7. King David committed adultery with Bathsheba in his attempt to have successful leisure time.
8. Solomon annoyed God when he introduced forced labor and over taxation in his bid to construct a temple for God.
9. Some Israelites married pagan women in their attempt to strengthen Israel.

WHAT IT MEANT TO LIVE A SUCCESSFUL LIFE IN THE OLD TESTAMENT.

In the Old Testament leading a successful life involved the following;

- Being faithful to God's commandments for example Abraham was faithful to God's instructions.
- Living in good relationship with God and fellowman was a sign of success.
- Owning many wives and children was also counted as a sign of success e.g. King Solomon has 700 official wives and 300 concubines.
- Having a large family was also a sign of success; for example King David was successful with a big family.
- Having material wealth like cattle, land, gold, and silver for example Solomon had all these items in his Palace.
- Having many friends indicated success in society.

- Having status and influence in society; for example Solomon was famous in Israel and outside Israel.
- Being able to judge cases wisely was an indication of success, For example Solomon judged the case of two women wisely.
- Having trust in God in spite of suffering like Prophet Elijah who suffered for the sake of God.
- Following traditional rituals of Israel like naming, circumcision etc. all were indicators of success in life.
- Living for a long time with good life; e.g. Abraham died at the age of 175 years Genesis 25:7-8.
- Having one's sacrifice accepted by God also indicated success in one's life.

FACTORS THAT BROUGHT ABOUT SUCCESS IN THE OLD TESTAMENT

1. **Faithfulness** in God brought success for example Abraham was blessed with many descendants because of his faith.
2. Obedience to God also brought success for example Noah was spared along with his family members during the floods.
3. Having love for God; Abel's love for God also brought success to him when God accepted his sacrifice and blessed him.
4. Faith and trust in God brought success for example Job was restored to his position because of trusting God.
5. Being wise and respectful to God also brought success e.g. Joseph was able to interpret the dream of the king and he was made governor of Egypt.
6. Moses' obedience to God brought success to him in that after death, he was taken to heaven.
7. Prophet Elijah attained success in proving to the Israelites who the true God was at Mt Carmel.
8. Monotheism which means belief in one God had been strongly emphasized as the basis of Israel's success.
9. Repentance of sins was a key road to success, for example David repented and was forgiven by God.
10. Obedience to God's laws, for example Moses disobeyed God and never reached Canaan but Joshua was obedient and was appointed Moses' successor.

WAYS IN WHICH JOB WAS SUCCESSFUL AND A FAILURE

(Job 1, 2, 42, 12-16)

(A) Job as a successful man.

1. He worshiped only one God and he was faithful to him.
2. During his suffering, he didn't say anything against God although all his property of wealth was destroyed and all his children died.
3. He remained innocent throughout though his wife told him to curse God but he didn't. This is a sign of success.
4. He was honest to God.
5. He continued offering sacrifices to God though he was being tempted constantly.
6. God blessed him with all the wealth he had lost during his suffering.

7. He even saw his great grant children which was a sign of success and blessing.
8. He died at a very ripe/old age which was a sign of success.

(B) Job as a Failure.

1. He lost all his property/wealth during his suffering.
2. During suffering, he was isolated and refused by all his friends.
3. He was tempted by Satan however much he showed his faith to God.
4. He asked God to curse the day he was conceived in his mother's womb.
5. He married an unfaithful wife who asked him to denounce God.
6. He had friends who were not faithful.
7. He had a long period of suffering and he was left alone most of the time.
8. He lost all his sons, daughters and servants.

SUCCESS IN THE NEW TESTAMENT

According to the New Testament, success is seen in the following ways:-

1. Doing God's will i.e. doing what God expects of us.
2. Becoming a person for others like the way Jesus Christ did i.e. being lovely and friendly to the rest.
3. Accepting the value of Christ i.e. loving God and neighbor.
4. Humility is a manifestation of success for a Christian.
5. Complete trust in God and genuine service to him signifies success.
6. Success is manifested in being open and doing what God wants believers to do.
7. Success is also a result of living according the ten commandments of love.
8. According to the New Testament, success is not based on material achievements but helping others; Mt:25:35-36)
9. Being able to develop individual talents is a manifestation of being successful; Jesus encouraged his followers to use their talents so as to live a successful life, (Mt. 25:4-30)
10. Having virtues like being merciful, kindness, being just as Jesus emphasizes in the beatitudes are sources of success in the life of a Christian.
11. Serving others can also lead to success; for example Jesus showed it when he washed the feet of his disciples (John 12:5)
12. Success is given to those who have hope in the second coming of Jesus upon which man will enjoy salvation.
13. St. Paul teaches that those who give glory to God because of being the creator of the universe will get success in the end.

WHAT JESUS TEACHES ABOUT SUCCESS IN THE NEW TESTAMENT

Jesus has the following ideas about success in the New Testament

1. Jesus says that he is the origin of success and whoever believes in Him shall get everlasting success, (John 3:15)

2. He teaches that being faithful to what Jesus teaches is a short cut to success, (John 5:24)
3. In the beatitudes Jesus teaches that a person who would attain success is one who is kind, merciful, lovely etc. Mt. 25:3-12.
4. Jesus encourages the use of talents in order for one to get success in life; Mt 25:4-30.
5. Jesus calls upon his followers to be loyal just as he was loyal to the will of his father in order to get success John 4:34.
6. To Jesus success means opposing selfishness and not worshipping any-thing else like money, Luke 9:23-26
7. He called upon the rich to help the poor, needy, hungry and naked in order to get for themselves success from God (Mt. 25:35-36)
8. He taught that serving others can lead to success in life.
9. He taught that success does not only depend on material things; he told a rich young man to sell his property in order to get success; (Mt. 19:16-22)
10. He taught his followers that there will be resurrection after earthly life and that will success for those who will get there; John 11:25.

What do Christians learn from Jesus' teaching on success?

Christians learn the following from Jesus' teaching on Success;

- Christians learn to believe in Jesus as a true source of success.
- They learn to worship only one God who is a giver of success.
- They learn to be kind, merciful and lovely to others.
- They learn to develop and make use of their talents.
- Christians learn to accept the gospel of Jesus to get success.
- They learn to be rich at spreading the good news in order to get success.
- Christians learn to live a repentant kind of life.
- They learn to share with other especially the needy, orphans and beggars of the time.
- They learn to believe in resurrection of all the dead.
- They learn to consider Jesus as personal savior and the only means to salvation.
- They learn to fellowship with one another instead of fellowshipping with their wealth.

JESUS AS A SUCCESSFUL PERSON

Jesus is said to have been successful in the following ways;

1. He succeeded in doing his father's will.
2. Jesus was humble and his humility qualified him as a successful person.
3. He succeeded when he accepted death on the cross to save his followers.
4. He rose from the dead and thus he successfully conquered death.
5. Jesus gave peace to those who were isolated e.g. tax collectors, prostitutes, lepers etc.
6. He managed to overcome Satan's temptation in the wilderness (Mt: 4: 1- 11).
7. He was successful in performing miracles; such as turning water into wine.
8. He was successful in obeying his earthly parents i.e. Mary and Joseph.

