

NAME.....ADM. NO.....

SCHOOL.....CLAS.....

233/2

CHEMISTRY

PAPER 2

THEORY

JAN/FEB. 2013

2HRS

BUNYORE-MARANDA JOINT EXAMINATIONS

KENYA CERTIFICATE OF SECONDARY EDUCATION

CHEMISTRY

PAPER 2

2 HOURS

INSTRUCTIONS TO CANDIDATES

- (a) Write your name and index in the spaces provided above
- (b) Answer all the questions in the spaces provided in the question paper.
- (c) Mathematical tables and silent electronic calculators may be used.
- (d) All workings MUST be shown clearly where necessary.

FOR EXAMINER'S USE ONLY

QUESTION	MACIMUM SCORE	CANDIDATE'S SCORE
1	12	
2	7	
3	13	
4	12	
5	9	
6	14	
7	13	
TOTAL	80	

This paper consists of 12 printed pages

Candidates should check the question paper to ascertain that all pages are printed as indicated and that no question is missing

1. Below is part of the periodic table. The letters are not the actual symbols of the elements. Study it and answer the questions that follow.

						Q
C	E			L	N	
D	F					

- a. i. State and explain the difference in the melting points of D and F (2mks)

.....

- ii. Explain the difference in the atomic radii of G and N. (2mks)

.....

- iii. Select the element that is the strongest reducing agent. Explain. (2mk)

.....

- iv. Compare the nature of the aqueous solution of the oxide of C and that of L. explain. (2mks)

.....

- b. Study the table below and answer the questions that follow.

SUBSTANCE	M.P(K)	B.P(K)	ELECTRICAL CONDUCTIVITY	
			SOLID	MOLTEN
J	365	463	NIL	NIL
K	1323	2773	GOOD	GOOD
L	1046	1680	NIL	GOOD
M	2156	2776	NIL	NIL

- c. Which of the substances J, K, L and M represent the following;

.....

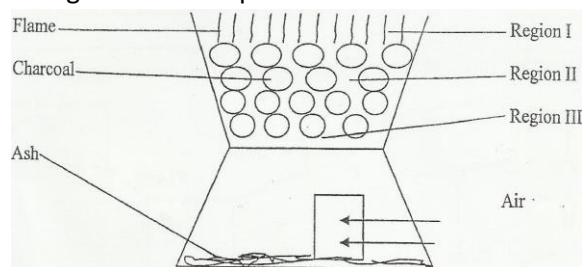
- i. Silicon (IV) oxide..... (1/2mks)

- ii. Barium sulphate..... (1/2mks)

- d. In terms of structure and bonding, explain why silicon (IV) Chloride (SiCl_4) is a liquid at room temperature while Magnesium (MgCl_2) is a solid. (3mks)

.....

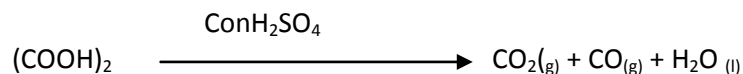
2. (a) The diagram below represents a charcoal burner. Study it and answer the questions that follow.



- a. Write equations for the reactions taking place at
 I.....
 II.....
 III..... (3mks)
- b. State the colour of the flame. (1mk)

- c. The ash that collects in the lower compartment was dissolved in water and filtered.
 i. Suggest the Ph of the solution. (1mk)

- d. Carbon(II) oxide can be prepared in the laboratory by a process represented below.

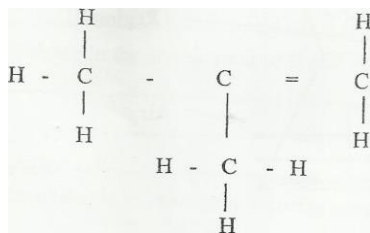


- i. What role does concentrated Sulphuric (VI) acid play in the reaction. (1mk)

- ii. How would you remove carbon (IV) oxide from carbon (II) oxide? (1mk)

