

NAME: ADM NO:

SCHOOL: STREAM:

INDEX NO: SIGNATURE:

233/1

CHEMISTRY

PAPER 1

JULY 2024

2 HOURS

MUSLIM SCHOOLS JOINT EXAMINATIONS TEST (MUSJET)
Kenya Certificate of Secondary Education
CHEMISTRY – FORM 4

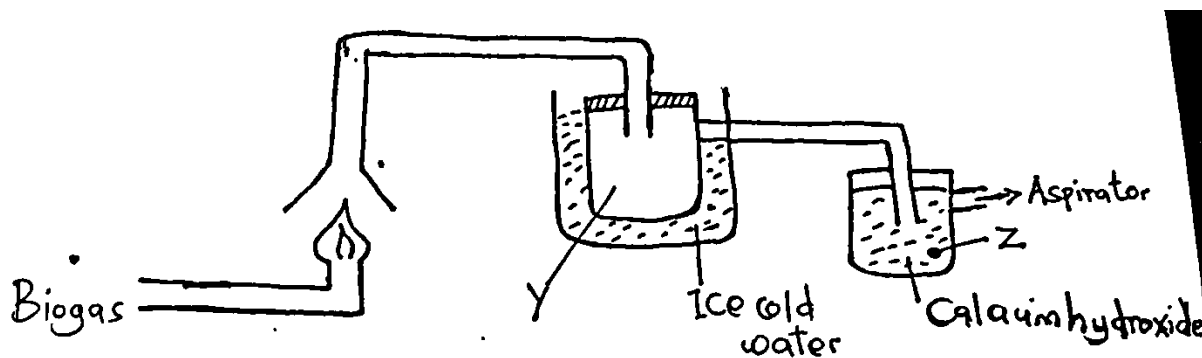
INSTRUCTIONS TO CANDIDATES

1. Write your name, school and index number in the spaces provided.
2. Answer **ALL** questions in the spaces provided.

FOR EXAMINERS' USE ONLY

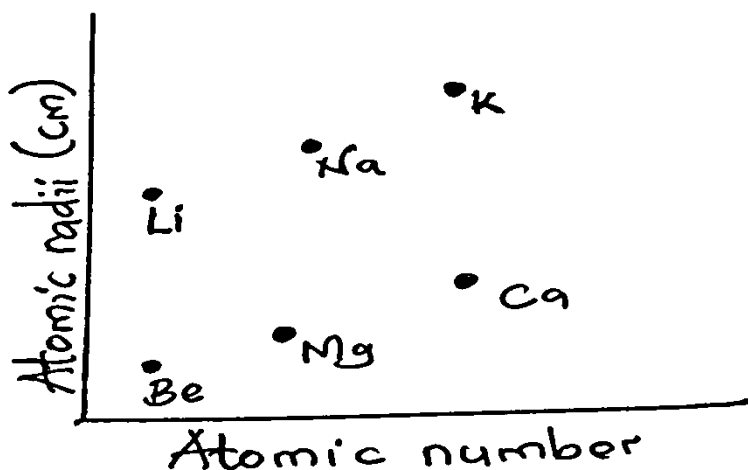
| QUESTION | MAXIMUM SCORE | CANDIDATE'S SCORE |
|----------|---------------|-------------------|
| 1 - 28 | 80 | |

- Describe an experimental procedure that can be used to extract oil from nut seeds. (2mks)
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- A luminous flame produces more light than a non-luminous flame. Explain. (1mk)
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- Ethanol and dimethyl ether have both molecular formulae C_2H_6O . Explain why ethanol boils at $78.2^\circ C$ and dimethyl ether has a boiling point of $-24^\circ C$. (2mks)
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- In an experiment, ammonium chloride was heated in a boiling tube with a moist red and blue litmus paper at the mouth of tube. State and explain the observation made. (3mks)
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- The set up below was used to investigate the products of burning biogas (methane). Study it and answer the questions that follow:



- State one chemical test for the product formed in tube Y. (1mk)
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- State and explain the observation which would be made in Z. (2mks)
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6. The plots below were obtained when the atomic radii of some elements in group I and II were plotted against atomic number.



- a) Explain the trends shown by Li, Na and K. (1mk)

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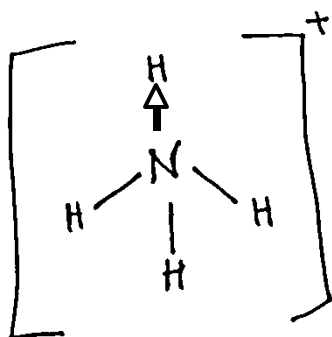
- b) Explain why the atomic radius of elements Be, Mg and Ca are lower than those of Li, Na and K. (2mks)

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7. (a) Ammonium ion has the following structure



Label on the structure:

- (i) Covalent bond

(1mk)

- (ii) Dative bond

(1mk)

- (b) Why does an ammonia molecule form an ammonium ion with a proton?