9. He was successful because he was not killed when King Herod ordered his soldiers to kill all baby boys at a young age.
10. He was successful in living a honest and trustworthy life.
11. Jesus worked with his disciples which enabled them to achieve their desired goals.
12. He achieved rights for the children when he defended their rights to freely enjoy God's presence.
13. He defeated Satan when he died and successfully resurrected after 3 days.

PRESUMED FAILURES OF JESUS

Jesus was a failure in the following ways;

1. Jesus was born in a kraal of cattle and therefore he came from a poor family of a carpenter with nothing to boast of.
2. He accepted to be baptized yet he was not a sinner.
3. He was approached and tempted by a devil. This put him in a situation of a failure.
4. He associated with sinners like tax collectors, prostitutes etc. thus he was also taken to be a sinner.
5. Jesus referred to himself as a prophet but with no honor in his own home town. He was not respected in Nazareth.
6. He lost temper in the temple and this indicated that Jesus was a failure for he lacked self-control Mk 11:15.
7. He abandoned eating and chose to preach; people thought he was mad, hence failure.
8. He was too humble (servant of others) yet he said he was king.
9. His ministry was short lived. It lasted for only thirty three years.
10. He met opposition from religious leaders, scribes and the Pharisees.
11. He experienced a shameful death on the cross with criminals although he was innocent.
12. His friends (disciples) didn't understand him something which was unfortunate.
13. He didn't have an army to protect his ideology and this led to his death and persecution of his followers.
14. His popularity increased after his death and so he didn't enjoy his fame.
15. Jesus was considered a failure because he didn't marry therefore he did not have children.

Question.

(i). What should a Christian do in order to achieve a successful life?

(ii). Give the weaknesses of the church's successes.

CHRISTIAN UNDERSTANDING OF SUCCESS

Christians understand success in the following ways;

1. Christians believe that is brought by leading a prayerful life, fasting, meditation on God and attending Christian retreats.
2. Success means having time to praise Gog through Christian music, dance and drama.
3. It means attending bible studies, fellowships and sharing with one another.

4. Success is understood as having time to make offerings to God as well as paying tithe.
5. It means doing charitable works and helping the poor.
6. It means attending crusades organized by different people.
7. Success also means being persevering to all sorts suffering in the Christian life.
8. It means self-sacrifice and being committed to God.
9. It means changing into a new person or being born again.
10. It means preaching the gospel to other people.
11. It means discovering and utilizing our talents for our betterment and good of others.
12. It means being faithful to and praising God.

THE SUCCESS JESUS WON FOR THOSE WHO BELIEVE IN HIM

The following are the successes Jesus won for the Christians;

1. Jesus' death and resurrection made his followers to attain salvation in life hence success.
2. Those who accepted his gospel became children of God's family and that means success on their side.
3. Through Jesus' death and resurrection, Jesus' followers have victory over death and a hope of resurrecting as Jesus did.
4. Jesus has given power to his followers to withstand persecutions thus attaining success.
5. Believers in Jesus have been given power to resist temptations from the devil.
6. Through forgiveness of sinners, they have been reconciled with God.
7. Jesus has given his followers power to perform miracles and wonders in his name.
8. Believers received guidance of the Holy Spirit throughout their lives.
9. Jesus taught his followers the aspect of sharing with one another.
10. He has helped them to develop love for one another and for their God.

HOW THE DISCIPLE WERESUCCESSFUL AFTER THE PENTECOST DAY

The disciples were successful in the following ways;

1. They had joy and courage despite persecutions and innocent murders like that of St. Peter.
2. They were successful in preaching the gospel message to different areas without fear for example St. Paul.
3. They baptized people with an aim of winning them to Jesus Christ.
4. They founded churches foe example St. Paul opened up churches in Corinth and Galatia.
5. The disciples helped the suffering and needy people of their time.
6. They shared the Holy Communion in their homes and ate together as members of the same family.
7. They supported and strengthened one another in times of need.
8. They performed miracles in the name of Jesus for example Peter healed the man at the temple gate.
9. They accepted martyrdom due to their faith; for example St. Stephen and Peter were killed for the sake of the gospel.
10. They wrote down Christian epistles (letters) and scriptures e.g. St. Paul wrote letter to the Galatians, Corinthians etc.
11. Others made missionary journeys to preach to the gentiles e.g. St. Paul preached in Corinth.

Similarities and differences between traditional African understanding of success and Jesus' teaching about success

Similarities

1. In both traditional African and Jesus' teaching, a good relationship with God is considered because he is the source of success.
2. Both teachings stress that success can be achieved through being in harmony with others.
3. Both teachings present initiation ceremonies as basis for success. For example traditionalists believed in initiation rituals while Christians believe in baptism.
4. In both prayers are relied upon in order for one to attain success.
5. In both team work is a key factor in bringing success. Jesus worked with his disciples and in Africa communal work was encouraged.
6. In both situations success is got through use of talents people are gifted with.
7. Both believed that success can be achieved through thanks giving to the divinities.
8. In both cases success can be achieved through hard work.
9. In both cases there is a common belief that success is meant to be for all people without discrimination.
10. In both cases success comes from sharing with other and so selfishness is condemned.

Differences

1. Jesus teaches that through him alone man would attain success, but Africans considered loyalty to traditional customs.
2. To the Africans success was measured in terms of material things, while to Jesus, material things can hinder one from getting success.
3. To Africans polygamous marriages were a measure of success, while to Jesus monogamy is.
4. To Africans loyalty to ancestors would lead to success, while to Jesus loyalty to the Holy Spirit does it.
5. To the Africans success depends on material things, but Jesus teaches that it depends on one's hope and faith.
6. To Jesus following the law of God leads to success, but to the Africans success comes from serving the whole community.
7. In Africa success is seen in being a hero while to Jesus it's a private matter between man and God.
8. To Jesus the biggest success is found in heaven while to the Africans it is found here on earth.

Chemistry

1. NITROGEN AND ITS COMPOUNDS

1.1. NITROGEN

Occurrence of nitrogen

Atomic number 7, atomic mass 14. It is one of the main elements needed for plant growth. Nitrogen is the most abundant gas in the atmosphere, occupying about 78 per cent by volume. It occurs in nature in a combined state as in minerals such as sodium nitrate. It is found in living things in form of proteins.

1.2. LABORATORY PREPARATION OF NITROGEN FROM AIR

The methods include:

a. Thermal decomposition of ammonium nitrite

Ammonium nitrate when heated decomposes to give nitrogen.

$NH_4NO_2(s) \rightarrow N_2(g) + 2H_2O(l)$

Ammonium nitrite is prepared from the reaction between sodium nitrite and ammonium chloride

$NH_4Cl(s) + NaNO_2(s) \rightarrow NH_4NO_2(s) + NaCl(s)$

b. Reduction of copper (II) oxide using ammonia

$3CuO(s) + 2NH_3(g) \rightarrow 3Cu(s) + N_2(g) + 3H_2O(l)$

c. Direct combination of chlorine and ammonia gives nitrogen and ammonium chloride

$Cl_2(g) + 8NH_3(g) \rightarrow N_2(g) + 6NH_4Cl(s)$

1.3. INDUSTRIAL PREPARATION OF NITROGEN FROM AIR

The raw material is air. It is done by systematically removing carbondioxide and oxygen leaving nitrogen.

