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**KENYA NATIONAL EXAMINATION COUNCIL**  
**REVISION MOCK EXAMS 2016**  
**TOP NATIONAL SCHOOLS**

**PRECIOUS BLOOD SCHOOL**  
**CHEMISTRY**  
**PAPER 1**  
**TIME: 2 HOURS**

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CHEMISTRY  
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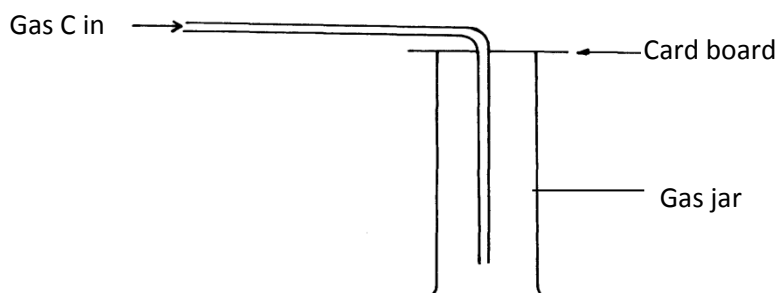
**PRECIOUS BLOOD KCSE TRIAL AND  
AND PRACTICE EXAM 2016**

**INSTRUCTIONS TO CANDIDATES:**

- Write your name and Index number in the space provided above.
- Answer *all* the questions in the spaces provided.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators can be used.

Question	Maximum score	Candidate's score
Score 1 - 29	80	

1. a) Describe hardness of water. (1mk)  
 b) Explain how dilute hydrochloric acid can be used to determine the type of hardness in a sample of tap water. (1mk)  
 c) State **two** largescale uses of hardwater. (1mk)
2. The diagram below represents a set-up of apparatus used to collect a sample of a laboratory gas C.

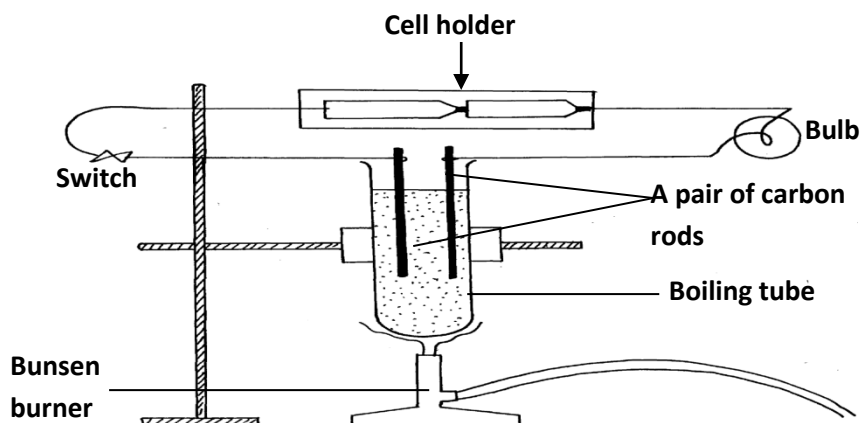


- a) Indicate in the diagram, the direction of the movements of gas C and air inside the gas jar. Give a reason for your answer. (2mks)  
 b) Name **two** laboratory gases that can be collected using the same method as gas C. (1mk)
3. When burning magnesium ribbon is put into a gas jar of carbon (IV) oxide gas, it continues to burn leaving behind white solid powder and black solid specks as residue write chemical equation for the reaction that produces.
  - i) The white solid powder. (1mk)
  - ii) Black solid specks. (1mk)
4. An element X has atomic number 3, relative atomic mass 6.94 and consists of two isotopes of mass numbers 6 and 7.
  - a) What is the mass number of the more abundant isotope of X? (1mk)
  - b) Calculate the relative abundance of each of the isotopes. (2mks)
5. Explain the meanings of the following physical properties of laboratory gases.
  - i) A chocking smell. (1mk)
  - ii) An irritating smell. (1mk)
  - iii) A neutrol gas (1mk)
6. The following grid represents an extract of a periodic table. Use the grid to answer the questions that follow.


