Name……………………………………………………… Index No……………………………

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**553/1**

**BIOLOGY**

**(Theory paper)**

**Paper 1**

**Uganda Certificate of Education**

BIOLOGY

(Theory Paper)

**Paper 1**

2 hours 30 minutes

**INSTRUCTIONS TO CANDIDATES:**

* *This paper consists of sections* ***A****,* ***B*** *and* ***C****.*
* *Answer* ***all*** *question in section* ***A*** *and* ***B****, plus* ***two*** *questions in section* ***C****.*
* *Write the answers to section* ***A*** *in the boxes provided, answers to section* ***B*** *in the spaces provided, and answers to section* ***C*** *in the answer booklets provided.*
* *Any additional question(s) answered will* ***not*** *be marked.*

|  |
| --- |
| **For Examiner’s use Only** |
| **Part/Question**  | **Marks**  | **Examiners Signature**  |
| **A** |  |  |
| **B: No.31** |  |  |
|  **No.32** |  |  |
|  **No.33** |  |  |
| **C** |  |  |
| **Total**  |  |  |

**Turn Over**

**SECTION A (30 MARKS)**

1. Which of the following groups of terrestrial animals is least adapted to water conservation?
2. Mammals.
3. Insects.
4. Birds.
5. Reptiles.
6. Which of the following animals uses book lungs for gaseous exchange?
7. Liver fluke.
8. Tick.
9. Earth worm.
10. Roundworm.
11. A flaccid cell placed in very dilute salt solution for a long time would;
12. Decrease in volume.
13. Increase in volume.
14. Experience no change.
15. Have a shrinked vacuole.
16. If the person’s liver is damaged. Which of the following activities would be affected?
17. Protein digestion.
18. Elimination of urine.
19. Formation of glycogen.
20. Water content regulation.
21. Which one of the properties of clay soil distinguishes it from sand soil?
22. It has small spaces in between its particles.
23. It holds less amount of water.
24. It has a lower capillarity.
25. Water moves through it more rapidly.
26. Where in the maize grain are most carbohydrates stored?
27. Cotyledon.
28. Radicle.
29. Endosperm
30. Plumule.
31. In which of the following conditions would transpiration occur most rapidly?
32. Dark and hot conditions
33. Cold and well illuminated conditions.
34. Dark and cold conditions.
35. Hot and well illuminated conditions.
36. In which of the following parts of the kidney nephrone does ultra filtration occurs?
37. Glomerulus.
38. Proximal convoluted tubule.
39. Distal convoluted tubule.
40. Loop of henle.
41. Which bacteria are responsible for Nitrogen fixation in plant root nodules?
42. Azobacter.
43. Nitrobacter.
44. Nitrosomonas.
45. Staphylococcus.
46. Which of the following tropic levels describes the zebras feeding on grass in grassland?

 **Zebras** **grass**

1. Decomposers primary consumers.
2. Decomposers secondary consumers.
3. Primary consumers primary producers.
4. Primary producers primary consumers.
5. When testing a leaf for presence for starch, it is boiled in water for about 5 minutes. This is done in order to ;
6. Dissolve chlorophyll.
7. Soften the leaf.
8. Exposé starch granules and kill the protoplasm.
9. Allow penetration of iodine.
10. Biological control of pests is generally of an advantage as compared to use of pesticides because it ;
11. Doesn’t pollute the environment.
12. Is cheaper.
13. Has longer lasting effect.
14. Is non selective.
15. Which one of the following fruits is a berry?
16. Avocado.
17. Jackfruit.
18. Mango.
19. Orange.
20. To identify the food nutrient present in solution M, a candidate performed the following tests;

|  |  |
| --- | --- |
| **Tests** | **Observations** |
| 1. Heated M with Benedict’s solution.
 | Solution remained blue |
| 1. Heated M with hydrochloric acid , cooled, added sodium hydroxide, then Benedict’s solution and heated again.
 | Solution turned to blue to green to yellow and orange. |

 The most likely substance in M is

1. Lipid.
2. Sucrose.
3. Starch.
4. Glucose.
5. A student wanted to determine the percentage of air in a soil sample . During her experiment , she obtained the results below:

Volume of dry soil = 250cm3

Volume of water added = 400cm3

Volume of mixture after stirring = 600cm3

What was the percentage of air?

1. 80%
2. 62.5%
3. 20%
4. 50%
5. Which of the following processes requires energy in form of ATP?
6. Water uptake.
7. Carbondioxide uptake.
8. Mineral salt uptake.
9. Transpiration.
10. Which is the correct path taken by blood in human heart and lungs?
11. Left atrium left ventricle lungs right atrium right ventricle.
12. Left atrium left ventricle right ventricle right atrium lungs.
13. Right atrium right ventricle left ventricle left atrium lungs.
14. Right atrium right ventricle lungs left atrium left ventricle.
15. The major reason why animals undergo hibernation is to:
16. Regulate body temperature during coldness.
17. Regulate body temperature during hot condition.
18. Conserve food reserves.
19. Conserve water in the body.