It is done in stages. These include:

a. The air is pumped into the set up

b. It is then passed through sodium hydroxide solution which removes carbondioxide

Sodium hydroxide absorbs and removes carbondioxide from the air mixture and forms sodium carbonate

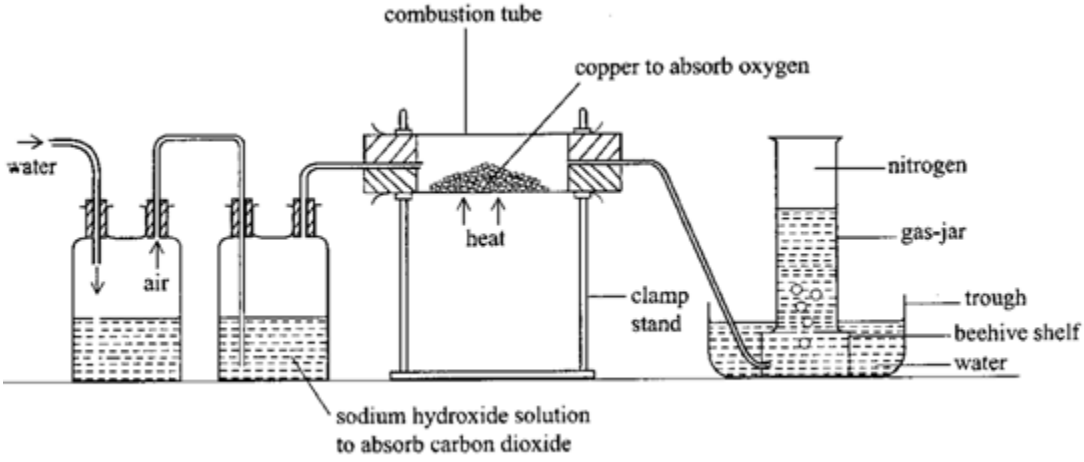
$2NaOH(aq) + CO_2(g) \rightarrow Na_2CO_3(aq) + H_2O(l)$

c. It is then passed over heated copper in the furnace to remove oxygen

It removes the oxygen by reacting it with the hot copper leading to formation of copper oxide

$2Cu(s) + O_2(g) \rightarrow 2CuO(s)$

d. The remaining air is mainly composed of nitrogen which is collected over water since it is slightly less dense than air.



Note:

- It can be dried by passing the gas through a U-tube containing glass beads wetted with concentrated sulphuric acid to dry it and then collected in a syringe.
- Nitrogen formed by this method is not pure. It contains several impurities, mainly the noble gases as well as unreacted oxygen.
- Commercially nitrogen is manufactured through fractional distillation of liquid air.

1.4. TEST FOR NITROGEN

Nitrogen is almost inactive (inert) at ordinary temperatures. There is almost no positive test for it. This is because nitrogen is composed of diatomic molecules, the atoms of which are held together very strongly by three (triple) covalent bonds. Only when sufficient energy is supplied to break these bonds does nitrogen react. Because of being inert, it has no simple positive test. It can only be identified by its negative response to the following tests for other common gases.

1. Nitrogen extinguishes a burning splint and the gas does not burn. This distinguishes it from other gases that support burning like oxygen and dinitrogen oxide or any combustible gas such as hydrogen, carbon monoxide, hydrogen sulphide.
2. Nitrogen has no smell. This distinguishes it from gases such as sulphur dioxide ammonia, hydrogen chloride.
3. Nitrogen has no action on lime-water. This distinguishes it from carbon dioxide.

1.5. PROPERTIES OF NITROGEN

1.5.1.1. PHYSICAL PROPERTIES

1. Nitrogen is a colourless and tasteless gas.
2. It is slightly soluble in water under ordinary conditions.
3. It is slightly less dense than air.
4. Nitrogen and hydrogen combine at high temperatures and pressure in the presence of a catalyst to form ammonia.
   $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
5. Nitrogen reacts only with the reactive metals (magnesium and calcium). When these metals are heated strongly, they burn in nitrogen forming the corresponding nitride, which is white in colour.
   $3Mg(s) + N_2(g) \rightarrow Mg_3N_2(s)$
   $3Ca(s) + N_2(g) \rightarrow Ca_3N_2(s)$
   The heat produced by the burning magnesium ribbon or calcium is strong enough to break the triple bond in the nitrogen molecule forming free nitrogen atoms. The free atoms are very reactive and combine with these metals to form a nitride. If a burning wooden splint is placed in a jar of nitrogen, it gets extinguished. This is because the heat it produces is not sufficient to break the tripple bond between the nitrogen atoms
   The nitrides dissolve in water to form the corresponding hydroxide and ammonia.
   $Mg_3N_2(s) + 6H_2O(1) \rightarrow 3Mg(OH)_2(aq) + 2NH_3(g)$
   $Ca_3N_2(s) + 6H_2O(1) \rightarrow 3Ca(OH)_2(aq) + 2NH_3(g)$
6. In thunderstorms, a small amount of nitrogen reacts with the oxygen in the air to form nitrogen monoxide and nitrogen dioxide.
   $N_2(g) + O_2(g) \rightarrow 2NO(g)$
   $2NO(g) + O_2(g) \rightarrow 2NO_2(g)$

The electrical discharge in a thunderstorm provides sufficient energy for this reaction to occur.

1.6. USES OF NITROGEN

1. Used in the Haber process for the manufacture of ammonia.

   $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

2. It is used in food packaging, for example in crisp packets, to keep the food fresh and in this case to prevent the crisps being compressed.

3. Liquid nitrogen is used as a refrigerant.

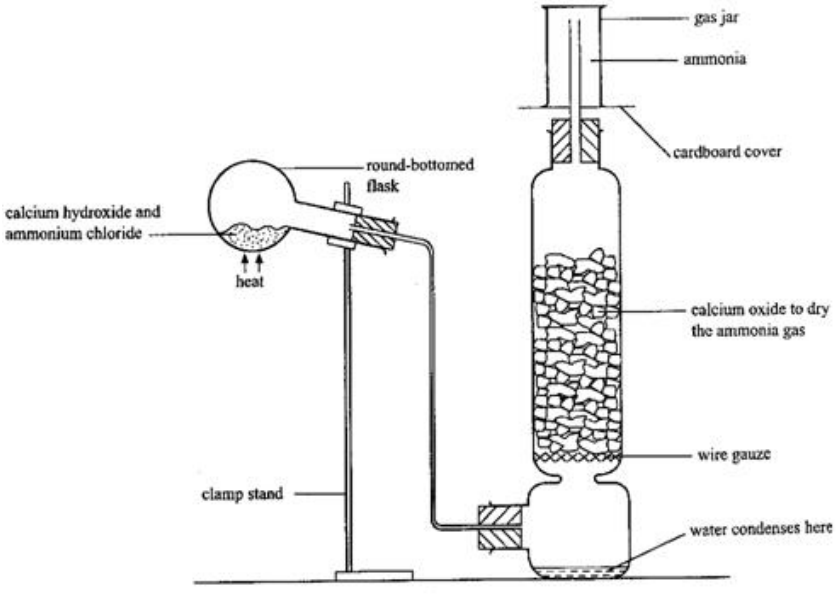
4. Because of its unreactive nature, nitrogen is used as an inert atmosphere for some processes and chemical reactions. For example, empty oil tankers are filled with nitrogen to prevent fires.