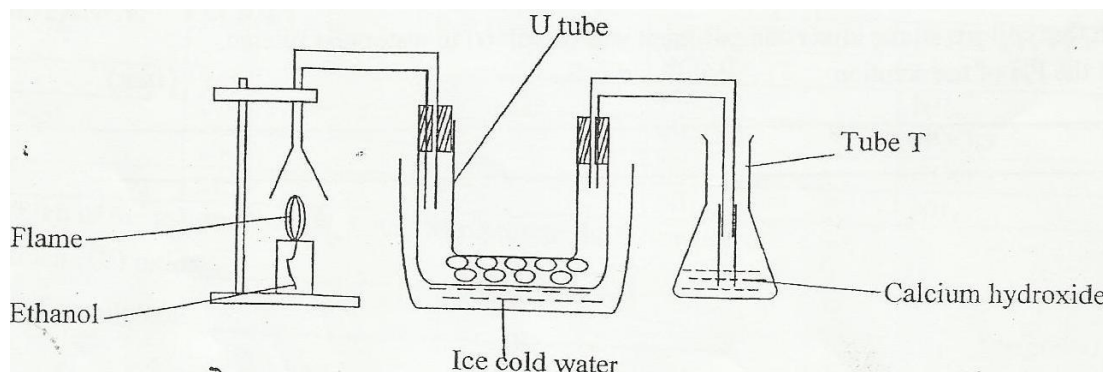
3. (a) Give the IUPAC names of the following compounds. (1mk)

i)



- ii) $\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$ (1mk)

- (b) A lamp containing ethanol was burnt in air and the product collected as shown in the diagram.

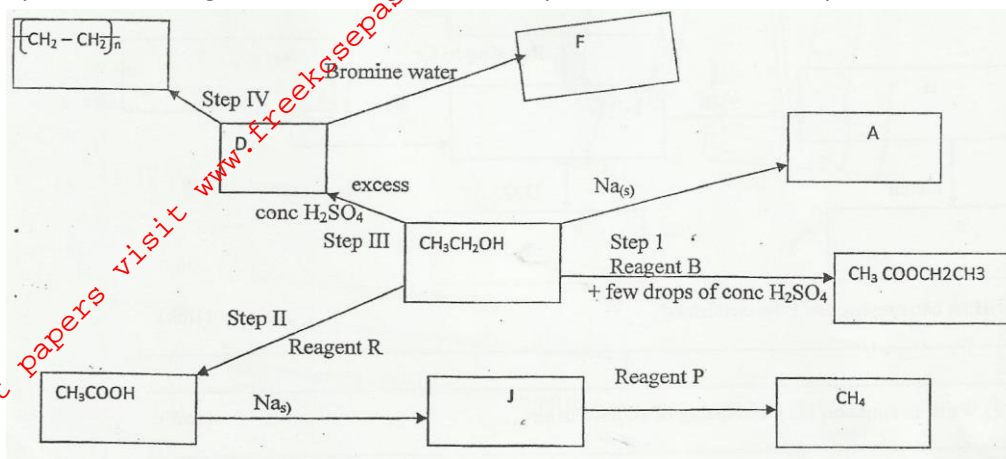


State the observation made in the

- i. U-tube (1mk)

- ii. Tube T (1mk)

(c) Study the reactions given in the diagram carefully and then answer the questions that follow.



I. Identify the following

- I. Reagent B..... (1/2mk)
- II. Reagent P..... (1/2mk)
- III. Reagent R (1/2mk)
- IV. Substance A..... (1/2mk)
- V. Substance F..... (1/2mk)
- VI. Substance D..... (1/2mk)

ii. Write an equation to show formation of J. (1mk)

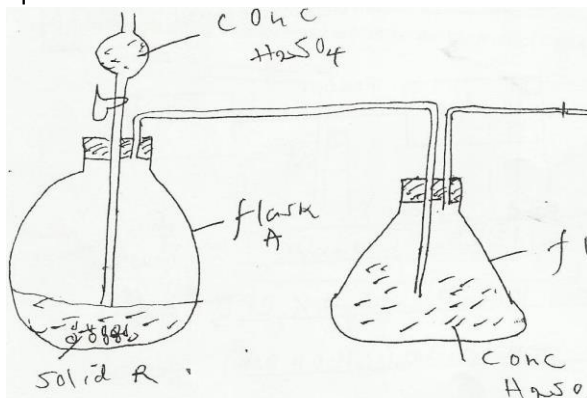
iii. Explain one disadvantage of the continued use of items made from compounds formed in step (IV) (1mk)

iv. What observation would be made when D is bubbled through bromine water? (1mk)

v. The compound D reacts with hydrogen in the presence of a catalyst G to form a compound H. Name:

- I. Compound H.....
- II. Catalyst G.....

4. The figure below is a set up of apparatus used for preparation of sulphur (IV) oxide. Study it and answer questions that follow.