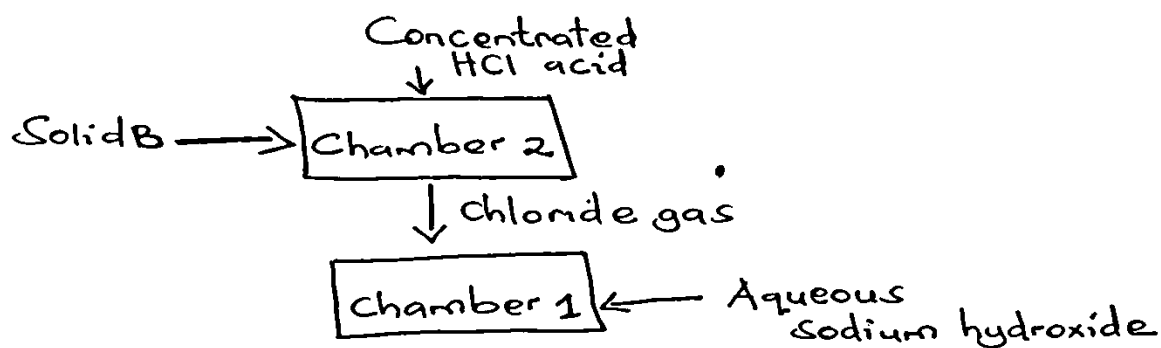
(1mk)

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8. Hydrogen sulphide is highly toxic and flammable gas and is usually prepared in the flame chamber.
- (a) Name any two reagents that can be used to prepare the gas in the laboratory. (1mk)
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- (b) Other than vulcanization of rubber. Identify any other use of sulphur. (1mk)
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9. Describe two chemical tests that can be used to distinguish ethanol from ethanoic acid. (3mks)
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10. (a) The electronic arrangement of the ion of element Q is 2,8,8. If the formula of the ion is Q^{3-} . State the group and period to which Q belongs.
- Group (1mk)
- Period (1mk)
11. Draw and name three isomers of pentene. (3mks)

12. Study the flow chat below and answer the questions that follow.



- (a) Identify solid B. (1mk)
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(b) Name the type of reaction that takes place in chamber 2. (1mk)

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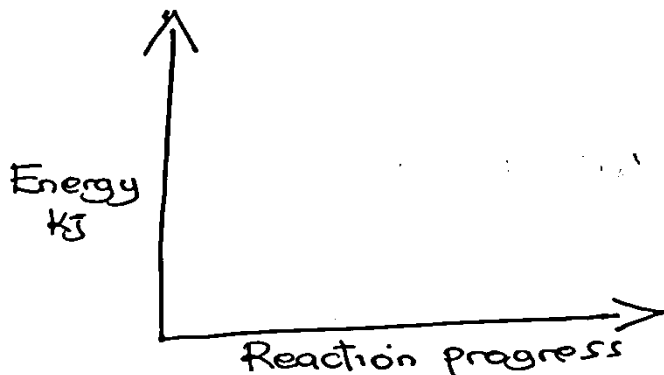
(c) Write an equation for the reaction that takes place in chamber 1. (1mk)

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13. The molar enthalpy of solution for potassium hydroxide is -42kJ/mole .

a) On the axes provided, draw a labelled energy level diagram for the dissolution process of potassium hydroxide. (2mks)



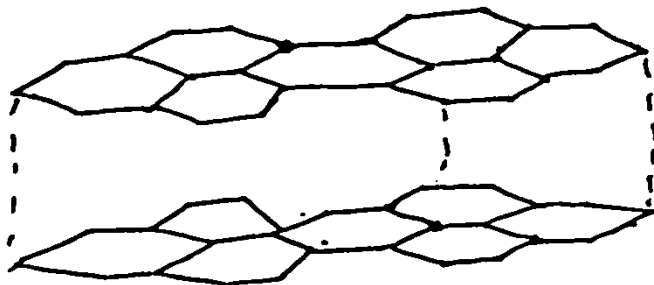
b) Calculate the enthalpy change when 5.6g of potassium hydroxide is completely dissolved in water ($K=39$, $O=16$, $H=1$) (2mks)

14. a) What is meant by allotropy. (1mk)

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b) The diagram below shows the structure of one of the allotropes of carbon.



(i) Identify the allotrope. (1mk)

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(ii) State two properties of the above allotrope and explain how it is related to its structure.(2mks)

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15. Why is dilute nitric acid not used to prepare hydrogen gas. (1mk)

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16. Starting with copper (II) oxide, describe how you can prepare copper (II) sulphate crystals.(3mks)

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17. (a) State Boyles' Law. (1mk)

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(b) A fixed mass of a gas occupies 200cm^3 at temperature of 23°C and pressure 740mmHg . Calculate the volume of the gas at -25°C and 780mmHg pressure. (2mks)

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18. When a hydrated sample of calcium sulphate $\text{CaSO}_4 \cdot n\text{H}_2\text{O}$ was heated until all the water was lost, the following data was recorded.