1.7. AMMONIA

1.7.1. LABORATORY PREPARATION OF AMMONIA

The apparatus is set up as shown in figure 2.4. The flask has to be slanted to prevent water produced by the reaction from running into the hot flask when it causes the glass to crack. A mixture of calcium hydroxide and ammonium chloride is first ground thoroughly. Then it is placed in the flask and heated, producing ammonia which is collected by downward displacement of air since it is less dense than air. The gas is dried by calcium oxide (quicklime).

$Ca(OH)_2(s) + 2NH_2C1(s) \rightarrow CaC1_2(s) + 2H_2O(1) + 2NH_3(g)$



Instead of calcium hydroxide, sodium hydroxide or potassium hydroxide solution may be used, in which case the flask would be placed in the vertical position and heated.

$NaOH(aq) + NH_4Cl(s) \rightarrow NaCl(aq) + H_2O(l) + NH_3(g)$

$KOH(aq) + NH_4Cl(s) \rightarrow KCl(aq) + H_2O(l) + NH_3(g)$

Ammonium sulphate may be used instead of ammonium chloride.

$Ca(OH)_2(s) + (NH_4)2SO_4(s) \rightarrow CaSO_4(s) + 2H_2O(l) + 2NH_3(g)$

The usual drying agents such as concentrated sulphuric acid and anhydrous calcium chloride are not used because ammonia reacts with them to form ammonium sulphate and tetraamine calcium chloride respectively.

$2NH_3(g) + H_2SO_4(l) \rightarrow (NH_4)2SO_4(s)$

$CaCl_2(s) + 4NH_3(g) \rightarrow Cac1_2.4NH_3(s)$

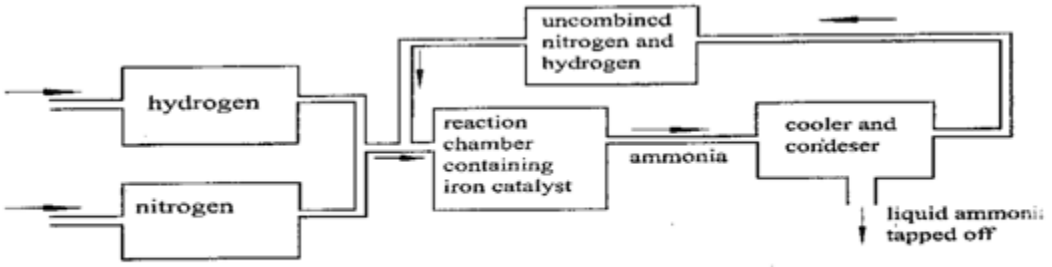
1.7.2. INDUSTRIAL PREPARATION OF AMMONIA (HABER PROCESS)

Dry nitrogen and hydrogen in the ratio of one to three respectively, are passed over a catalyst of iron with some traces of aluminium oxide present. The reaction occurs at the surface of the catalyst, therefore, the catalyst should be finely divided to increase the surface area over which the reaction occurs. Aluminium oxide improves the performance of the catalyst by making it more porous thus providing a higher surface area for the reaction. The temperature is between 450^oC – 500^oC. The gases are under a pressure of 250 atmospheres to 500 atmospheres. Ammonia is produced.

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

Ammonia is removed from the mixture of gases by cooling the mixture with a freezing mixture. It is only ammonia that liquefies and can be removed from the mixture. The unreacted nitrogen and hydrogen are recycled (figure 2.5).

Nitrogen used in this process is obtained by fractional distillation of liquid air and hydrogen is obtained from natural gas or electrolysis of brine.



1.7.3. TESTS FOR AMMONIA

The gas has a characteristic chocking smell. It turns damp red litmus paper blue and forms white fumes with concentrated hydrochloric acid or hydrogen chloride.

1.7.4. PROPERTIES OF AMMONIA

It is a colourless gas with a choking smell. It is less dense than air and thus collected by upward delivery. It is an alkaline gas and therefore turns red litmus blue. It is the only common alkaline gas.

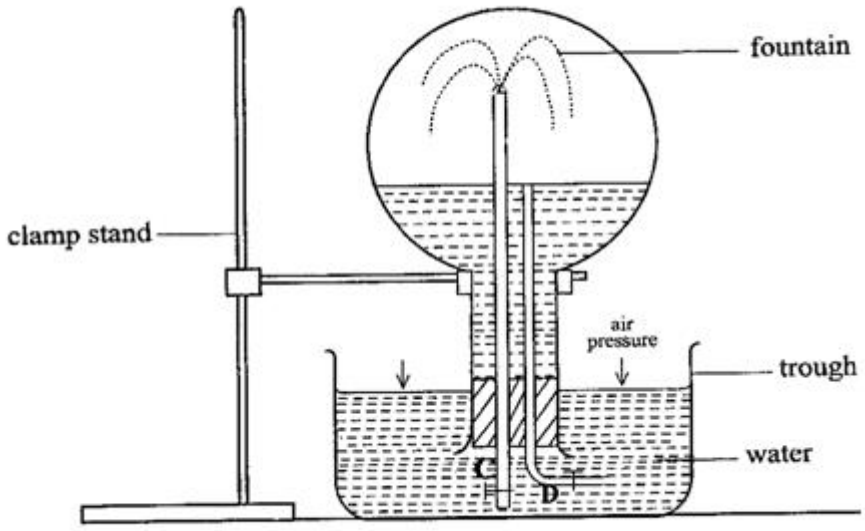
1.7.5. SOLUBILITY OF AMMONIA IN WATER

It is very soluble in water to give an alkaline solution. The great solubility of ammonia is due to the reaction of the gas with water. Ammonia is a base and removes protons from water to produce ammonium ions and hydroxide ions.

$NH_3(g) + H_2O(l) \rightarrow NH_4^+(aq) + OH^-(aq)$

The solution is only weakly alkaline because of the reversible nature of this reaction, which results in a relatively low concentration of hydroxide ions. Ammonia gas dissolved in water is usually known as aqueous ammonia.

1.7.6. EXPERIMENT TO DEMONSTRATE THE HIGH SOLUBILITY OF AMMONIA GAS IN WATER



This is an experiment to demonstrate the high solubility of ammonia gas in water. A large round thick walled flask is filled with ammonia gas. It is then fitted with two glass tubes C and D with clips at one end (figure 2.6). The flask is inverted over a trough of water and the clip on tube D opened to allow in a few drops of water and then closed. These are shaken with ammonia to dissolve it. If the red litmus solution is added to water in the trough, water in the flask will turn to blue indicating that it is an alkaline gas which dissolved in water. The clip on the tube C is opened. Water runs up the tube and spreads at the end of the tube forming a fountain.
The few drops of water, which entered through tube D, dissolved all the ammonia gas in the flask so that a partial vacuum was created in the flask. When the clip on tube C was opened, atmospheric pressure pushed the water up the tube forming a fountain.

1.7.7. ACTION OF AMMONIA ON COPPER (II) OXIDE

When a stream of dry ammonia is passed over very strongly heated copper(II) oxide as shown in figure 2.7, a colourless liquid (water) forms in the U-tube. The black oxide turns brown and a colourless gas collects in the jar over water. Ammonia reduces the copper(II) oxide to copper and itself oxidized to nitrogen.

