s.2 chemistry holiday work

(READ, RESEARCH AND REMEMBER)

Question one

(a) (i) Draw a diagram to show a setup of the apparatus that can be used to prepare a sample of dry hydrogen in the laboratory from zinc.
(ii) State the condition(s) for the reaction leading to the formation of hydrogen in (a)(i).
(iii) Write an ionic equation for the reaction leading to the formation of hydrogen in (a)(i).

(b) State
(i) how hydrogen can be identified.
(ii) **three** ways through which the formation of hydrogen in (a)(i) can made to proceed faster.
(iii) the reason for the choice of the method of collection of hydrogen in (a)(i).

(c) Dry hydrogen was passed over heated copper(II) oxide.
(i) State what was observed.
(ii) Write equation for the reaction that took place.
(iii) State the property hydrogen shows in the reaction that took place in (c)(i).
(iv) Name **one** other oxide that reacts with hydrogen in a similar way like copper(II) oxide.

(d) Explain why when dry hydrogen was passed over strongly heated lead(II) oxide, a shiny grey solid and colourless liquid were formed. (Your answer should include equation for the reaction that takes place).

(e) Write equation to show the reaction of hydrogen with chlorine.

(f) State **one** large scale use of hydrogen.

Question two

(a) Oxygen is one of the major components of air as a mixture. It is also a constituent two compounds in air.
(i) Differentiate between the terms **mixture** and **compound**. (02 mks)
(ii) State the approximate percentage by volume of oxygen in air.
(iii) Name **one** other substance which is also a major component of air besides oxygen and state its approximate percentage by volume in the air.
(iv) Determine the approximate ratio of oxygen to the substance named in (a)(iii).
(v) Name the suitable industrial process by which oxygen in air can be obtained free from the named substance in (a)(iii) and give a reason why their separation by the named method is possible.
(vi) Name **two** processes during which the concentration of oxygen in the atmosphere can be
I. increased. (01 mk)
II. decreased. (01 mk)
(vii) State **one** industrial use of the substance named in (a)(iii).(01 mk)
(viii) Describe an experiment to show how the percentage by volume of oxygen in air can be determined. (07 mks)
(ix) Write the name and formulae of the **two** of oxygen compounds which are components of air. (02 mks)

(b) One of oxygen compounds you have named in (a)(ix) exists at room temperature as a liquid.
(i) Identify the compound. (0½ mk)
(ii) Name **one** substance that would be used in the laboratory to confirm the presence of the compound identified in (b)(i) and state what be observed if the named substance is treated with the compound in (b)(i).
(iii) Name the method by which the compound identified in (b)(i) can be used to simultaneously prepare its components in the laboratory. (*Diagram not required*) (01 mk)

Question three

(a) (i) With the help of a labeled diagram, briefly describe how a dry sample of oxygen can be prepared in the laboratory using sodium peroxide.
(ii) State how oxygen produced in (i) can be identified. (01 mk)

(b) Write equation for the reaction between excess dry oxygen and
(i) burning magnesium.
(ii) red hot charcoal.
(iii) hot iron wire.

(c) The product of the reaction in (b)(ii) was mixed with water and litmus paper dropped into the resultant mixture.
(i) State what was observed. (01 mk)
(ii) Explain what took place. (*No equation(s) required*) (1½ mks)

(d) During large scale production of oxygen from air, both carbon dioxide and water are first removed before air is liquefied.
(i) Briefly explain why both water vapour and carbon dioxide are first removed.
(ii) Name **one** substance that can be used to remove
I. water vapour.
II. carbon dioxide.
(iii) Write equation to show how the named substance in (c)(ii) removes carbon dioxide.
(iv) Briefly describe how oxygen can be obtained from the liquid air free from water and carbon dioxide. (*Diagram(s)* ***not*** *required*)

(e) State **one** large scale use of oxygen to a society. (0½ mk)

Question four

(a) State how the following mixtures of substances can be separated

Mixture	**Method of separation**
Copper(II) oxide and sodium carbonate	
Coloured extract of grass dissolved in ethanol	
Ink	
Crude oil (petroleum)	
Water and ethanol	
Ammonium chloride and sodium chloride	
Potassium chloride and potassium nitrate	
Potassium chloride and sodium chloride	

Sodium chloride and calcium carbonate	
Salt from sea water	

(b) Giving examples, distinguish between
  (i) miscible liquids.
  (ii) immiscible liquids.

(c) Describe briefly how a mixture of the liquids named in (b)(ii) can be separated.

Question five

(a) Define the term **oxide**.

(b) Complete the table below.

Element	Formula of oxide	Type of oxide	Name of oxide
Sodium			
Aluminium			
Carbon			
Calcium			
Sulphur			

(c) Write equation to show the oxide of calcium can be prepared.

(d) Few drops of water were added to the oxide of calcium.
  (i) State what was observed.
  (ii) Write equation for the reaction that took place.

(e) State which of the oxides in (b) react with
  (i) acids only.
  (ii) alkalis only.
  (iii) both acids and alkalis.
  (iv) neither acids nor alkalis.

(f) A piece a burning magnesium was lowered into a jar of dry oxygen.
  (i) State what was observed.
  (ii) Write equation for the reaction that took place.

(g) To the product in (e) was added dilute nitric acid. State what was observed and write equation for the reaction that took place.

(h) State what would be observed and write equation for the reaction that would occur when copper(II) hydroxide
  (i) is heated strongly.
  (ii) is added to warm dilute sulphuric acid.

(i) A mixture of copper(II) oxide and magnesium was heated strongly.
  (i) State what was observed.
  (ii) Write equation for the reaction that took place.

(j) The experiment in (h) was repeated using magnesium oxide and lead. State what was observed and give a reason for your answer.

Question six

(a) A mixture of magnesium powder and lead(II) oxide.
  (i) State what was observed.
  (ii) Write equation for the reaction that took place.

(b) The procedure in (a) was repeated using calcium oxide instead of copper(II) oxide.
  (i) State how calcium oxide would be affected.
  (ii) Give a reason for your answer.

(c) A mixture of magnesium powder and lead(II) oxide was heated strongly until there was no further change.
  (i) State what was observed.
  (ii) Write equation for the reaction that took place.

(d) The experiment in (c) was repeated using procedure in (a) was repeated using a mixture of copper turnings and magnesium oxide. State what was observed

(e) Briefly explain your observations in (c) and (d).

Question seven

Fill the table below, stating what happens in each column when the elements are burnt in excess pure oxygen.

Element	Colour of the flame	Colour of the product	Name of the product
Sodium			
Sulphur			
Phosphorous			
Carbon			
Iron			
Magnesium			
Copper			
Calcium			