**On the grid above;**

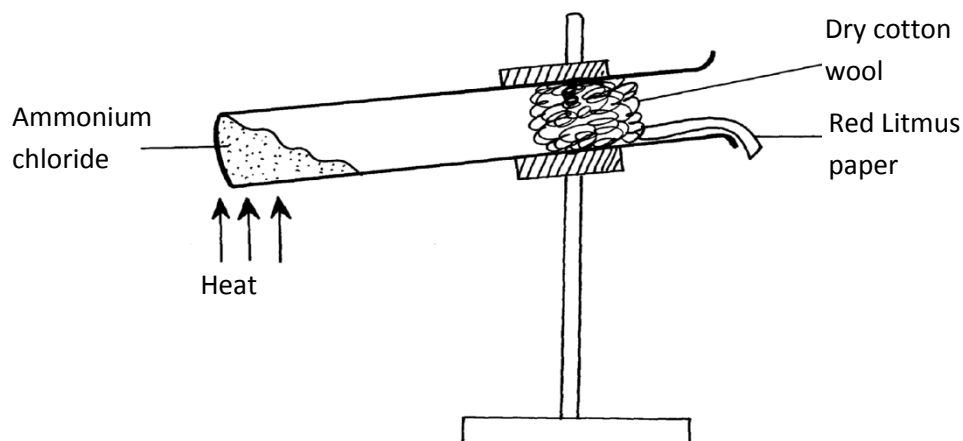
- a) Indicate by means of an arrow showing an increasing trend in the reducing power of elements. (1mk)
- b) Mark element J a metal and element Q a non-metal, such that compound J,Q, has the highest ionic character. Explain. (2mks)
7. A hydrocarbon has an emperical formula  $C_2H_3$  and a relative molecular mass of 54.
  - a) Determine the molecular formula of the hydrocarbon ( C=12; H=1) (1mk)
  - b) Name the homologous series to which the hydrocarbon belongs. Give a reason for your answer. (1mk)

- c) When **one** mole of the hydrocarbon reacts with one mole of hydrogen chloride gas, compound W is formed. Give the IUPAC systematic name of W. (1mk)
8. The diagram below represents a set-up used to investigate the effect of electric current on sodium chloride.



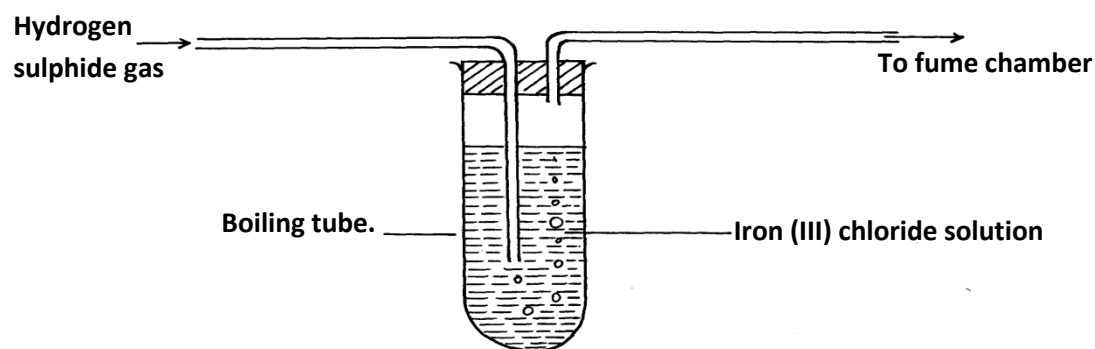
9. Explain why the bulb did not light when the switch was put on. (3mks)
10. In an experiment, 1g of calcium carbonate was completely dissolved in 100cm<sup>3</sup> of 0.25M excess hydrochloric acid. Calculate the molar concentration of the acidic solution formed. (Ca = 40; C = 12; O = 16) (3mks)
11. Describe how you would obtain pure solid samples of each of the following components of a solid mixture containing; Lead (II) chloride, Sodium carbonate and calcium sulphate. (3mks)
12. a) Name the polymer with the following structural formula. (1mk)
- $$\begin{array}{cccccccc} -\text{CH} & -\text{CH}_2 & -\text{CH} & -\text{CH}_2 & -\text{CH} & -\text{CH}_2 & -\text{CH} & -\text{CH}_2- \\ | & & | & & | & & | & \\ & & & & & & & \end{array}$$
- b) State **one** commercial use of the polymer. (1mk)
13. a) Write a chemical equation to represent the chemical reaction between an acid and water. (1mk)
- b) State **two** commercial uses of sulphuric acid. (1mk)
14. When aqueous potassium hydroxide is electrolysed using platinum electrodes, hydrogen gas is produced at the cathode.
- a) Give a reason why platinum is described as an inert electrode. (1mk)
- b) Explain how hydrogen gas is produced in this experiment. (2mks)
15. The heat of combustion of carbon, hydrogen and methane are 405kJmol<sup>-1</sup>, 286kJmol<sup>-1</sup> and 886kJmol<sup>-1</sup> respectively. Calculate the heat change for the reaction,  $\Delta H$ . (3mks)
- $$\text{C}_{(s)} + 2\text{H}_2(g) \longrightarrow \text{CH}_4(g); \Delta H$$
16. When chlorine gas is dissolved in water it acts as a bleaching agent.
- a) Write a chemical equation to show the role of water in the bleaching property of chlorine. (1mk)
- b) Name the chlorine compound that is present in the commercial bleaching agents. Give a reason for your answer. (2mks)
17. a) State Boyle's gas Law. (1mk)
- b) A fixed mass of a gas has a volume of 250cm<sup>3</sup> at 27°C and 750mmHg pressure. Calculate the gas volume that the gas would occupy at 41°C and 750mmHg pressure. (0° = 273k) (2mks)

