Name ..... Index Number ..... / .....

SCHOOL ..... Candidate's Signature .....

Date .....

233/1

CHEMISTRY

PAPER 1 (THEORY)

TIME: 2 HOURS

JULY/AUGUST 2016

KIGUMO SUB-COUNTY CLUSTER EXAMINATION 2016

Kenya National Examination Council

233/1

CHEMISTRY

PAPER 1 (THEORY)

TIME: 2 HOURS

Instructions to candidates

1. Write your **name** and **index number** in the space provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer **ALL** the questions in the spaces in the quesitons
4. **ALL** working **must** be clearly shown where necessary.
5. KNEC Mathematical tables and silent electronic calculators may be used.
6. Candidates shoudl answer the questions in English language.

For Examiner's use only

Questions	Maximum Score	Candidate's Score
1 - 30	80	

SECTION A

Answer ALL the questions on the spaces provided.

1. a) What is meant by term Isomerism. (1mk)

_____

b) Draw an Isomer of pentene. (1mk)

2. Consider the metals copper and zinc.

a) Name one ore for each metal

Copper: _____ (1mk)

Zinc: _____ (1mk)

b) Apart from copper being a good conductor of heat and electricity, state any other physical property of copper. (1mk)

_____

3. a) Define the term fuel. (1mk)

_____

b) State two factors to consider when choosing a fuel. (1mk)

_____

_____

4. a) State Graham's Law of diffusion. (1mk)

_____

_____

b) A compound contains 29.1% sodium, 40.5% sulphur and the rest is oxygen. Find the empirical formulae.
(Na = 23, S = 32, O = 16) (2mks)

_____

_____

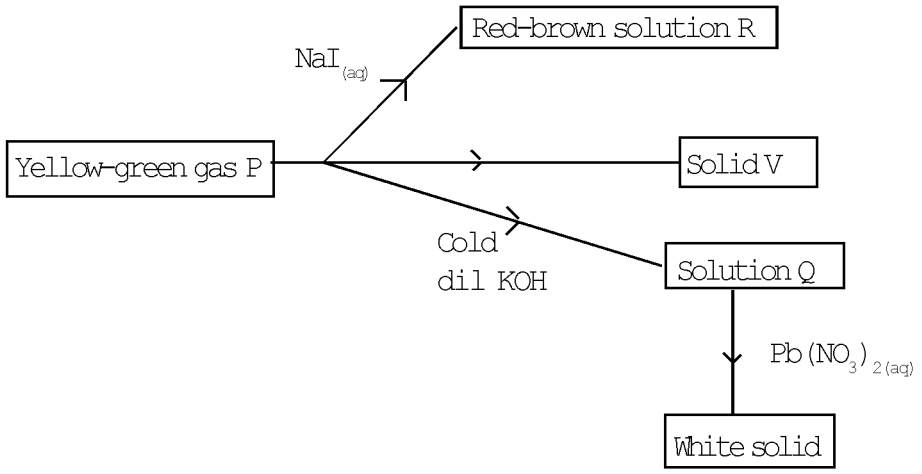
_____

5. a) Calculate the maximum of oxygen, measured at s.t.p., that can be obtained by heating a solution containing 8.8g of hydrogen peroxide. (2mks)

b) What is a standard solution. (1mk)

6. a) State two methods of removing permanent hardness in water only. (1mk)

7. Study the flow chart below and answer the question that follows.



Identify

i) Solid V (1mk)

ii) Solution R (1mk)

iii) Solution Q (1mk)

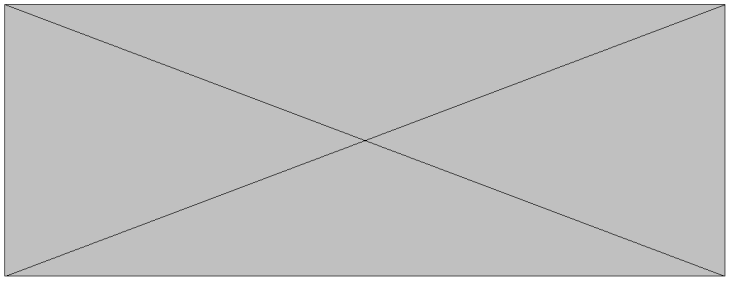
8. Crystals of hydrated sodium carbonate ($Na_2CO_3.10H_2O$) left in open air and changed to a white powder.