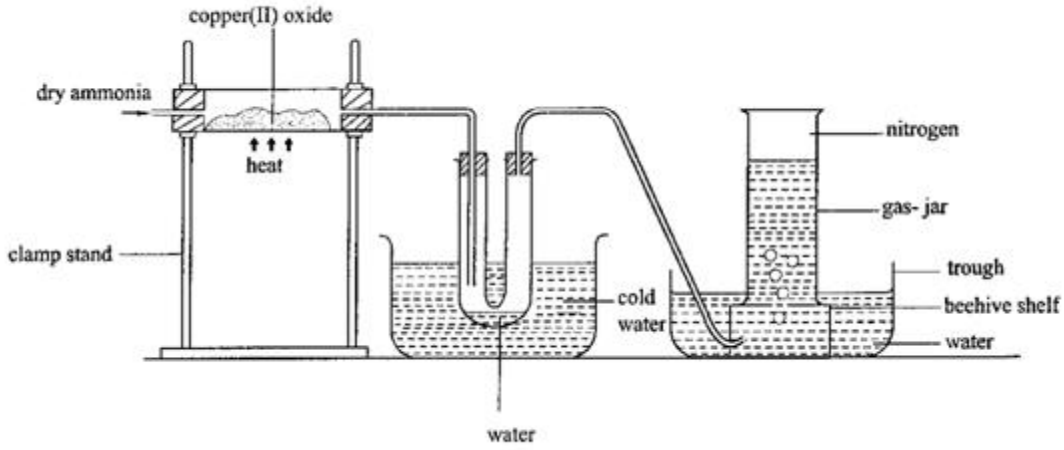
$$3CuO(s) + 2NH_3(g) \rightarrow 3H_2O(l) + N_2(g)$$

Here ammonia behaves as a reducing agent. A similar reaction takes place with the oxides of lead and iron.

$$3PbO(s) + 2NH_3(g) \rightarrow 2Pb(s) + 3H_2O(l) + N_2(g)$$

$$Fe_2O_3(s) + 2NH_3(g) \rightarrow 2Fe(s) + 3H_2O(l) + N_2(g)$$

This experiment can also be used to demonstrate that ammonia contains nitrogen.

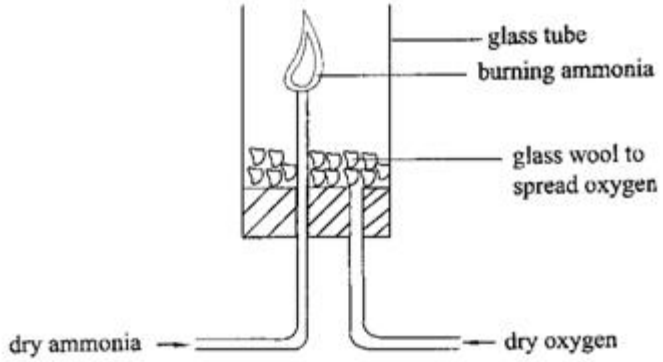


1.7.8. COMBUSTION OF AMMONIA

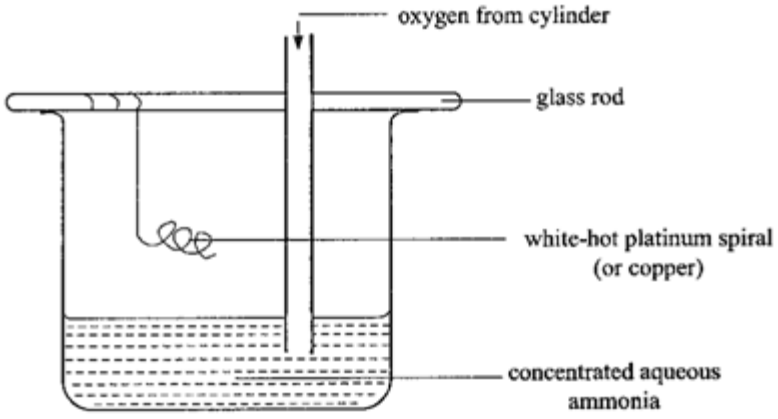
Ammonia is a good reducing agent, which means that it can be easily oxidised. Ammonia burns with a green/yellow flame, in an atmosphere of air slightly enriched by oxygen forming nitrogen and water.

$4NH_3(g) + 3O_2(g) \rightarrow 2N_2(g) + 6H_2O(l)$

The figure 2.8 shows how ammonia is burnt. The role of the glass wool is to distribute oxygen evenly throughout the gas vessel.



In presence of catalyst, ammonia is oxidised to nitrogen monoxide.



The figure 2.9 shows that set of the experiment. A hot platinum or copper wire which acts as a catalyst is suspended in a beaker of concentrated ammonia and oxygen is bubbled through the solution. The metal catalyst remains red-hot because the reaction is exothermic. Brown fumes of nitrogen dioxide, which are formed due to oxidation of nitrogen monoxide, are observed.

$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$
$2NO(g) + O_2(g) \rightarrow 2NO_2(g)$

The fumes later turn white due to formation of ammonium nitrate.
$4NO_2(g) + O_2(g) + 2H_2O(g) \rightarrow 4HNO_3(g)$
$NH_3(g) + HNO_3(g) \rightarrow NH_4NO_3(g)$

1.7.9. Reaction with hydrogen chloride

Ammonia reacts with hydrogen chloride to form white fumes, which turn to a white solid of ammonium chloride on standing.
$NH_3(g) + HCl(g) \rightarrow NH_4Cl(s)$

1.7.10. Reaction with chlorine

Ammonia burns spontaneously in chlorine forming a mist of hydrogen chloride.
$2NH_3(g) + 3Cl(g) \rightarrow N_2(g) + 6HCl(g)$
In excess ammonia, dense white fumes of ammonium chloride are formed. Hydrogen chloride formed reacts with excess ammonia to form the white fumes, which later settle to a white solid.
$2NH_3(g) + 3Cl_2(g) \rightarrow N_2(g) + 6HCl(g)$
$HCl(g) + NH_3(g) – NH_4Cl(s)$

This can be represented by one equation.
$3Cl_2(g) + 8NH_3(g) \rightarrow N_2(g) + 6NH_4Cl(s)$

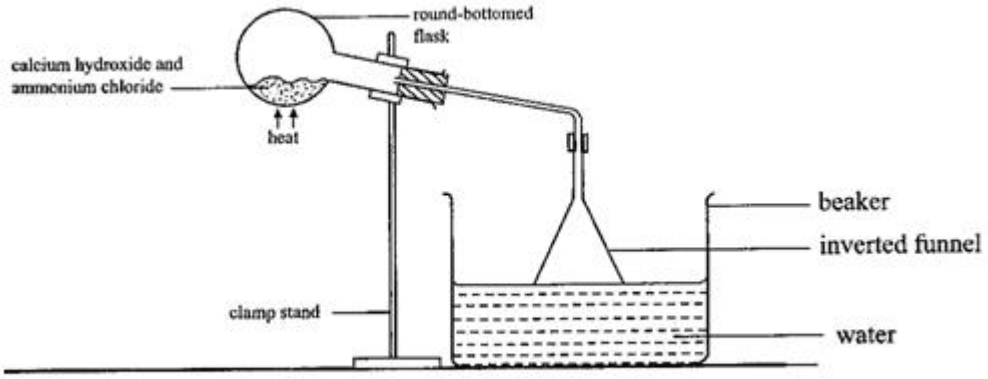
1.7.11. USES OF AMMONIA

1. Ammonia solution is used in laundry work to remove temporary hardness.
2. Ammonia is used to manufacture ammonium sulphate and ammonium nitrate used as fertilizers.
3. It is used in manufacture of nitric acid.
4. It is used in production of nylon.
5. It can be used as a refrigerant because it evapourates readily, removing heat from the surrounding as it does so. It can be easily liquefied by compression.