17. The diagram below shows a sample of ammonium chloride being heated in a dry boiling tube containing a plug of cotton and damp red litmus paper



State and explain what would be observed on the red litmus paper (3mks)

18. The diagram below represents a laboratory experiment to investigate the reaction between hydrogen sulphide gas and an aqueous iron (II) chloride.

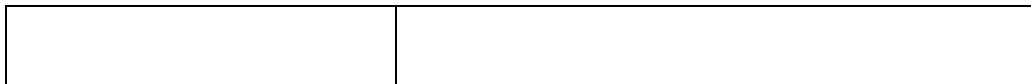


- Write chemical equation for the reaction which takes place in the boiling tube. (1mk)
  - What adjustment need to be made in the above set-up if the laboratory does not have a flame chamber. (1mk)
  - Describe a laboratory chemical test for a sample of hydrogen sulphide gas. (1mk)
19. State the main differences between alkanes and alkenes in terms of the following;
- Structure and bonding (1mk)

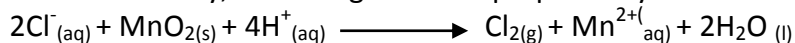
Alkanes	alkenes

- Reaction with chlorine gas. (2mks)

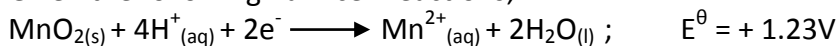
Alkanes	alkenes



20. In the laboratory, chlorine gas can be prepared by the reaction;



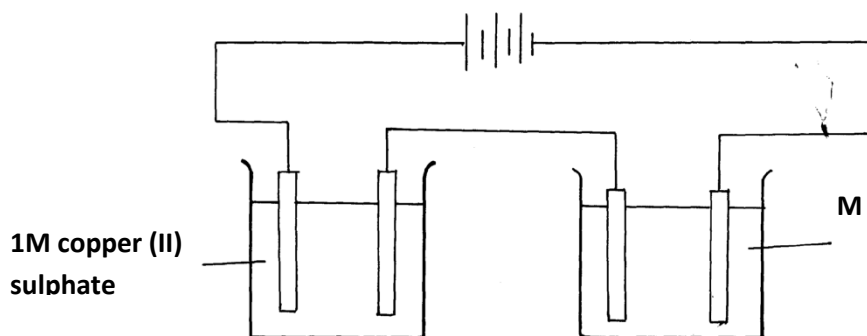
Given the following half- cell reactions;



Use the  $E^\ominus$  cell to explain how the above reaction is carried out in the laboratory. (3mks)

21. a) Define the term radioactivity. (1mk)  
 b) Q grams of a radioactive isotope sample takes 80 days to disintegrate to 7g. The half-life of the isotope is 20days. Find the initial mass Q. (2mks)
22. Explain why graphite is preferred to lubricating oil in the moving parts of the machine. (2mks)
23. In the chemistry laboratory, both blue and red litmus papers are used to test for the nature of gases and solutions. Explain (2mks)

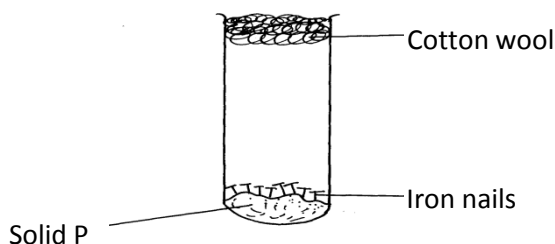
24. The following diagram was used to investigate the electrolysis of copper(II) Sulphate solution and molten G chloride using carbon electrodes.



When a fixed current was passed through the two electrolytic cells as shown, 1.27g of copper and 0.6g of G were deposited at the respective electrodes,. Calculate the numerical value of x in the formula  $\text{G}^{\text{x}+}$ .

(Cu=63.5; g = 60; 1 Faraday = 96500C) (3mks)

25. a) The following diagram represents a set-up used to investigate conditions necessary from rusting of iron.



