

Name..... Adm No.
Class..... Signature.....
Date.....

CHEMISTRY
PAPER 1
THEORY
2Hours

2017

FORM 3

INSTRUCTIONS TO STUDENTS:

- Write your **name** and **admission number** in the spaces provided above.
- **Sign** and write the **date** of examination in the spaces provided.
- Answer **all** the questions in the spaces provided.
- All working **must** be clearly shown where necessary.

For Examiner's Use Only:

Question	Maximum score	Student's score
1	06	
2	12	
3	20	
4	11	
5	05	
6	13	
7	13	
8	07	
9	03	
Total	90	

This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. (a) Name the following laboratory apparatus. (3 marks)
-



Figure 1

.....



Figure 2

.....



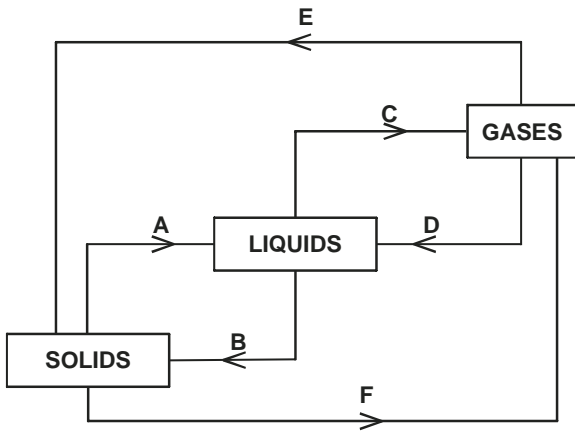
Figure 3

.....

(b) Give the function of: (3 marks)

1.
2.
3.

2. The following diagram shows the effects of heat on the physical states of substances.



(a) Identify the processes represented by the letters A, B, C, D, E and F (3 marks)

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(b) Name two substances that undergo the process labelled E and F. (2 marks)

.....

.....

(c) Name a method that can be used to extract the following:-

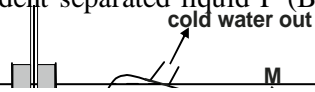
(i) Common salt from a salt solution. (1 mark)

.....

(ii) Paraffin from crude oil. (1 mark)

.....

(d) A student separated liquid P (B.P 78°C) and liquid Q (B.P 100°C) using the apparatus shown



below.

(i) Name the apparatus labelled

(a) M (1 mark)

(b) R (1 mark)

(ii) State one function of the glass bead in apparatus labelled R (1 mark)

.....

(iii) What is the reading on the thermometer when the first jar drops of the distillate appeared in the beaker. (1 mark)

.....

(iv) Which of the liquids remains in the flask. (1 mark)

.....

3. Study the information in the table below and answer the questions that follow (The letters do not represent the actual symbols of the elements)

		Ionization Energy_kJ/Mole	
Element	Electronic configuration	1 st ionization energy	2 nd ionization energy
A	2.2	900	1800
B	2.8.2	736	1450
C	2.8.8.2	590	1150

(a)What chemical family do the elements A, B and C belong?

(1mark)

.....
(b) Write the oxidation state of A and B. (1 mark)

.....
(c) Write the electronic structure of an ion of B and C. (2 marks)

.....
(d) Atoms of A, B, C are called divalent. Why? (2 marks)

.....
(e) What type of bonding exists in (2 marks)

I. atoms of C?

.....
II. chloride of B?

.....
(f) What is ionization energy? (1 mark)

.....
(g) Explain the following:

(i) The atomic radius of A is bigger than its ionic radius. (2 marks)

.....
(ii) The 1st ionization energy of C is lower than of B. (2 marks)

.....
(iii) C is a better conductor than B. (2 marks)

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

(h) Write a chemical equation for the reaction of element B with: (3 marks)

1. Air

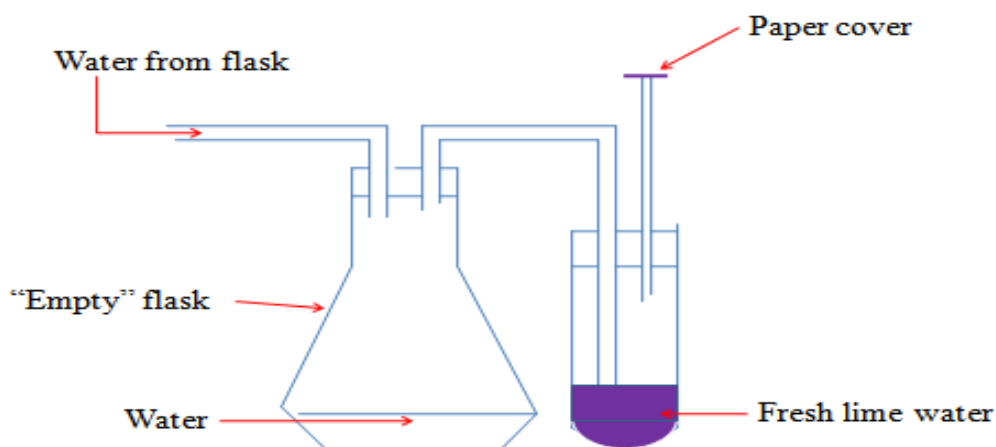
2. Chlorine gas

3. Water vapour

(i) State the uses of metals in this chemical family. (2 marks)

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.....
.....