1.7.12. AMMONIA SOLUTION

1.7.12.1. PREPARATION OF AMMONIA SOLUTION

It can be prepared by dissolving ammonia in water using the setup shown in figure 2.10. The filter is used in passing ammonia into water in order to prevent the 'sucking back' of water from the beaker into the reaction flask. Ammonia is so soluble in water that, in the process of dissolving, too much of it could dissolve at one time creating a low gaseous pressure in the reaction flask as well as in the delivery tube by the atmospheric pressure outside. The funnel is arranged with its rim only just immersed in order to ensure that when water is sucked into the funnel, contact with the water is broken and the water falls back into the beaker rather than being sucked back along the delivery tube.



1.7.13. AMMONIUM SALTS

1.7.13.1. NITROGENOUS FERTILIZERS

Fertilizers supply crops with inorganic elements required for their growth. Such elements include nitrogen, phosphorus, potassium and calcium. Nitrogen is one of the most important elements required for the growth of plants. However, the plants are not able to take in elemental nitrogen. They obtain it in the form of nitrates. Ammonium salts also supply plants with nitrogen since they are converted by soil bacteria to nitrates. Nitrogenous fertilizers supply nitrogen together with various other elements to plants. Majority of them are ammonium salts. They include ammonium sulphate (AS), ammonium nitrate (AN), di-ammonium phosphate (DAP), calcium ammonium nitrate (CAN) and ammonium sulphate nitrate (ASN).

In the laboratory, ammonium salts are made by reacting the appropriate acid with ammonia. For example, ammonium sulphate is made by neutralizing sulphuric acid with ammonia.

$2NH_3(g) + H_2SO_4(aq) \rightarrow (NH_4)_2SO_4(aq)$

In industry, ammonium sulphate cannot be made using sulphuric acid, as the later is very expensive. Instead, it is made by reacting ammonium carbonate with calcium sulphate. Ammonium carbonate is first prepared by saturating ammonia solution with carbon dioxide.
$2NH_3(g) + CO_2(g) + H_2O(l) \rightarrow (NH_4)_2CO_3(aq)$

Solid calcium sulphate is added and the mixture is stirred forming ammonium sulphate solution and calcium carbonate.
$(NH_4)2CO_3(aq) + CaSO_4(s) \rightarrow (NH_4)_2SO_4(aq) + CaCO_3(s)$

Calcium carbonate is removed by filtration and solid ammonium sulphate is obtained by crystallization.

1.7.13.2. EFFECT OF HEAT ON AMMONIUM SALTS

1. Ammonium chloride sublimes when heated. The cause of this sublimation is that ammonium chloride dissociates on heating to ammonia and hydrogen chloride, which recombine on cooling.
   $NH_4Cl(s) \rightarrow NH_3(g) + HCl(g)$

   Also ammonium carbonate sublimes.
   $(NH_4)_2CO_3(s) \rightarrow 2NH_3(g) + CO_2(g) + H_2O(g)$

2. Ammonium sulphate decomposes on heating into ammonia and sulphuric acid. Although the reaction is similar to that of ammonium chloride no sublimation occurs because sulphuric acid is less volatile than ammonia. The ammonia gas escapes before sulphuric acid volatiles such that the two cannot recombine.
   $(NH_4)_2SO_4(s) \rightarrow 2NH_3(g) + H_2SO_4(g)$

3. Ammonium nitrate is decomposed to nitrogen(I) oxide (dinitrogen oxide) and water.
   $NH_4NO_3(s) \rightarrow N_2O(g) + 2H_2O(g)$

   Dinitrogen oxide is a colourless gas. It is fairly soluble in water and neutral to litmus. It is denser than air and a glowing splint is relit when lowered into a gas-jar containing dinitrogen oxide. The heat decomposes dinitrogen oxide into oxygen and nitrogen. It is oxygen that relights the glowing splint.

   $2N_2O(g) \rightarrow 2N_2(g) + O_2(g)$

   Caution: Ammonium nitrate should not be heated in the laboratory because it explodes on strong heating.

4. Ammonium nitrate decomposes to nitrogen and water.
   $NH_4NO_2(s) \rightarrow N_2(g) + 2H_2O(g)$

1.7.13.3. TEST FOR AMMONIUM SALTS

When ammonium salts are heated with an alkali, a colourless gas (ammonia) which has a pungent choking smell and turns wet red litmus paper blue is given off.
$NH_4^+(aq) + OH^-(aq) \rightarrow NH_3(g) + H_2O(l)$

1.7.14. REACTIONS OF AMMONIA SOLUTION AND SODIUM HYDROXIDE SOLUTION

Ammonia solution neutralizes acids forming a salt and water only.
$2NH_4OH(aq) + H_2SO_4(aq) \rightarrow (NH_4)_2SO_4(aq) + 2H_2O(l)$

Ammonia solution precipitates metal hydroxides from solutions containing the metal ions. When a few drops of ammonia solution are added to a solution of copper(II) ions, a blue precipitate is formed.
$Cu^{2+}(aq) + 2OH^-(aq) \rightarrow Cu(OH)_2(s)$

When excess aqueous ammonia is added to the blue precipitate, the precipitate dissolves to form a deep blue solution containing complex tetraamine copper(II) ions.
$Cu(OH)_2(s) + 4NH_3(aq) \rightarrow [Cu(NH_3)_4]^{2+}(aq) + 2OH^-(aq)$

A solution of zinc ions forms a white precipitate with a few drops of aqueous ammonia. The precipitate dissolves in excess ammonia solution to form a colourless solution containing complex tetraamine zinc ions.
$Zn^{2+}(aq) + 2OH^-(aq) \rightarrow Zn(OH)_2(s)$
$Zn(OH)_2(s) + 4NH_3(aq) \rightarrow [Zn(NH_3)_4]^{2+}(aq) + 2OH^-(aq)$

Iron(II), iron(III), lead(II) and aluminum ions form precipitates of the hydroxides with aqueous ammonia which are insoluble in excess ammonia solution.

$Fe^{2+}(aq) + 2OH^-(aq) \rightarrow Fe(OH)_2(s)$
(green)
$Fe^{3+}(aq) + 3OH^-(aq) \rightarrow Fe(OH)_3(s)$
(brown)
$Pb^{2+}(aq) + 2OH^-(aq) \rightarrow Pb(OH)_2(s)$
(white)
$A1^{3+}(aq) + 3OH^-(aq) \rightarrow A1(OH)_3(s)$
(white)

A solution of aluminium, Zinc and lead(II) ions reacts with sodium hydroxide solution to form a white precipitate that is soluble in excess sodium hydroxide solution to form a colourless solution.