(i) Complete the diagram to show how the gas would be collected. (1mk)

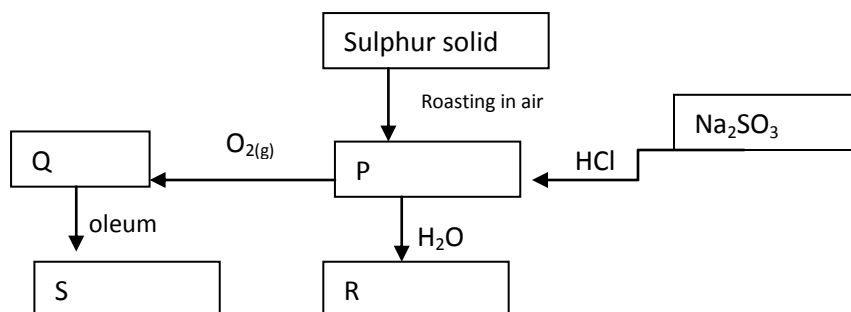
(ii) Name solid R..... (1mk)

(iii) State the purpose of concentrated sulphuric (VI) acid in this experiment in flask B. (1mk)

(iv) Write the chemical equation for the reaction between concentrated sulphuric (VI) acid and solid R. (1mk)

(v) With the help of a chemical equation, explain the observation made when red litmus paper is dipped in a solution of sulphuric (IV) oxide. (2mks)

(b) The following is a flow chart for the preparation of various products from sulphur. Study it and answer the questions that follow.



i. How can presence of P be confirmed (1mk)

ii. Write an equation for the roasting of sulphur in air (1mk)

iii. Give the names of Q, S and R

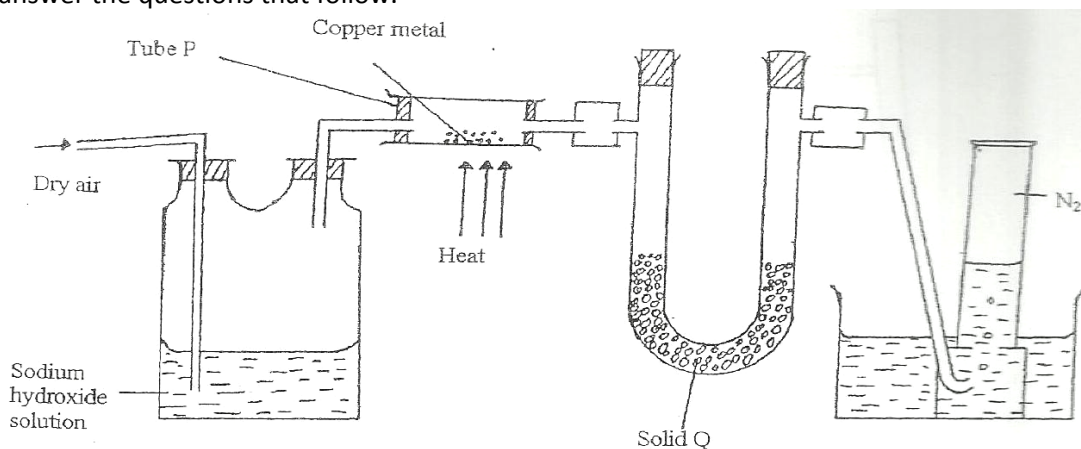
Q (1mk)

S (1mk)

R (1mk)

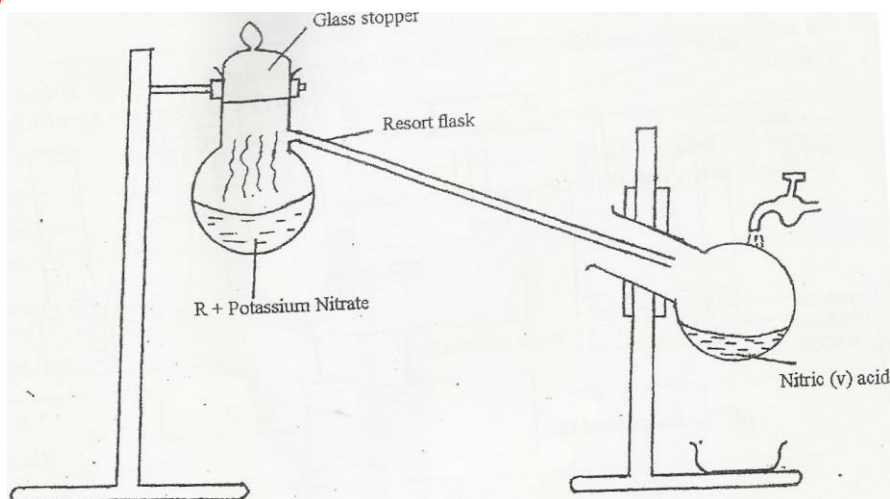
iv. Explain using ionic equations why a precipitate is observed when dilute hydrochloric acid and a few drops of barium chloride solution are added to a solution of a sulphate. (1mk)

5. (a) The diagram below represents a set-up that was to obtain dry nitrogen from air. Study it and answer the questions that follow.



