

Name

Index No. /

School

Candidate's Sign

Date

233/2

CHEMISTRY (THEORY)

PAPER 2

JULY/AUGUST 2013

TIME: 2 HOURS

KIKUYU DISTRICT INTERSCHOOLS EVALUATION
KENYA CERTIFICATE OF SECONDARY EDUCATION

233/2

CHEMISTRY

PAPER 2

INSTRUCTION TO THE CANDIDATES:-

- Answer **ALL** the questions in the spaces provided.
- All working **MUST** be clearly shown where necessary.
- Mathematical Tables and non - programmable Electronic Calculators may be used.

FOR OFFICIAL USE ONLY

Question	Maximum Score	Candidate's score
1	10	
2	12	
3	15	
4	9	
5	14	
6	10	
7	10	
TOTAL	80	

1. Study the table below and answer the questions that follow. (The letter do not represent the actual symbols of the elements)

Element	A	B	C	D	E	F	G	H
Atomic Number	11	12	13	14	15	16	17	18
Boiling point ($^{\circ}\text{C}$)	890	1110	2470	2360	280	445	-34.2	-186
Formula oxide		BO			E_2O_5		G_2O	
Boiling point of Oxide of $^{\circ}\text{C}$	1193	3075	2045	1728	563	-72	-91	

- (a) Complete the table to show the formulae of the oxides of A, C, D and F. (2 marks)

- (b) State the period to which the elements above belong to. (1 mark)

- (c) Select an oxide that reacts with both dilute hydrochloric acid and potassium hydroxide solution. (2 marks)

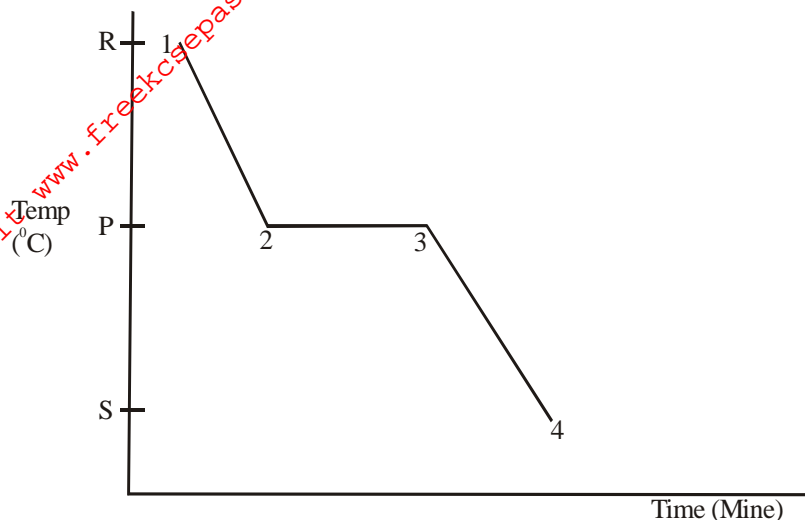
- (d) Write an equation for the reaction between the oxide of A and water. (1 mark)

- (e) Explain the difference in boiling point of the chloride of B and C. (2 marks)

- (f) Write the formula of the compound formed between E and G. (1 mark)

- (g) Explain the difference in the atomic radii of elements D and H. (2 marks)

2. (a) The figure belows shows the changes in temperature when a liquid sample was cooled.



- (i) Is the liquid sample pure or impure? Give a reason. (2 marks)

- Name the process represented by region 2 and 3. (2 marks)

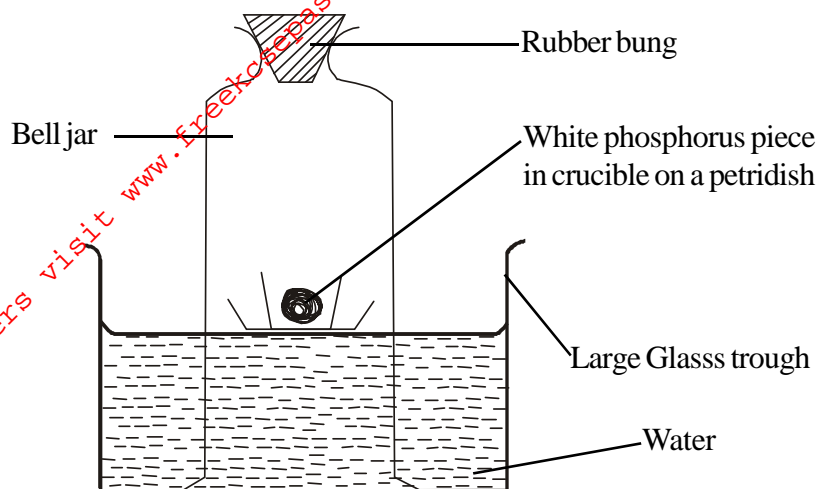
- (ii) Identify the physical states present between points;
1 and 2. (1/2 marks)

