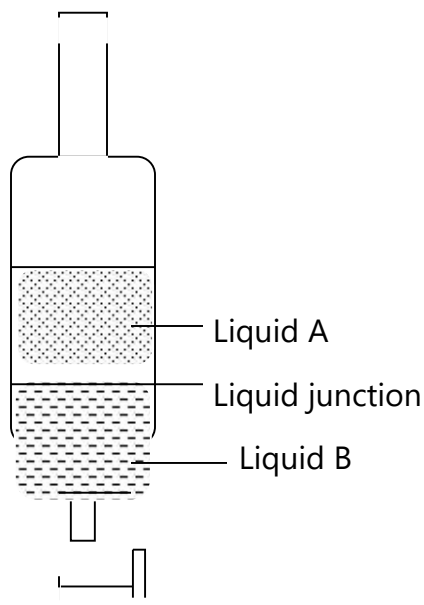


CHEMISTRY

SECTION A.

1. The figure below shows a set of the apparatus that is used for separating a mixture of water and kerosene.



- (a). Identify liquids A and B

(i). A.....($\frac{1}{2}$ mark)

(ii). B.....($\frac{1}{2}$ mark)

- (b) (i) State why liquid A forms the upper layer

.....

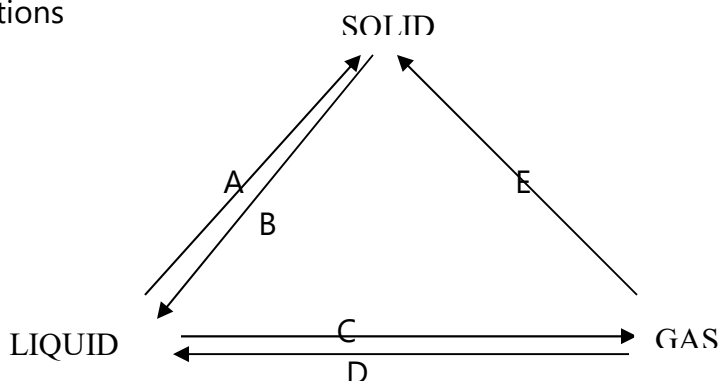
.....

- (c) State why the two liquids form a liquid junction as shown in the figure
(2mks)

.....

.....

2. The diagram below shows how states of matter can change under different conditions



- (a) Name the change of state of matter represented by (½ each)

A.....

B.....

C.....

D.....

E.....

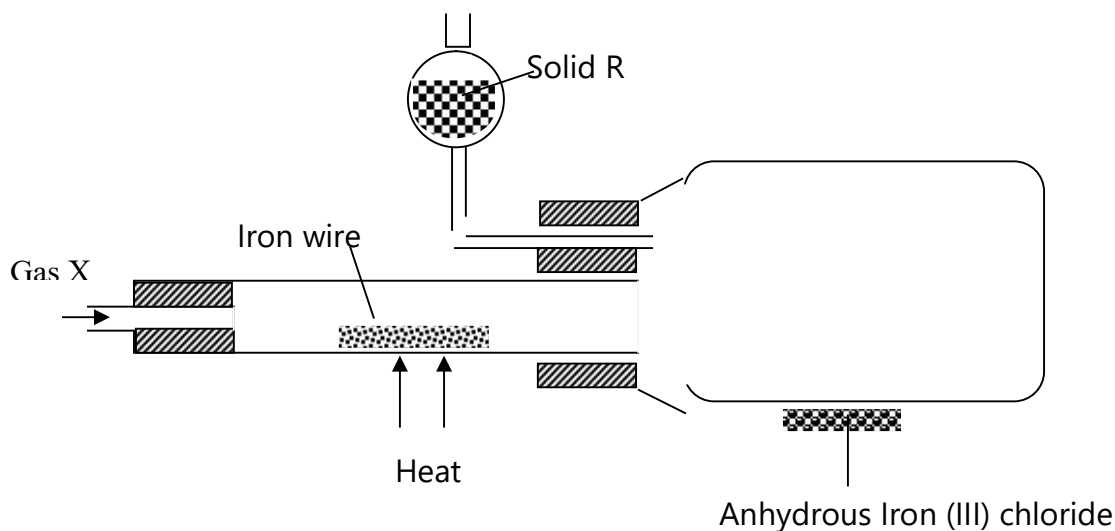
- (b) Name two substances which can undergo the change of state represented by **E**

.....