i) Explain what happens and give the relevant equation. (1mk)

ii) Give the name of the process shown above. (1mk)

_____

9. A student used the set-up shown in the diagram below inorder to study the reactions of some metals with steam. The experiment has carried out for ten minutes.



a) What observation would be made if gas H was ignited. (1mk)

_____

b) When the experiment was repeated using lead powder instead of Beryllium very little of gas H was obtained. Give a reason for this observation. (1mk)

_____

_____

c) Name another gas which is used together with hydrogen in welding. (1mk)

_____

10. Compare the reactivity of chlorine and bromine. (2mks)

_____

_____

_____

11. The table below shows the electrical conductivity of substances A, B and C.

Substance	Solid State	Molten state	Aqueous solution
A	Conducts	Conducts	Not soluble
B	Doesn't conduct	Conducts	Conducts
C	Doesn't conduct	Doesn't conduct	Not soluble

a) Give the type of structure and bonding that is present in substance A. (1mk)

_____

b) Which substance is likely to be sodium chloride. Explain. (2mks)

12. Hydrogen Iodide is a product formed when hydrogen reacts with Iodine according to the equations.

$H_{2(g)} + H_{2(g)} \rightleftharpoons 2HI_{(g)}$ $\Delta H = +52.0KJ/mole$

Explain how the following would affect the yield of Hydrogen Iodide.

a) Increase the temperature. (1mk)

b) A decrease in pressure of the system. (1mk)

c) State the Le Chatelier's principle. (1mk)

13. Explain the following observation made by a form three student.

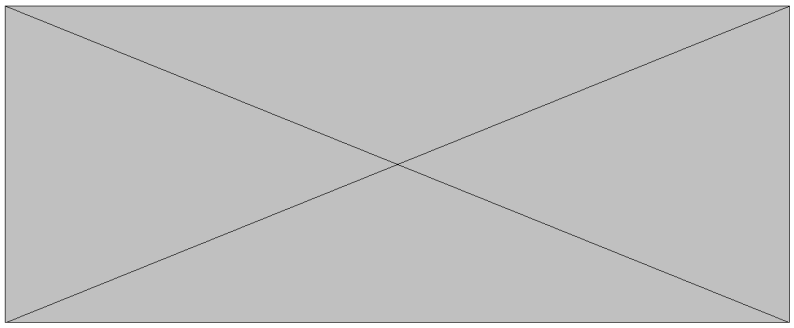
a) Dilute hydrochloric acid does not react with copper metal, but dilute nitric acid does. (1mk)

b) Describe briefly how one can distinguish Nitrogen (I) oxide from Nitrogen (II) oxide. (1mk)

14. a) Noble gas are usually unreactive. Explain these phenomena. (1mk)

b) Explain the meaning of the term ductility a property found in metals. (1mk)

c) Study the diagram below.



Write down the equation for production of gas Q. (1mk)

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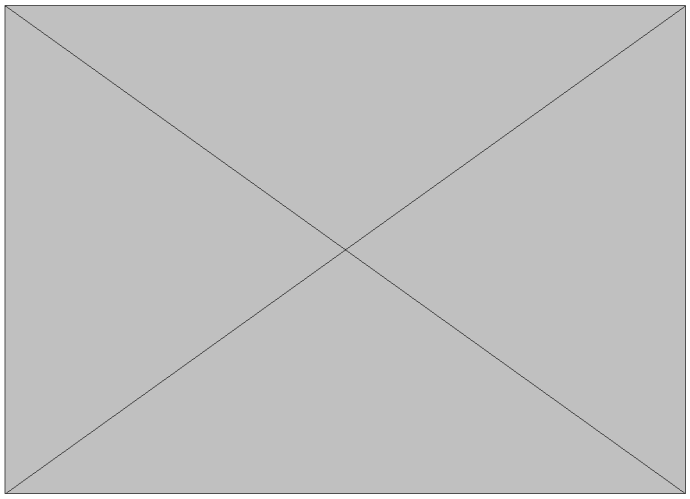
15. The diagram below was used by a student to prepare a certain gas.



a) Write equation taking place in the experiment. (2mks)

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b) State why it is advisable to burn the gas. (1mk)