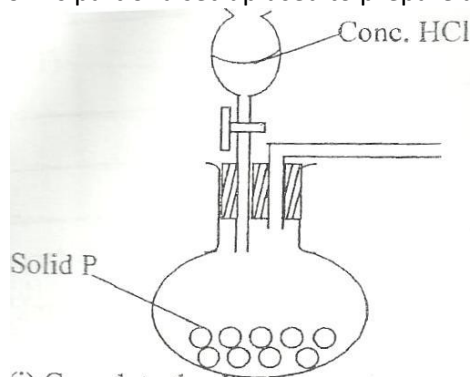
- i. Name solid Q (1mk)
- ii. What is the purpose of $\text{NaOH}_{(aq)}$? (1mk)
- iii. Write an equation for the reaction which took place in tube P (1mk)
- iv. Give the name of one impurity in the nitrogen gas obtained. (1mk)
- v. Why is liquid nitrogen used for storage of semen for artificial insemination? (1mk)

b. The set-up below was used to prepare nitric acid



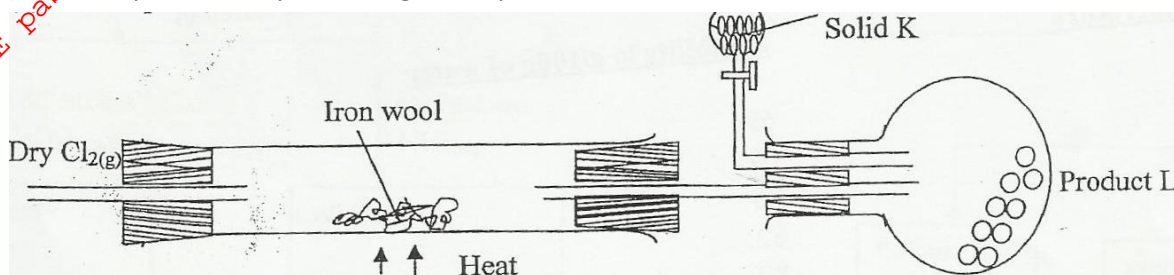
- i. Give the name of liquid R (1mk)
- ii. Write an equation for the reaction which took place in the glass retort. (1mk)
- iii. Explain the following (2mks)
 - a. Nitric acid is not stored in transparent glass.
 - b. The reaction between copper metal with 50% nitric acid (one volume of acid added to an equal volume of water) in an open test tube forms brown fumes.

6. (a) The diagram below is part of a set-up used to prepare and collect dry chlorine in the laboratory.



- i. Complete the diagram to show how dry chlorine gas is prepared. (2mks)
- ii. Name solid P (1mk)
-
- iii. Write an equation for the reaction that took place in the flask shown above. (1mk)
-
- iv. The gas produced above was passed through moist colored flower petals. State and explain observations made. (2mks)
-
-
-

(b) In an experiment dry chlorine gas was passed over hot iron as shown below



- i. Identify solid K and product L. (1/2mk)
- Solid K
- Product K
- ii. Give the role of solid K during this experiment. (1mk)
-
-
- iii. Write an equation leading to the formation of product L (1mk)
-
-
- iv. What property makes L to be collected in the flask as shown above? (1mk)
-
-
- v. Dry hydrogen chloride also reacts with hot iron wool to form substance M. Name substance M (1mk)
-
- c. (i) Hydrogen Chloride gas when dissolved in water conducts an electric current while the same gas dissolved in Methylbenzene does not. Explain. (2mks)
-
-
-
- (ii) Dilute hydrochloric acid cannot react with copper metal. Give a reason. (1mk)
-
-
-

7. (a) Define solubility of a salt.

(1mk)

(b) The table below shows the solubility of ammonium phosphate in water at different temperatures.