4. Study the set up of apparatus below and then answer the questions that follow.



(a) State the purpose of the experiment. (2 marks)

.....
.....
(b) For what reason is the paper cover used? (1 mark)

.....
(c) Explain what happens when water enters the flask? (1 mark)

.....
(d) What is observed when the air is bubbled in the lime water (2 marks)

.....
(e) Identify the compound that forms: (3 marks)

(i)lime water

.....
(ii)white precipitate

.....
(iii)when the white precipitate dissolves

.....
(f) Write the chemical equation for the reaction that take place when: (2 marks)

(i) white precipitate is formed

(ii) white precipitate dissolves

5. (a) Define the following. Give an example for each. (4 marks)

(i) Hygroscopic salts

.....
.....
(ii) Deliquescent salts

.....
.....

(b) 25cm³ of Sodium hydroxide solution was reacted with about 25 cm³ of dilute hydrochloric acid. This was with an intention to prepare a salt Y.

i) Name the method of preparing salt. Give a reason. (2 marks)

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

ii) Name the salt that is formed following the reaction. (1 mark)

.....

iii) Write a full balanced chemical equation for this reaction. (2 marks)

iv) State two properties of the salt in a(ii) above. (2 marks)

.....
.....

(v) State two uses of the salt. (2 marks)

.....
.....

6. About 2g of anhydrous copper (II)sulphate(VI)crystals is added into a clean test tube. Three drops of tap water is then added.

(a) What happens to the colour of anyhrous copper(II)sulphate(VI)crystals? (1 mark)

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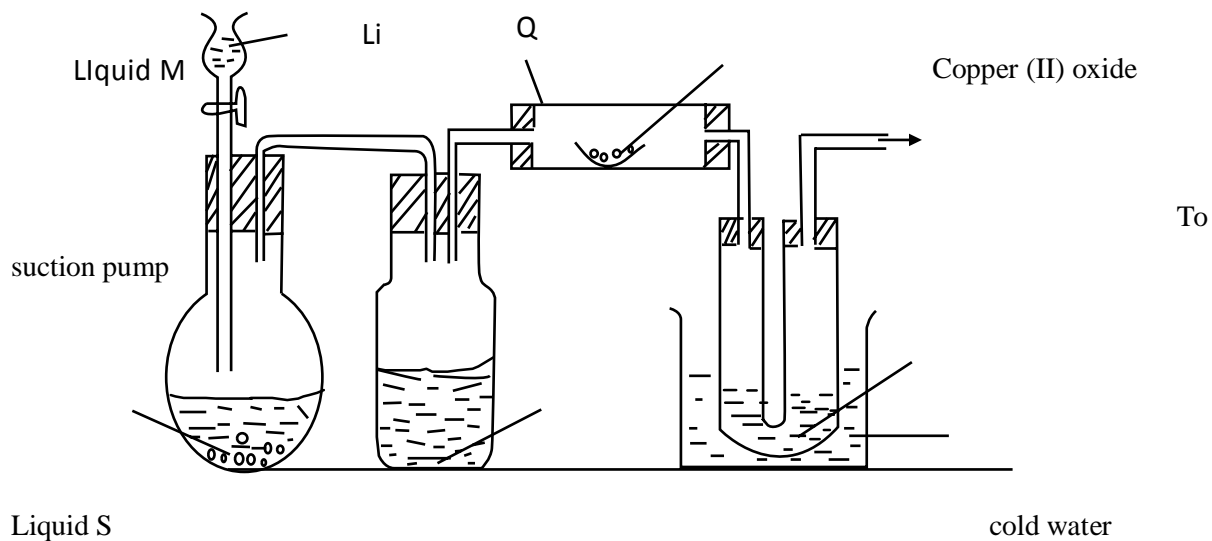
(b) Account for (a) above. (2 marks)

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

(c) Write word and chemical equations for the reaction that takes place.

(2 marks)

7. Below is a diagram shown how hydrogen can be prepared in the laboratory and the study of the reducing action of hydrogen.



a) What is reduction?

(1 mark)

.....
.....

b) Identify apparatus Q

(1 mark)

.....

c) Suggest a suitable drying agent K.

(1 mark)

.....

d) Name liquid M.

(1 mark)

.....

e) Explain the chemical reaction taking place in apparatus Q. (2 marks)

.....
.....

(f) Name liquid S. (1 mark)

.....

(g) Give two chemical tests for liquid S. (2 marks)

.....
.....

(h) Mention two uses of hydrogen gas. (2 marks)

.....
.....

(i) Write the chemical equation for the reaction. (2 marks)

8. The data below was recorded when metal K was completely burnt in air. K is not the actual symbol of the metal. (R.A.M; K = 56, O = 16)

Mass of empty crucible and lid = 10.240g

Mass of crucible, lid and metal K = 10.352g

Mass of crucible, lid and metal oxide = 10.400g

(a) Determine the mass of

(i) Metal K (2 marks)

(ii) Oxygen (2 marks)

(b) Determine the empirical formula of the metal oxide.

(3 marks)

9.(a) State Boyle's law.

(1 mark)

(b) 60cm^3 of oxygen gas diffused through a porous hole in 50 seconds. How long will it take 80cm^3 of sulphur (IV) oxide to diffuse through the same hole under the same conditions. (S = 32, O = 16).

(2marks)
