

Name: ..... Index No. ....

School: ..... Candidate's Sign. ....

Date: .....

233/1  
CHEMISTRY  
PAPER 1  
MARCH/APRIL 2011  
TIME: 2 HOURS

# BUTERE EAST ZONE JOINT EVALUATION TEST

*Kenya Certificate of Secondary Education (K.C.S.E.)*

Chemistry  
Paper 1

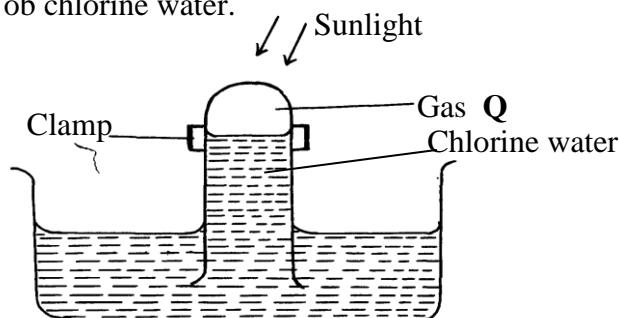
## INSTRUCTIONS TO THE CANDIDATES:-

- Write your **name** and **index number** in the spaces provided.
- Answer **all** the questions in the spaces provided.
- Mathematical tables and electronic calculations may be used for calculators.
- All working **must** be clearly shown where necessary.

Questions	Maximum score	Candidates score
1- 30	80	

*This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

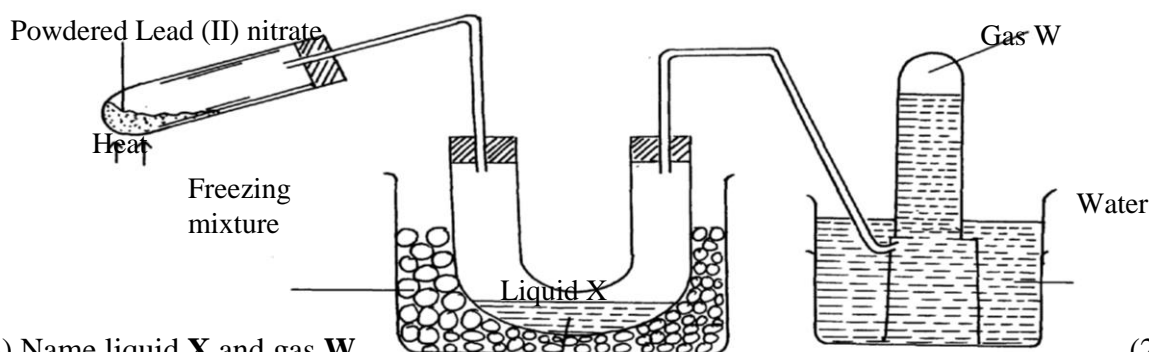
- An element **M** has atomic number 5.
  - Write the electronic configuration of **M** (1mk)
  - State the group and period to which element **M** belongs in the periodic table. (2mks)  
 Group ..... period.....
- Briefly explain why water is not used to put off oil fires. (2mks)
- Form 3 students of Kemu Girls High school set up the apparatus shown below to investigate the action of sunlight on chlorine water.



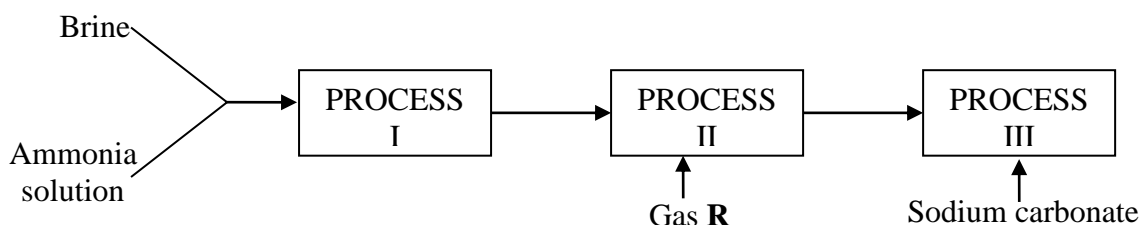
- Identify gas **Q**. (1mk)
  - Write an equation to show how gas **Q** is formed. (1mk)
- The common drying agents such as concentrated Sulphuric (VI) acid are not used to dry ammonia gas;
    - State and explain why concentrated sulphuric (VI) acid are not a suitable drying agent. (2mks)
    - Name a suitable drying agent for ammonia gas. (1mk)
  - Below is a table of first five alkanes and their boiling points;