- 3 and 4 (1/2 marks)

- 2 and 3 (1/2 marks)

- (iii) On the axis drawn above, sketch a graph for the mixture of the liquid above and ethanol given the two are miscible. (1 mark)

- (b) Study the following diagram and answer the questions that follow.



During the experiment the rubber band was removed and a hot glass rod put through the opening to ignite the phosphorus by touching. It was then immediately removed and the rubber band replaced as the phosphorus burnt producing thick white fumes.

- (i) How is phosphorus stored in the laboratory? Explain. (2 marks)

- (ii) State reasons why the level of water in the bell jar first went down as phosphorus burned then rose after it got extinguished. (2 marks)

- (iii) The white fumes formed in the bell jar slowly disappeared until the bell jar finally became clear. Explain. (1 mark)

- (iv) Given that the initial reading was 64cm^3 and the final volume was 80cm^3 . Determine the percentage by volume of oxygen in air. (2 marks)

3.

Temperatures ($^{\circ}\text{C}$)	10	20	30	40	50	60	70	80
Solubility of D	17	21	24	29	34	40	47	56
Solubility of E	35.8	36	36.2	36.5	36.8	37.3	37.6	38.0

Using these data, plot solubility curves for D and E on the same sheet of graph paper. Use your graph to answer the following.

(4 marks)

- (a) At what temperature are the solubilities of the two salts equal?

(1 mark)

- (b) Estimate the solubility of D at 0°C.

(1 mark)

- (c) A saturated solution of E in 50gm of water at 25°C was evaporated to dryness what was the mass of the residue?

(2 marks)

- (d) To separate 100gm of water are saturated at 75°C, one with D and the other with E. What is the difference in mass between the two solutions.

(2 marks)

For More Free KCSH past papers visit www.freekcshepapers.com



(e) The saturated solutions obtained were each cooled to 20°C.

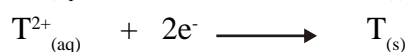
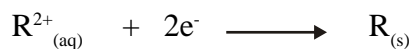
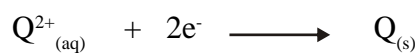
(i) Calculate the total mass of two salts precipitated.

(2 marks)

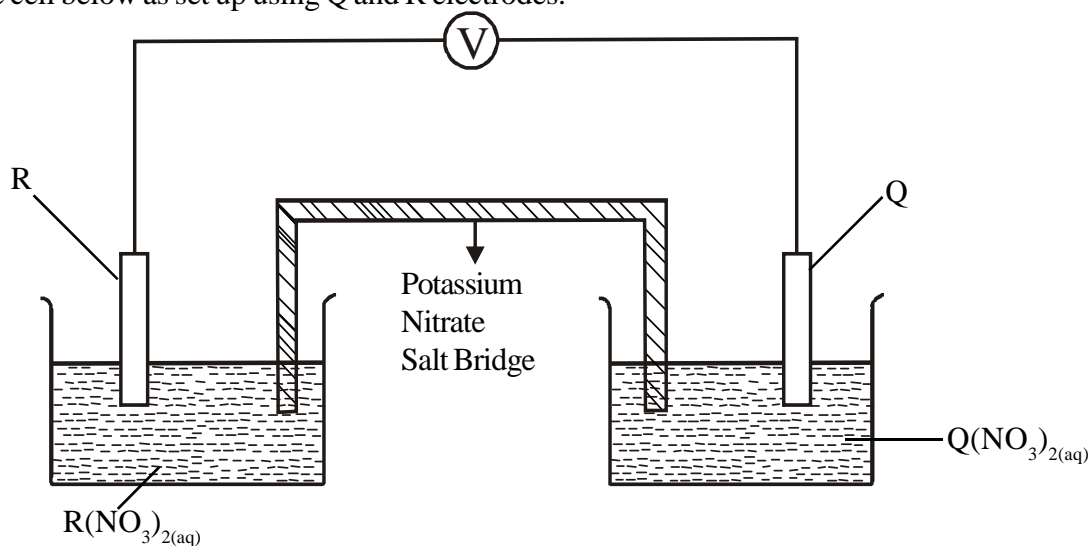
(ii) Calculate the mass of each salt dissolved at saturation in 20gm of water at 20°C.