$A1^{3+}(aq) + 3OH^-(aq) \rightarrow A1(OH)_3(s)$
$A1(OH)_3(s) + OH^-(aq) \rightarrow A1(OH)_4^-(aq)$
(aluminate ion)
$Zn^{2+}(aq) + 2OH^-(aq) \rightarrow Zn(OH)_2(s)$
$Zn(OH)_2(s) + 2OH^-(aq) \rightarrow Zn(OH)_4^{2-}(aq)$
(zincate ion)
$Pb^{2+}(aq) + 2OH^-(aq) \rightarrow Pb(OH)_2(s)$
$Pb(OH)_2(s) + 2OH^-(aq) \rightarrow Pb(OH)_4^{2-}(aq)$
(plumbate ion)

Iron(II) and iron(III) ions in solution, react with sodium hydroxide solution to give a green and brown precipitate respectively, insoluble in excess sodium hydroxide solution.

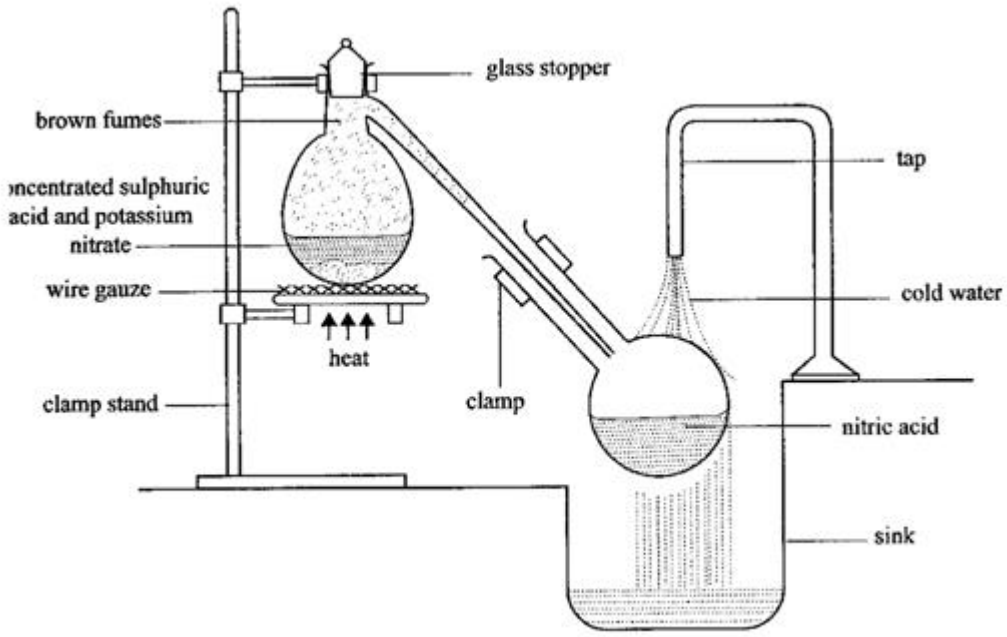
$Fe^{2+}(aq) + 2OH^-(aq) \rightarrow Fe(OH)_2(s)$
$Fe^{3+}(aq) + 3OH^-(aq) \rightarrow Fe(OH)_3(s)$

Magnesium and calcium ions in solution react with sodium hydroxide solution to give a white precipitate insoluble in excess sodium hydroxide solution.

$Ca^{2+}(aq) + 2OH^-(aq) \rightarrow Ca(OH)_2(s)$
$Mg^{2+}(aq) + 2OH^-(aq) \rightarrow Mg(OH)_2(s)$

1.7.15. NITRIC ACID

1.7.15.1. LABORATORY PREPARATION OF NITRIC ACID



When a mixture of potassium nitrate and concentrated sulphuric acid is heated gently, potassium nitrate gradually dissolves and effervescence occurs givning off nitric acid which is condensed in another flask placed in a sink and cooled by tap water as shown in figure 2.11.
$KNO_3(s) + H_2SO_2(l) \rightarrow KHSO_4(s) + HNO_3(g)$

Brown fumes of nitrogen dioxide are produced during heating because of thermal decomposition of nitric acid.

$4HNO_3(g) \rightarrow 2H_2O(l) + 4NO_2(g) + O_2(g)$

The experiment must be carried out in all-glass apparatus because nitric vapour attacks rubber and cork.

1.7.15.2. INDUSTRIAL PREPARATION OF NITRIC ACID

Nitric acid is manufactured by the catalytic oxidation of ammonia. Ammonia and excess air are passed over a heated platinum catalyst at about 800oC, forming nitrogen monoxide. The reaction is exothermic.

$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$

Nitrogen monoxide is cooled and reacts with oxygen from excess air to produce brown fumes of nitrogen dioxide.

$2NO(g) + O_2(g) \rightarrow 2NO_2(g)$

Nitrogen dioxide together with excess air is dissolved in hot water to form nitric acid.
$2H_2O(l) + 4NO_2(g) + O_2(g) \rightarrow 4HNO_3(aq)$

1.7.15.3. USES OF NITRIC ACID

1. In the manufacture of fertilizers such as ammonium nitrate. It is manufactured by reacting ammonia gas and nitric acid.
   $NH_3(g) + HNO_3(aq) \rightarrow NH_4NO_3(aq)$
2. Used for the manufacture of dyes and explosives.
3. Used in manufacture of drugs.

1.7.15.4. PROPERTIES OF NITRIC ACID

It behaves chemically in two ways.
1. It is a strong acid.
2. It is a powerful oxidizing agent.

1.7.15.5. NITRIC ACID ACTING AS A STRONG ACID

Nitric acid is a very strong acid, being almost completely ionized in dilute solution with the production of the hydrogen ion and the nitrate ion.
$HNO_3(aq) \rightarrow H^+(aq) + NO_3^-(aq)$

This ionization confers on it the usual acidic properties, modified to some extent by powerful oxidizing action of the acid.

(a) It liberates carbon dioxide from carbonate and hydrogencarbonate.
   $CuCO_3(s) + 2HNO_3(aq) \rightarrow Cu(NO_3)2(aq) + H_2O(l) + CO_2(g)$
   $NaHNO_3(s) + HNO_3(aq) \rightarrow NaNO_3(aq) + H_2O(l) + CO_2(g)$

(b) It reacts with oxides and alkalis to form salt and water only.

$CuO(s) + 2HNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + H_2O(l)$
$NaOH(aq) + HNO_3(aq) \rightarrow NaNO_3(aq) + H_2O(l)$

(c) Hydrogen is liberated when very dilute acid is added to magnesium.
$Mg(s) + 2HNO_3(aq) \rightarrow Mg(NO_3)_2(aq) + H_2(g)$

Magnesium is the only metal that liberates hydrogen with nitric acid and only when the acid is very dilute. Other metals are oxidised by the acid to the corresponding nitrates.

1.7.15.6. NITRIC ACID AS AN OXIDIZING AGENT

(a) When concentrated nitric acid is added to a green solution of iron(II) sulphate and warmed, it oxidizes it to a yellow or brown solution of iron(III) sulphate.
$Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + e^-$

(b) Concentrated nitric acid reacts with copper giving off nitrogen dioxide.
$4HNO_3(l) + Cu(s) \rightarrow Cu(NO_3)_2(aq) + 2H_2O(l) + 2NO_2(g)$

If the acid is 50% concentrated (equal volume of water as the volume of acid), nitrogen monoxide is formed.
$3Cu(s) + 8HNO_3(aq) \rightarrow 3Cu(NO_3)_2(aq) + 4H_2O(l) + 2NO(g)$

Lead reacts with nitric acid in a similar way. Aluminium and iron are made assive because of the formation of the oxide layer, which forms a protective layer over the metal and stops further reaction.