Name	Boiling point (°C)
Methane	-161.5
Ethane	-88.6
Propane	-42.1
Butane	-0.5
Pentane	36.1

- What is the state of pentane at room temperature (25°C) (1mk)
  - Why does the boiling point increase from methane to pentane? (2mks)
- Calculate the heat of formation of methane given that the heat of combustion of Carbon, hydrogen and methane are  $-393\text{KJmol}^{-1}$ ,  $-285\text{KJmol}^{-1}$  respectively. (3mks)
  - The diagram below shows an experiment in which Lead (II) nitrate crystals are heated. Study it and answer the questions that follow;



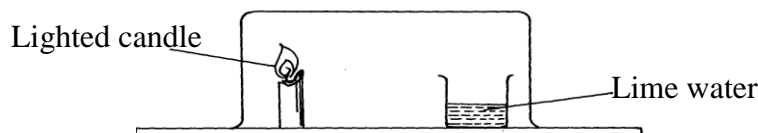
- Name liquid **X** and gas **W** (2mks)  
 Liquid **X** ..... gas **W** .....
  - Write an equation for the reaction that takes place in the heated test tube. (1mk)
- Below is a simplified scheme of solvay process. Study it and answer the questions that follow;



- (a) Identify gas **R** ..... (1mk)  
 (b) Write an equation for the process III (1mk)  
 (c) Give one use of Sodium Carbonate (1mk)
9. An atom **P** contains 90% of isotope  $^{17}\text{P}$ . Calculate the relative atomic mass of **P**. (3mks)
10. In an experiment  $100\text{cm}^3$  of air was passed over heated copper turnings.  $80\text{cm}^3$  of air remained at the end of the experiment;  
 (a) What happened to the  $20\text{cm}^3$  of air? (1mk)  
 (b) Give names of **four** major components of the  $80\text{cm}^3$  of air that remained. (2mks)
11. The following results were obtained in an experiment;



- (a) Identify ;  
 (i) the reddish brown deposits (1mk)  
 (ii) the colourless solution (1mk)
- (b) Write an equation for the reaction taking place (1mk)
12. When 2.23g of Lead (II) oxide were heated in a stream of dry hydrogen gas, 2.07g of lead were formed and 0.18g of water was collected. Calculate the mass of hydrogen which combines with one mole of oxygen atoms (Pb = 27, O = 16, H = 1) (3mks)
13. (a) Write an ionic equation for the reaction between Copper (II) sulphate and Sodium hydroxide solution. (1mk)  
 (b) Name the type of reaction in (a) above. (1mk)
14. At room temperature Silicon (IV) oxide is a solid whereas Carbon (IV) oxide is a gas although silicon is next to Carbon in group (IV) of the periodic table. Explain (2mks)
15. Below are the bond dissociation of some elements;  
 Use this information to calculate the heat of reaction for;  
 $2\text{C}_{(s)} + 3\text{H}_{2(g)} \rightarrow \text{C}_2\text{H}_{6(g)}$  (3mks)
16. Describe how you would prepare a dry sample of Zinc carbonate in the laboratory starting with Zinc chloride solid. (3mks)
17.  $25\text{cm}^3$  of a solution of hydrochloric acid dissolved 3g of Magnesium ribbon. Calculate the concentration of hydrochloric acid in  $\text{Mol dm}^{-3}$  (Mg = 24). (3mks)
18. Study the arrangement below and answer the questions that follow:



- Explain what will be observed after sometime. (3mks)
19. The table below shows the solubilities of two salts **P** and **Q** at different temperatures;

Tempe °C		10	20	30	40	50
Solubility in (g/100g) of water	<b>P</b>	4.6	7.0	9.8	13.0	16.9
	<b>Q</b>	10.2	14.6	20.1	27.4	35.9