(3 marks)

4. (a) Below are standard electrode potentials for some half cell reactions.



The cell below as set up using Q and R electrodes.



(i) Write down half - cell equations of each half - cell.

(2 marks)

(ii) Write down the overall cell equation. (1 mark)

(iii) Calculate the e.m.f of the cell above. (1 mark)

(iv) Explain how the salt bridge helps in maintaining the charge balance in each half - cell when the cell is in operation. (2 marks)]

(v) Explain why potassium chloride salt bridge cannot be used when lead nitrate solutions is used as an electrolyte in the above setup. (2 marks)

5. The list below shows the formula of some organic compounds. Use it to answer the questions that follow. Use the letters T₁ and T₆.

- T₁ - CH₃CH₂CH₂CH₃
T₂ - CH₃CH₂CH₂COOC₂H₅
T₃ - CH₃CH₂CH₂CH₂OH
T₄ - CH₃CH₂CH₂COOH
T₅ - CH₃CH₂CHCH₂
T₆ - CH₃CCCH₃

(a) Select compounds which

(i) Are not hydrocarbons. (1 mark)

(ii) Will decolourise both bromine water and acidified potassium manganate (VII). (1 mark)

(iii) Will produce hydrogen gas when reacted with sodium metal. (1 mark)

(iv) Will produce bubbles of a gas when reacted with sodium carbonate. (1 mark)

(b) (i) Identify the compound that is likely to undergo polymerization. Give a reason for your answer and using two molecules show how polymerization occurs.

Compound (1 mark)

Reasons (1 mark)

Polymerization (1 mark)

(ii) Name the process by which compound T₂ is formed and identify the compounds that were used to form it.

Process (1 mark)

Compound (1 mark)

(c) Compound T₃ can be converted to T₄ as shown by the equation below.



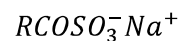
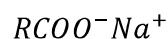
Give the following information.

$$\Delta H_c \text{ for } C_4H_9OH = -4910 \text{ KJmol}^{-1}$$

$$\Delta H_c \text{ for } C_3H_7COOH = -4090 \text{ KJmol}^{-1}$$

Determine the heat change for the reaction above. (3 marks)

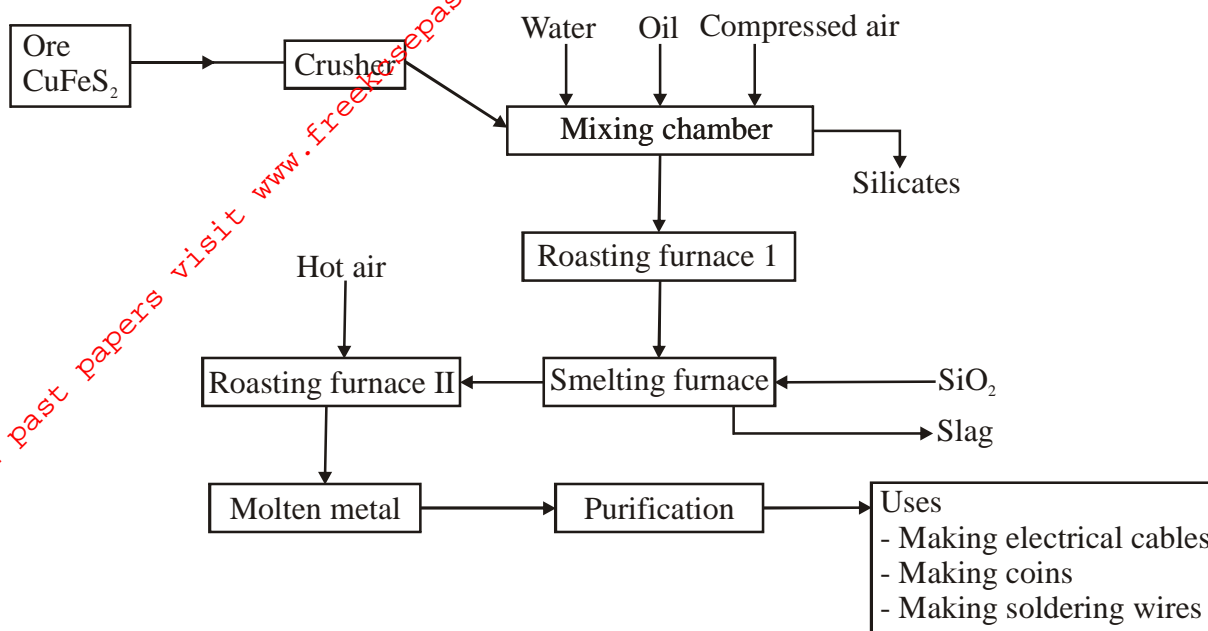
(d) The structure below represent two cleansing agents.