- (c) State one condition other than temperature that can bring about the change of state represented by **D** (½ mark)

.....

3. Anhydrous Iron (III) chloride was prepared using the set up of the apparatus shown in the figure below



(a) Identify;

(i) **X**.....(½ mark)

(ii) **R**.....(1mark)

(b) Write equation for the reaction leading to formation of Iron (III) chloride.(1½ mk)

.....

(c) (i) State what would be observed if Iron (III) chloride is exposed to air. (1mark)

.....

(ii) Give a reason for your answer in (c) (i) above. (1mark)

.....

4. The number of particles (protons, electrons and neutrons) in atoms, **Q**, **T**, **W**, **X** and **Y** are shown in the table below.

Atoms	Protons	Number of particles	
		Electrons	Neutrons
Q	1	1	0
T	8	8	8
W	12	12	12
X	1	1	1

(a). State the;

(i). Atomic number of **Y** (½ mark)

.....

(ii) Mass number of **Q** (½ mark)

.....

(iii). Atoms that are isotopes (½ mark)

.....

(b). Identify the atoms that belong to elements in the same group of the periodic table

.....(1mark)

(c). Write the structural formula of the compound that can be formed when **Q** combines with **T**. (1mark)

.....
.....

(d). (i). State one property of the compound formed between **T** and **W**. (1mark)

.....
.....

(ii). Give a reason for your answer in (d) (i) above. (1mark)

.....

..... 5. (a) (i) State the conditions under which magnesium can react with water.(1mark)

.....
.....

(ii). Write the equation for the reaction that takes place in (a) (i). (1½ marks)

.....
.....

(b). The product from (a) above was shaken with water. State what was observed.

.....
.....

(c). Dilute hydrochloric acid was added to the product in (b) above. Write an equation for the reaction that took place. (1½ marks)

.....
.....
.....

6. Part of the periodic table is shown below;

I							VIII
	II	III	IV	V	VI	VII	
			W		V		Z
	Y	T				Q	

(a). State;

(i). The most reactive metal. (½ mark)

.....

(ii). The most reactive non-metal (½ mark)

.....

(iii). The atom that forms the largest anion. (½ mark)

.....

(iv). The most non-reactive element. (½ mark)

.....

(b). Write the formulae of the compounds formed between the following pairs of elements and in each case state the type of bonding

(i). **W** and **Q**: (1mark)

.....

Type of bonding.

.....

(ii). **T** and **V**. (1mark)

.....

Type of bonding

.....

7. (a) Chlorine can be prepared from concentrated hydrochloric acid

(i). Name a substance that can react with hydrochloric acid to produce

chlorine.

(1mark)

.....

(ii). Write equation for the reaction.

(1½ marks)

.....

.....

(b). Chlorine gas was passed through cold dilute sodium hydroxide solution

(i). State what was observed.

(1mark)

.....

.....

(ii). Write the equation for the reaction that took place. (1½ marks)

.....

8. When hydrogen peroxide was exposed to sunlight, a gas was formed

(a). (i) Name the gas.

(½ mark)

.....

(ii). State how the gas could be identified.

(½ mark)

.....

(iii). Write an equation for the reaction leading to the formation of the gas

1½

.....

(b). Name one reagent that can be used to speed up the rate of formation of the gas. (1 mark)

.....

9. During the manufacture of chlorine in the laboratory, the gas may be passed through water and concentrated sulphuric acid before collection;

(a). State the use of:

(i). Water.

(½ mark)

.....

(ii). Concentrated sulphuric acid.

(½ mark)

.....

(b). Chlorine is a bleaching agent when in the presence of water.

(i). Write an equation for the reaction between chlorine and water. (1½ marks)

.....

(ii). Using equations, explain the bleaching action of chlorine. (2½ marks)

.....

.....

.....

(c). State what would be observed if chlorine was bubbled through a solution of Iron (II) sulphate solution. (1 mark)

.....