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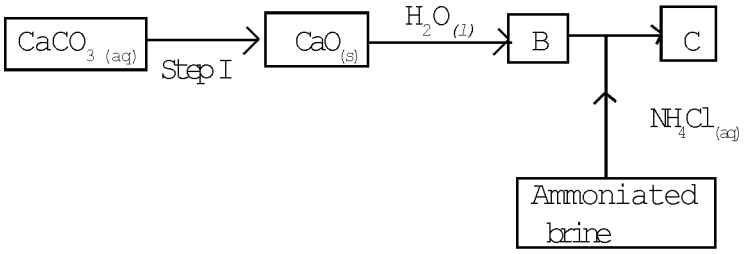
16. Study the flow chart given below.



a) Name substance B. (1mk)

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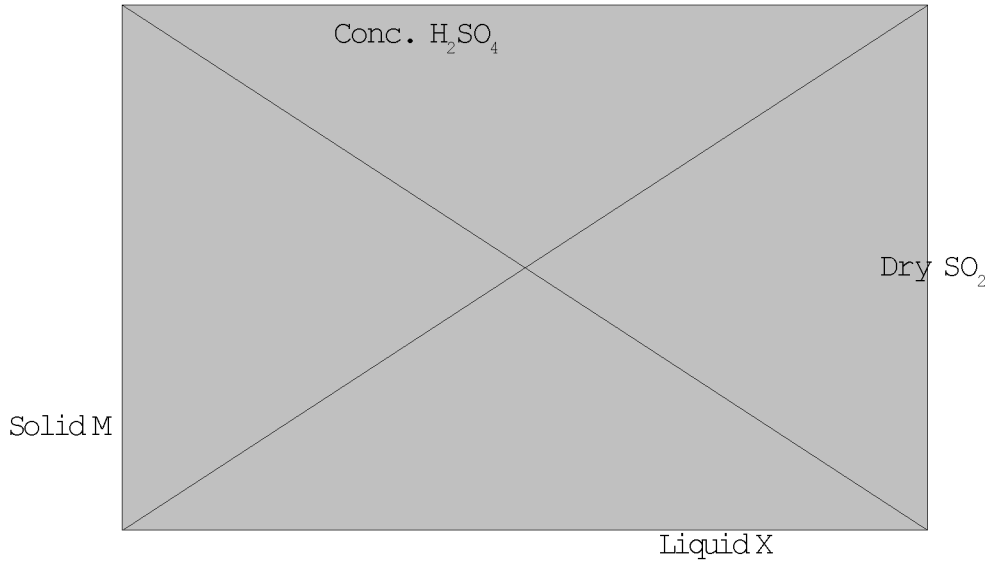
b) Give one us of product C. (1mk)

c) Write the equation between substance B to form substance C. (1mk)

17. The diagram below was used to prepare and collect Sulphur (IV) oxide gas.



a) Identify solid M. (1mk)

b) State two properties of SO_2 that makes possible to be collected in the method shown. (1mk)

c) What are the optimum conditions of conversion of SO_2 to SO_3. (1mk)

18. During an electrolysis of Zinc sulphate using inert electrodes, a current of 0.5A was passed for 40 minutes on a steady current.

a) Write down the equation at the cathode. (1mk)

b) Calculate the volume produced at the cathode given that 1F = 96,500c, MGV = 22.4 litres. (2mks)

19. a) Half-life of a radio-active elements is 30 days. Calculate the time required for its activity 37.5 counts per minute. (2mks)

b) Differentiate between an alpha and beta particles. (1mk)

20. a) What type of bond is formed when Beryllium and oxygen react. (1mk)

b) Explain why water fetched in rocky areas tend to boil at higher temperature than distilled water. (2mks)

21. a) Copper (II) Sulphate crystals were placed in a beaker containing water. State and explain the observations made after two days. (2mks)

b) Describe how you can differentiate between Lead (II) ions and Calcium ions using Sodium chloride. (1mk)

22. Ethanol obtained from glucose can be converted to ethene as shown below.

a) Name and describe the processes that take place in step I and step II. (2mks)

b) State the importance of producing biodegradable plastics and detergents. (1mk)

23. The table below is a part of the periodic table. The letters are not the actual symbols of the element. Study it and answer the questions that follows.