<u>Temperature</u>	<u>Solubility in g/100g of water</u>
10	63
20	69
30	75
40	82
50	89
60	97

(i) On the grid provided, plot the graph of solubility against temperature.

(2mks)

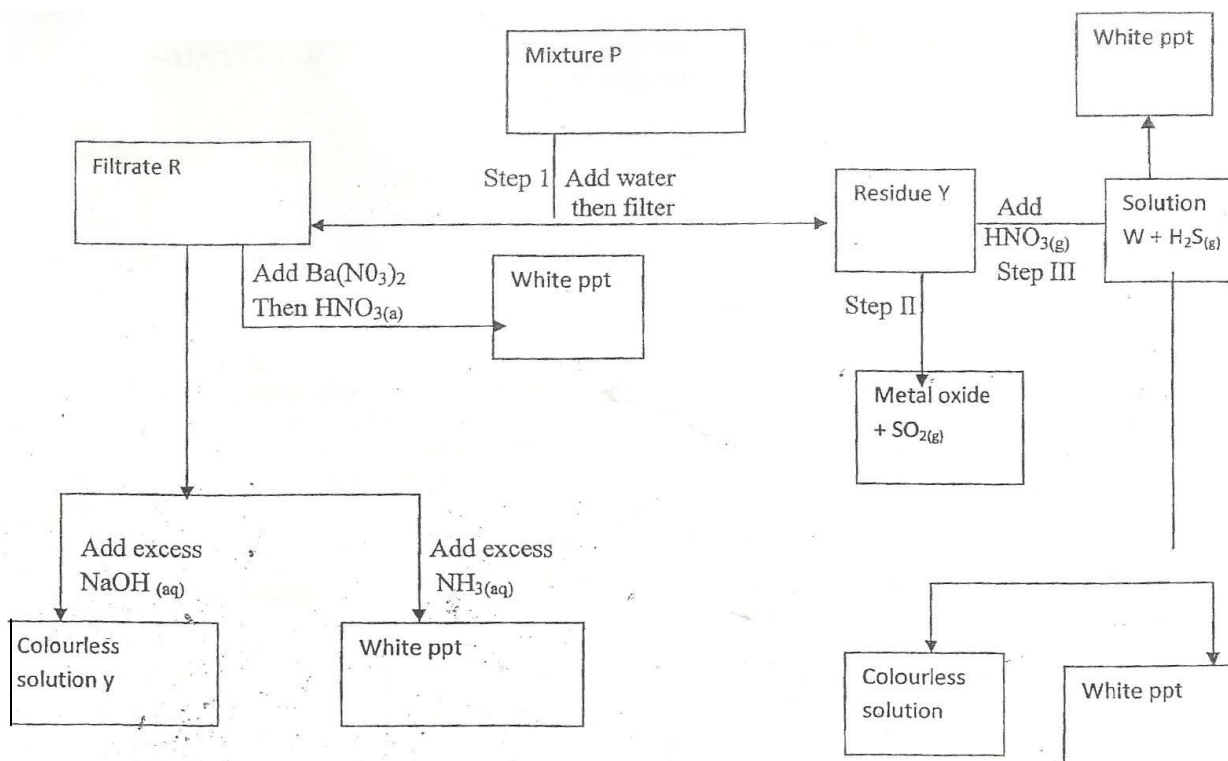
(ii) Using the graph

(a) Determine the solubility of ammonium sulphate at 35°C

(c) The solubility of potassium chlorate is 200g per 100g water at 80°C and 90g per 100g of water at 45°C. Calculate the mass of potassium chlorate that will crystallize out of a solution if 160g of saturated solution at 80°C is cooled 45°C.

(21/2mks)

d. The figure below shows the analysis of a mixture P which consists of two salts. Study it and answer the questions that follow.



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- i. What does the process in step I suggest about the mixture P. (1/2mk)
.....
.....
- ii. State the conditions necessary for the reaction in step II to occur. (1/2mk)
.....
- iii. What observation would indicate the presence of H_2S in step III (1/2mk)
.....
- iv. Identify the cation present in (1mk)
(i) Filtrate R.....
(ii) Solution W.....
- v. Write the formula of the complex ion in solution Z. (1/2mk)
- vi. State how the gases evolved in step II and III can be distinguished using pieces of moist red litmus paper (1mk)
.....
.....
- vii. Write an ionic equation for the reaction between filtrate R and ammonia solution. (1mk)
.....
- viii. Name two salts contained in the mixture. (1mk)
.....
.....