- A solution contained 15g each of **P** and **Q** at  $50^\circ\text{C}$  in 100g of water. On cooling this solution to  $10^\circ\text{C}$ . What total mass of crystals would be obtained? (2mks)
20. A white solid dissolves in water to form a colourless solution. The colourless solution forms a white precipitate with ammonia solution but becomes soluble in excess of the alkali. The colourless solution forms a white precipitate with silver nitrate. What ions are present in the white solid? (2mks)
21. Four solutions of pH 7, 2, 8.5 and 13 respectively were each reacted with Calcium turnings. In which of the solutions would hydrogen gas be produced. Explain each case. (3mks)
22. A known volume of ozonized oxygen diffuses through a small hole in 55 seconds whereas the

same amount of oxygen. Mixed with chlorine takes 67seconds under the same conditions.

Determine the molecular mass of ozone. (Cl =33.5) (3mks)

23. (a) What property of concentrated Sulphuric (VI) acid is illustrated by its action on:  
 (i) Sugar..... (½mk)  
 (ii) Copper metal ..... (½mk)  
 (b) Write the equation for the reaction of concentrated sulphuric acid with copper metal. (1mk)

24. Study the table below and answer the questions that follow:

Substance	Melting point (°C)	Boiling point (°C)	Electric conductivity
<b>C</b>	Low	high	Conducts in solid state
<b>D</b>	Low	low	Does not conduct
<b>E</b>	High	high	Conducts in liquid but not in solid

- (a) What substance is likely to be; (1½mks)  
 (i) Ethanol.....  
 (ii) A salt.....  
 (iii) Sodium.....  
 (b) What is the structure of **E**. Explain. (1½mks)

25. Ammonia is formed when nitrogen combines with hydrogen;  
 (a) Using dots (.) and cross (x) diagram, show how a molecule of ammonia is formed. (N =7, H = 1). (2mks)

(b) State the type of bond formed in (a) above. (1mk)

26. A colourless gas **X** is slightly soluble in water forming a neutral solution. The gas does not support burning and forms brown fumes when exposed to air. Write an equation for the reaction gas **X** and air. (1mk)

27. In an experiment, the heat generated burning 0.7g of ethanol raised the temperature of 250cm<sup>3</sup> of water from 15°C to 35°C, calculate;

(a) the quantity of heat produced during the experiment (*density of water = 1gcm<sup>-1</sup>, heat capacity of water = 4.2Jg<sup>-1</sup>K<sup>-1</sup>, O= 16, C = 12, H = 1*). (1mk)

(b) the molar enthalpy of combustion of ethanol. (2mks)

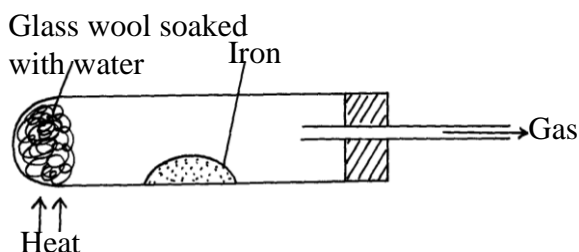
28. Draw a dot-cross diagram to show bonding in Cl<sub>2</sub>O atomic numbers (Cl = 17, O = 18). (2mks)

29. In an experiment, soap was added to three samples of water. The results shows the volume of soap solution required to lather with 500cm<sup>3</sup> of each water sample before and after boiling;

	Sample 1	Sample 2	Sample 3
Volume of soap used before water boiled	26.0	14.0	4.0
Volume soap after water boiled	26.0	4.0	4.0

- (i) Which water sample is likely to be soft? (1mk)  
 (ii) Explain the change in volume of soap solution used in sample 2. (2mks)

30. The diagram below represents set-up that was used to react iron with water. Study it answer the questions that follow;



- (a) Write an equation for the reaction that takes place. (1mk)  
 (b) Why would it not be advisable to use Potassium in place of iron in the above set up? (1mk)  
 (c) The glass wool is heated prior to heating of iron. Explain the procedure. (1mk)