19. Which of the following examples explains tropism?

 A. Withdrawal of wood like from light.

 B. Bending of mimosa plant on touch.

 C. Withdrawal of housefly larva from light.

 D. Growing of a been root towards water.

20. Which of the following is a method of asexual reproduction for amoeba?

A. Binary fission

B. Binary fusion

C. conjugation

D. multiple fission

21. In flowering plants, an endosperm is formed when, the second male nucleus fuses with the

 A. Egg Nucleus

 B. Polar nuclei

 C. Antipodal cells

 D. Embryo Sac

 22. Which one of the following parts of the middle ear is linked to the inner ear?

 A. Stapes

B. Eardrum

C. Cochlea

D. Oval window

23. Which of the following is less important during flight in birds?

 A. Hollow bones

B. Quill feathers

C. Pectoral muscles

D. Down feathers.

24. In pea plants, a cross between pure breeding tall and short peas, produces tall peas. The phenotypic ratio expected when a heterozygous plant is crossed with a short plant will be:

A. 50% tall, 50% short

B. 100% tall

C. 25% tall,75% short

D. 75%tall and 25% short

25. A vertebra that has a short neural spine, large neural canal, intervertebrarterial canals is more likely to be;

 A. Thoracic vertebra

B. Caudal vertebra

C. Lumber vertebra

D. cervical vertebra

26. Fig 1 shows how the body temperature of animals varies with environmental temperatures.

 A

Body temperature

***Fig. 1***

 B

 Environmental temperature.

 Which of the following explains well the figure?

1. Body temperature of A is dependent on environmental temperature.
2. Body temperature of B is dependent on environmental temperature
3. A has a higher body temperature than that of B.
4. B loses more heat than A.

27. The following are the events that occur during seeds germination.

1. Testa splits
2. Hypocotyls grows fast
3. Epicotyls grows fast
4. Cotyledons appear above the ground
5. Cotyledons remain below the ground

The correct order for epigeal germination is

1. (i), (ii) and (iv)
2. (i), (iv) and (ii)

C. (i), (iii) and (iv)

D. (i), (iv) and (iii)

28. The best method of studying distribution of a grass species in a football pitch is

1. Quadrat
2. line transect
3. Direct counting
4. capture recapture

29. Which of the following chromosomal changes result in the decrease of genetic material?

1. Duplication
2. Deletion
3. Translocation
4. Inversion.

30. Pitching in fish is controlled by:

1. Pectoral and pelvic fins.
2. Pectoral and ventral fins.
3. Dorsal and ventral fins.
4. Dorsal and pelvic fins.

**SECTOION B (40MARKS)**

31. An investigation was carried out on the germination and growth of sorghum, the dry weight of the endosperm and weight of the embryo were determined at 2 days intervals .the results as shown in table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dry weight of the endosperm (mg) | 43 | 40 | 33 | 20 | 10 | 6 |
| Weight of the embryo(mg) | 2 | 2 | 7 | 16 | 25 | 33 |
| Time (days) | 0 | 2 | 4 | 6 | 8 | 10 |

1. On the same axes, plot a graph of the dry weight of the endosperm, weight of the embryo varying with time. (07marks)

(b) Describe the shapes of the graphs (06marks)

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(c) Explain why the shape of the graphs for:

(i) Dry weight of the endosperm (02marks)

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(ii) Weight of the embryo (02marks)

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(d) State two internal factors and one external factor of the seed that can cause dormancy. (03marks)

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32 . (a) Distinguish between diffusion and active transport. (03marks)

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(b) State how the following factors affect the rate of diffusion:

(i) Diffusion gradient (01mark)

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(ii) Surface area to volume ratio (01mark)

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 (iii) Temperature (01marks)

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 (c) Outline the role of active transport in plant and animals. (04marks)

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33. (a) Define the term parasitism. (02marks)

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 (b) State the effects of ecto parasites on their hosts. (04marks)

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 (c) Explain how Ascaris lumbricoides is adapted to its parasitic mode of life

 (04 marks).

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**SECTION C (30 MARKS)**

34. (a) Explain the mechanism involved and the path way taken by the oxygen from the atmosphere to the liver cells in humans. (08 marks)

 (b) Describe how gaseous exchange takes place in insects. (07marks)

35. (a) Explain the role of the skin in temperature regulation. (10marks)

 (b) State the functions of the skin in mammals. (05marks)

36. (a) Define photosynthesis. (02 marks)

(b) Describe an experiment to show that carbondioxide is necessary for photosynthesis to take place. (08 marks)

(c) Apart from carbondioxide state any other four factors that affect photosynthesis. (02 marks)

(d) What is the importance of photosynthesis in nature? (03marks)

37. Describe the effects and methods of control of water pollution. (15marks)

***END***