10. Use the data in the table below to answer the questions that follow

Sub- stance	M.pt /°C	B.pt /°C	Solubility in water	Electrical conductance	Electrical conductance	Density at room temperature
				Solid form	Molten form	
A	714	1418	V	None	Good	2.3g/cm ³
B	-95	56	V	None	None	0.8g/cm ³
C	1083	2580	I	Good	Good	8.9g/cm ³
D	-101	-34	V	None	None	2.55g/cm ³
E	-23	77	I	None	None	1.6g/cm ³
F	-219	-183	S	None	None	1.33g/cm ³

V=very soluble, S=slightly soluble, I=insoluble

(a). (i) Name two substances that are liquids that are liquids at room temperature. ½

.....

(ii). Which of the two is more volatile? (½ mark)

.....

(b). Which substance would dissolve in water and could be separated from the solution by;

(i). Fractional distillation. (½ mark)

.....

(ii). Evaporation of the water. (½ mark)

.....

(c). Which of the substance **A** to **F**,

(i). Has a structure consisting of ions? (½ mark)

.....

(ii). Is a metal? (½ mark)

.....

(iii). Is a liquid which from separate layer with water, would the water, be above or below? (1mark)

.....

(d). Which substance is a gas which.

(i). Would not be collected efficiently over water? (½ mark)

.....

(ii). Would be collected efficiently over water? (½ mark)

.....

.....

SECTION B:

(Attempt any two questions from this section)

11. (a) Describe how a dry sample of hydrogen chloride can be prepared from a named chloride.(No diagram is required). Your answer should include the following;

- Conditions for the reaction
- Name of the drying agent
- Method of collection
- Equation for the reaction

(b) Name the substance that is formed when hydrogen chloride is passed through water.

- (c) (i) Name one reagent that can be used to test for the presence of chloride ion
- (ii) State what would be observed if the reagent was added to the chloride solution
- (iii). Write an equation of reaction that would take place.

(c) A solution of hydrogen chloride in water conducts electricity while a solution of hydrogen chloride in methylbenzene does not. Explain this observation; writing appropriate equations where applicable.

12. (a) Define the terms;

(i). Solute. (2½ marks)

(ii). Saturated solution. (2½ marks).

(b) The Solubilities of potassium chloride and potassium nitrate at certain temperatures are shown in the table below.

Temperature /°C	0	11	15	30	40	50	57
Solubility of chloride per 100g of water	27.9	31.0	32.0	36.5	40.0	43.0	43.0
Solubility of nitrate per 100g of water	14.0	21.5	25.0	43.0	63.0	84.0	102.0

(i). Plot on the same axes a graph of solubility against temperature for the solubility of potassium chloride and potassium nitrate (5½ marks)

(ii). State which one of the two salts has a solubility which increases less rapidly with increase in temperature.

(iii). Determine the temperature at which the Solubilities of the two salts are equal. (½ mark)

(c). A saturated solution of potassium nitrate at 30°C was cooled to 5°C. Calculate the amount of potassium nitrate crystals in grams formed. (3marks)

13. (a) (i). Describe with the aid of a well labelled diagram how a dry sample of chlorine can be prepared in the laboratory starting with manganese (IV) oxide (7marks)

(ii) Write an equation for the reaction that takes place (1½ marks)

(iii). State any three uses of chlorine (2½ marks)

(b). State with the aid of equations what would be observed if chlorine was added to;

(i). Iron (II) chloride solution. (1½ marks)

(ii). Potassium iodide solution. (1½ marks)

(c). Burning Sodium was plunged with a jar of chlorine.

(i). State and explain what was observed (1mark)

(ii). Write the equation for the reaction (1mark)

14. Explain each of the following observations to support your explanations where applicable:

(a) Isotopes of an element have the same atomic numbers but different mass numbers. They however exhibit the same chemical properties (3marks)

(b). Chlorine gas turns moist blue litmus paper first to red and then bleaches it but

dry chlorine gas has no effect on dry blue litmus paper. (4marks)

- (c). When magnesium powder is added to a solution of copper (II) sulphate, its colour changes from blue to colourless and a red brown solid is formed but when pieces of silver metal are added to copper (II) sulphate, the solution retains its colour. (4marks)
- (d). Solid sodium chloride does not conduct electricity yet an aqueous solution or molten sodium chloride conducts electricity. (4marks)

END