(c) Reaction with non-metals

(i) Concentrated nitric acid reacts with sulphur to give brown fumes of nitrogen dioxide.
$S(s) + 6HNO_3(l) \rightarrow H2SO_4(aq) + 2H_2O(l) + 6NO_2(g)$

(ii) When a piece of red-hot charcoal is put into concentrated nitric acid, it continues to burn and brown fumes are formed.
$C(s) + 4HNO_3(l) \rightarrow CO_2(g) + 4NO_2(g) + 2H_2O(l)$

(iii) When red phosphorus is gently heated with moderately dilute nitric acid, brown fumes are formed.
$P(s) + 5HNO_3(aq) – H_3PO_4(aq) + H_2O(l) + 5NO_2(g)$

(d) Other oxidation reactions
When hydrogen sulphide is passed through moderately dilute nitric acid, a pale yellow precipitate of sulphur and nitric acid is reduced to nitrogen monoxide. With concentrated nitric, nitrogen dioxide is formed.
$3H_2S(g) + 2HNO_3(aq) \rightarrow 3S(s) + 2NO(g) + 4H_2O(l)$
$H_2S(g) + 2HNO_3(l) \rightarrow S(s) + 2NO_2(g) + 2H_2O(l)$

1.8. NITRATES

1.8.1. ACTION OF HEAT ON NITRATES

Nitrates of potassium and sodium when heated melt to a colourless liquid and then slowly decompose to give a pale yellow nitrate and a colourless gas which rekindles (re-lights) a glowing splint.

$2NaNO_3(s) \rightarrow 2NaNO_2(l) + O_2(g)$
$2KNO_3(s) \rightarrow 2KNO_2(l) + O_2(g)$

Lead(II) nitrate makes a cracking sound when heated. The sound is due to the fact that the air inside the crystals splits them when it expands due to heating. A brown mixture of nitrogen dioxide and oxygen is given off. Lead(II) oxide (residue) is brown when hot and yellow when cold.

$2Pb(NO_3)_2(s) \rightarrow 2PbO(s) + 4NO_2(g) + O_2(g)$

Most metallic nitrates decompose to a metal oxide, nitrogen dioxide (brown fumes) and oxygen gas which relights a glowing splint.

$2Ca(NO_3)_2(s) \rightarrow 2CaO(s) + 4NO_2(g) + O_2(g)$
(white) (white)
$2Mg(NO_3)_2(s) \rightarrow 2MgO(s) + 4NO_2(g) + O_2(g)$
(white) (white)
$2Zn(NO_3)_2(s) \rightarrow 2ZnO(s) + 4NO_2(g) + O_2(g)$
(white)
$2Cu(NO_3)_2(s) \rightarrow 2CuO(s) + 4NO_2(g) + O_2(g)$
(green) (black)

Zinc oxide is yellow when hot and white when cold. Zinc nitrate and copper(II) nitrate are hydrated and when heated do not produce a cracking sound. They melt first and dissolve in their water of crystallization forming a solution. The solution then evaporates and when most of the water has evapourated, decomposition starts. Mercury(II) nitrate and silver nitrate decompose to the metal, nitrogen dioxide and oxygen.

$Hg(NO_3)_2(s) \rightarrow Hg(1) + 2NO_2(g) + O_2(g)$
$2AgNO_3(s) \rightarrow 2Ag(s) + 2NO_2(g) + O_2(g)$

Exercise

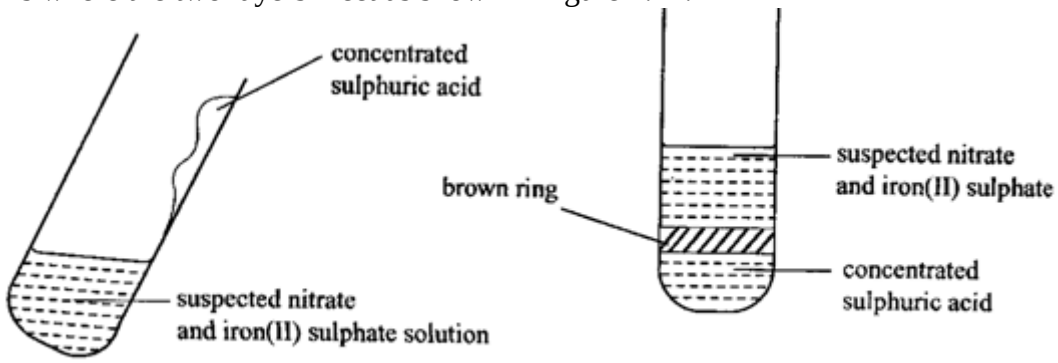
When a green compound W was heated strongly, a brown gas was given off and a black residue remained.

(a) Name the
  (i) brown gas
  (ii) black residue
(b) Write the equation for the reaction.
(c) Dilute nitric acid was added to the black residue and warmed.
  (i) State what was observed.
  (ii) Write the equation for the reaction.
(d) To the products in (c) was added aqueous ammonia drop wise until in excess.
  (i) State what was observed.

(ii) Write the equation(s) for the reaction(s) that took place.

1.8.2. TEST FOR NITRATES

1. Brown ring test:
   To a solution of a nitrate in a test-tube, an equal volume of freshly prepared iron(II) sulphate solution is added. The test-tube is held in a slanting position and very carefully concentrated sulphuric acid is poured down the sides of the test-tube. Concentrated sulphuric acid is denser than the solution and therefore sinks to the bottom. A brown ring forms where the two layers meet as shown in figure 2.12.



   The formula of the brown ring is FeSO4.NO. Concentrated sulphuric acid reacts with nitrate ions to give nitric acid.
   $H^+(aq) + NO_3^-(aq) \rightarrow HNO_3(aq)$
   Nitric acid formed then oxidizes iron(II) to iron(III) and itself reduced to nitrogen monoxide.
   $Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + e^-$
   $4HNO_3(aq) \rightarrow 2H_2O(l) + 4NO(g) + 3O_2(g)$

   Nitrogen monoxide combines with the remaining iron(II) sulphate to form the dark brown compound, nitroso-iron(II) sulphate.
   $FeSO_4(aq) + NO(g) \rightarrow FeSO_4.NO(aq)$

   The ring disappears if the solution is shaken. This is because when concentrated sulphuric acid and water mix, a lot of heat is evolved which decomposes the compound.

   $FeSO_4.NO(aq) \rightarrow FeSO_4(aq) + NO(g)$

2. Using hot concentrated sulphuric acid
   A solid nitrate is gently heated with concentrated sulphuric acid in a test-tube forming nitric acid. The top part of the tube is heated to decompose nitric acid forming brown fumes of nitrogen dioxide.
   $4HNO_3(g) \rightarrow 2H_2O(l) + 4NO_2(g) + O_2(g)$
3. Copper and concentrated sulphuric acid
   Mix a solid nitrate with copper and heat gently with concentrated sulphuric acid. Nitric acid formed reacts with copper forming brown fumes of nitrogen dioxide.
   $Cu(s) + 4HNO_3(l) \rightarrow Cu(NO_3)(aq) + 2H_2O(l) + 2NO_2(g)$