P			M	N	O		
	T	Q	R		S		

a) Select an element which is the most reactive. (1mk)

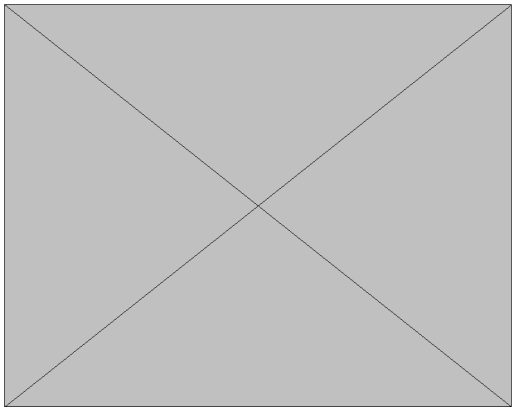
_____

b) How do the ionic radius of T and S compared? Explain. (2mks)

_____

_____

24. A mixture of substance K (density 0.626g/cm^3) and Z (density 0.85g/cm^3) was allowed to settle in a container as shown below.



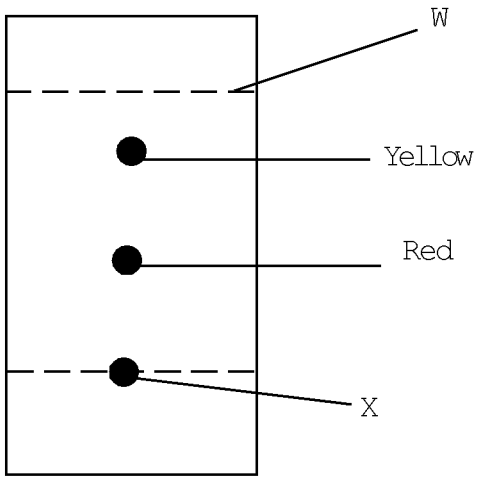
a) Which liquid forms layer (I) (1mk)

_____

b) Explain your answer in (a) above. (1mk)

_____

c) The chromatogram below shoes the constituents of a flower extract. Study it and answer the question that follows.



Give a reason to explain the different positions of red and yellow pigments. (1mk)

25. A student was given a mixture of Lead carbonate and sodium carbonate powders. Explain how you would obtain solid sodium carbonate, (3mks)

26. A compound was analysed and found to contain 24.27% carbonate, 4.08% hydrogen and the rest is chlorine. If the molar mass of the compound is 99.0, calculate the molecular formula.
(C = 12, H = 1, Cl = 25.5) (3mks)

27. a) Write down the equation between burning magnesium and carbon (IV) oxide. (1mk)

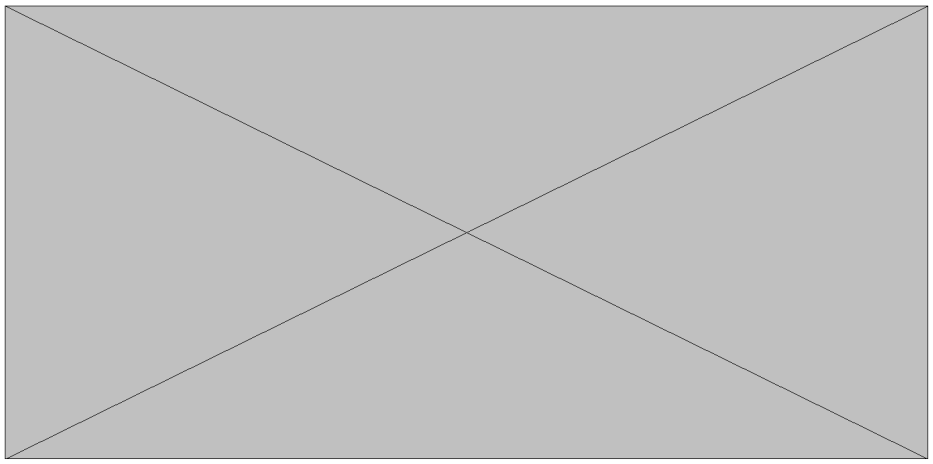
b) Carbon (IV) oxide does not support combustion yet burning magnesium continues to burn; Explain. (2mks)

28. Draw the following structure.

i) 2-bromo-4-methylpent-2-ene (1mk)

ii) Two hydrocarbons compounds are represented by the formulae C_4H_8 and C_4H_{10}.
Which of the compounds is saturated;
Explain (2mks)

29. The diagram below illustrates an experiment to investigate the conduction of electricity in liquids. Study it and answer the questions that follows.



a) State one mistake in the set-up. (1mk)

b) If the liquid in the beaker was benzene. State what expected at the bulb? Explain (2mks)