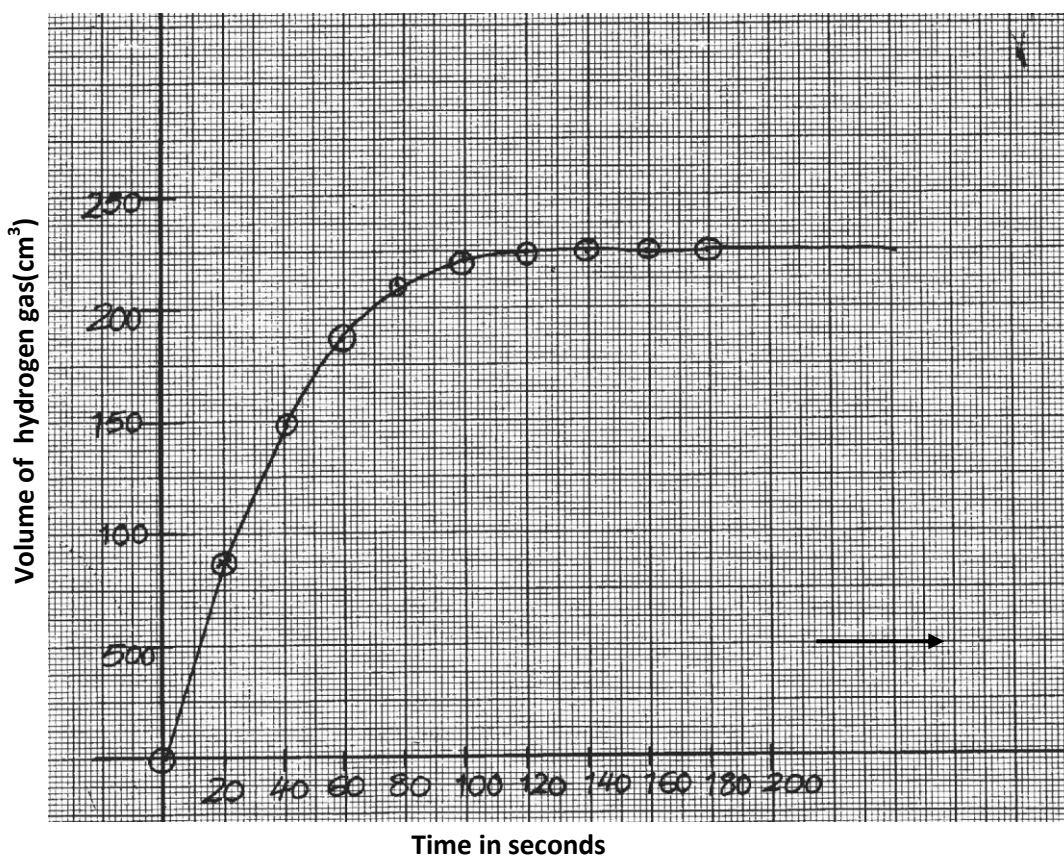
After several days it was found that the nails did not rust. Identify solid P. (1mk)

- b) The following are standard electrode potentials of some half-cell reactions. Use the data to answer the questions that follow.

Metal	Electrode potentials
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S	-1.37
T	-0.83
U	0.00
V	+0.58
W	+1.46

- i) Suggest the identify of element U. (1mk)
- ii) Draw a labeled diagram of an electrochemical cell that would produce the largest e.m.f. (2mks)
26. Study the following equilibrium equation and answer the questions that follows.
- $$\text{NH}_4^+_{(\text{aq})} + \text{OH}^-_{(\text{aq})} \rightleftharpoons \text{NH}_3(\text{g}) + \text{H}_2\text{O}(\text{l}) \quad \Delta H = +54\text{kJmol}^{-1}$$
- Explain how ammonia gas can be prepared in the laboratory. (2mks)
27. a) Write a chemical equation for the combustion of laboratory gas, when the Bunsen burner produces a non-luminous flame. (1mk)
- b) Describe **two** observable characteristics of aluminous flame. (1mk)
28. Explain why during the extraction of metals, copper can be extracted by the electrolysis of copper (II) sulphate solution, while aluminium chloride cannot be extracted by electrolysis of aluminium sulphate solution. (2mks)
29. The graph below was obtained from an experiment used to investigate the reaction between Zinc granules and 2M hydrochloric acid.



- a) Calculate the rate of reaction when  $t = 60$  seconds. (2mks)
- b) Suggest how the rate of the above reaction can be reduced so that it can be studied more closely at the same temperature (1mk)