Mass of crucible = 30.296g

Mass of crucible + hydrated salt = 33.111g

Mass of crucible + anhydrous salt = 32.781g

Determine the empirical formula of the hydrate salt (Relative formula mass of $\text{CaSO}_4 = 136$, $\text{H}_2\text{O} = 18$) (3mks)

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19. When excess lead (II) nitrate solution was added to a solution of sodium chloride, the precipitate was found to weigh 5.56g, determine the amount of sodium chloride in the solution. (3mks)
(Na=23, Pb=207, Cl=35.5, N=14, O=16)

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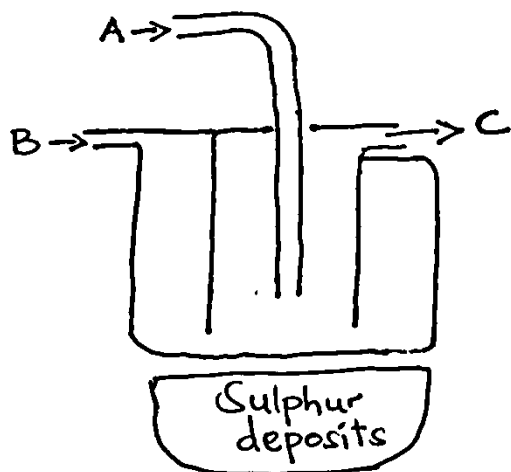
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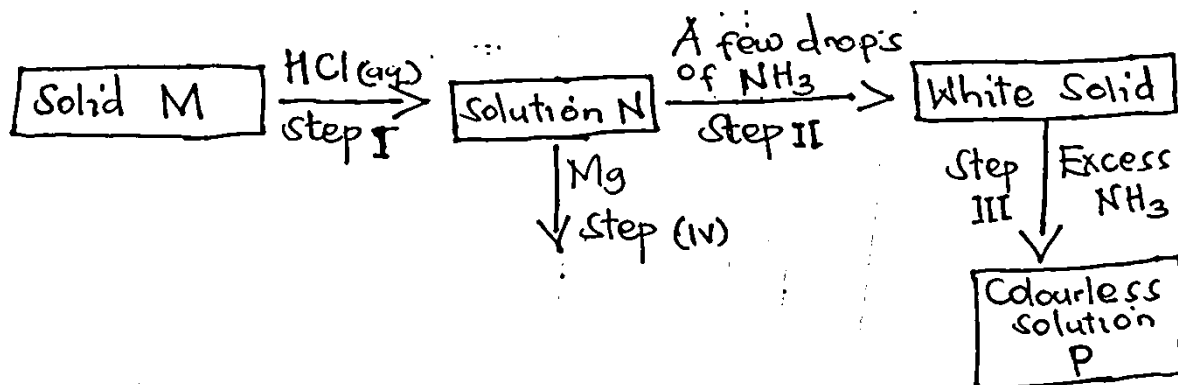
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20. The diagram below shows how sulphur is extracted from sulphur deposits.



- (a) Name the process represented above. (1mk)
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- (b) Identify A. (1mk)
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- (c) State one physical property of sulphur that makes it possible to be extracted by this method. (1mk)
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- (d) State one physical property of sulphur that makes it possible to be extracted by this method. (1mk)
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21. The scheme below shows some reaction sequence starting with solid M. Study it and answer the questions.



- (a) Write the formula of the complex ion in solution P. (1mk)
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- (b) Write an equation for the reaction in step IV. (1mk)
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- (c) Write an equation for the reaction in step I. (1mk)
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22. Draw a well labelled diagram used to prepare dry samples of hydrogen gas in the laboratory. (3mks)

23. (a) What are Isotopes. (1mk)
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- (b) Element Q (not the actual symbol of the element) has two isotopes with mass numbers 8 and 9. If the relative atomic mass of Q is 8.94, determine the percentage abundance of each isotopes. (3mks)
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24. Aluminium is extracted from aluminium oxide by electrolysis.

(a) Other than the cost of electricity, give another reason why this method is expensive. (1mk)

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(b) Calculate the mass of aluminium obtained when a current of 20A is used for 5 hours (1 faraday=96500C, Al=27) (3mks)

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25. (a) Name two ores of iron. (2mk)

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(b) Give the name of the suitable method used in extracting iron from the ore. (1mk)

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(c) Name one impurity present in pig iron and state one effect of the impurity in the physical property of iron. (2mks)

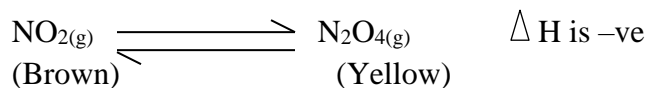
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26. The concentration of a solution of aluminium sulphate is 0.02M. How many sulphate ions are contained in 150cm³ of the solution. (3mks)

(Avogadro's constant 6.0 x 10²³)

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27. At room temperature, nitrogen (iv) oxide exists as an equilibrium mixture with dinitrogen tetra oxide.



State the observation made when the mixture is heated. Give a reason. (2mks)

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28. Define solubility. (1mk)

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THE END