In the table give one advantage of using each of them. (2 marks)

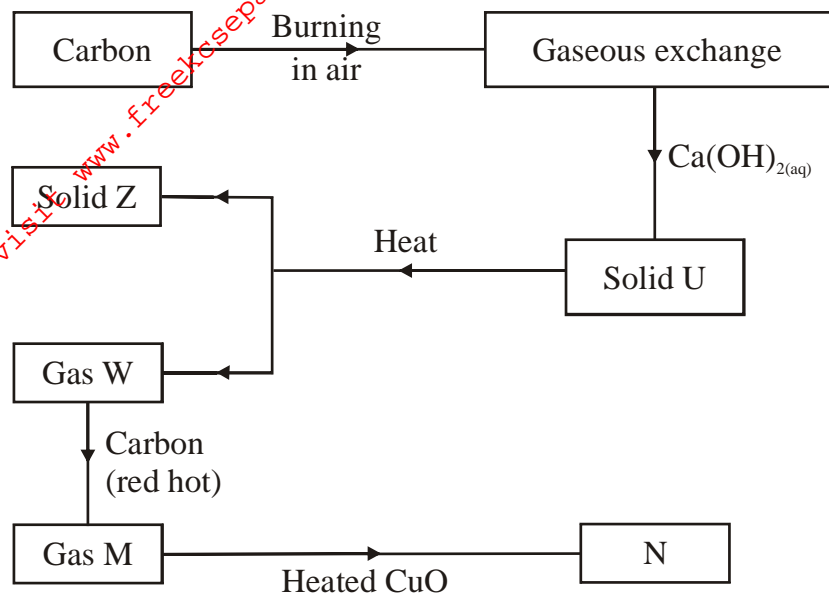
	Advantage
$RCOO^-Na^+$	
$RCOSO_3^-Na^+$	

6. Study the flow chart below and use it to answer the questions between.



- (a) Identify the process described by the flow chart. (1 mark)
- _____
- (b) Explain why the Ore is crushed. (1 mark)
- _____
- (c) Which process occurs at mixing chamber? (1 mark)
- _____
- (d) Explain the use of (3 marks)
- Water
- _____
- Oil
- _____
- Compressed air
- _____
- (e) Write down an equation for the formation of slag. (1 mark)
- _____
- (f) Identify the cations present where the metal is being purified. (1 mark)
- _____
- (g) Given a reason for the following uses of the above metal.
- I. Making electrical wires. (1 mark)
- _____
- II. Making soldering wires. (1 mark)
- _____

7. (a) The flow diagram below shows several reactions starting with carbon.



- (i) Identify the following (2 marks)

U _____

Z _____

W _____

M _____

- (ii) State the observation made when gas M is passed over heated copper (II) Oxide. (1 mark)

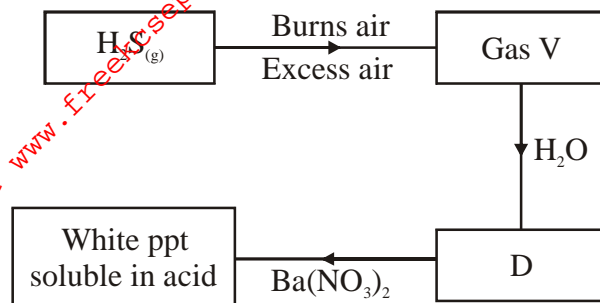
- (iii) State one application of solid Z. (1 mark)

- (iv) Write an equation for the formation of gas M from gas W. (1 mark)

- (v) Explain the precaution to be taken in (iv) above. (2 marks)

- (b) (i) Explain why the boiling point of sulphuric (VI) acid (333°C) is much higher than that of water (100°C). (1 mark)

- (ii) Study the flowchart below and answer the questions that follow.



I. Name

Gas V _____

D _____

II. Write an ionic equation for the formation of white precipitation. (1 mark)