

Name..... Index number

Class..... Adm no.....Candidate's signature

School

233/1

CHEMISTRY

Paper 1

THEORY

AUG./ SEPT. 2022

2 Hours**SUKELLEMO JOINT MOCK EXAM**

Kenya Certificate of Secondary Education

CHEMISTRY

Paper 1

THEORY**Instruction to Candidates**

- Write your name, index number class and admission number in the spaces provided
- Sign and write the date of examination in the spaces provided.
- Answer **all** the questions in the spaces provided.
- Mathematical tables and silent electronic calculators may be used.
- All working **must** be clearly shown where necessary.
- **This paper consists of 12 printed pages**
- **Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.**
- **Candidates should answer the questions in English.**

For Examiner's Use Only

Questions	Maximum Score	Candidates Score
1-31	80	

1. Element A has three isotopes with mass numbers **30, 32** and **35**. Given that the RAM of element A is **30.5** and the percentage abundance of ³⁵A is **5%**, calculate the percentage abundance of the other two isotopes. (3 marks)

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2. Describe how you would prepare crystals of sodium chloride starting with 100cm³ of 1M sodium hydroxide. (3 marks)

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3. Concentrated sulphuric (VI) acid was left exposed in air for a few days. It was found that the level of the acid had risen.

a) Why did the level of the acid in the container rise? (1 Mark)

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b) What property of the acid is shown by the rise in the level of the acid(1mk)

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c) How is this property useful in the laboratory? (1 Mark)

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4. Calculate the volume of oxygen produced when 10g of silver nitrate was completely decomposed by heating at s.t.p. (Ag = 108, N = 14, O = 16, MGV at s.t.p. = 22.4dm³)

(3 Marks)

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A solution of hydrogen chloride gas in water conducts an electrical current, while that of hydrogenchloride in methylbenzene does not conduct. Explain. (1Mark)

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6. a) The electron arrangement of ions X^{3+} and Y^{2-} are 2.8, and 2.8.8 respectively. In which groups do X and Y belong? (1 Mark)

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b) State the formula of the compound that would be formed between X and Y (1 Mark)

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7. The elements nitrogen, phosphorus and potassium are essential for plant growth. Phosphorus in the fertilizer may be in the form of ammonium phosphate. Calculate the mass of nitrogen present if a 25kg bag contained pure ammonium phosphate. ($(NH_4)_2HPO_4$ (N=14.0, H=1.0, P=31.0, O=16.0) (3 Marks)

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8. A mixture consists of sulphur powder and iron filings.

(i) Describe how to obtain sulphur from the mixture (3 marks)

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9. a) Draw structural formulae of three isomers with molecular formula C_4H_8 . (3 marks)

10. a) What is hardness of water?

(1 mark)

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b)

Sample of water	Volume of soap used before boiling (cm ³)	Volume of soap used after boiling (cm ³)
A	30	10
B	30	30

i. (Name the type of water hardness in sample A. Explain (1mark)

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ii. State **one** large scale uses of hard water. (1 mark)

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11. Use the bond energy value given below for questions that follows

Bond	Bond energy (KJmol ⁻¹)
H – H	432
C = C	610
C – C	346
C – H	413

Determine the enthalpy change for the conversion of butene to butane by hydrogen. (3mks)

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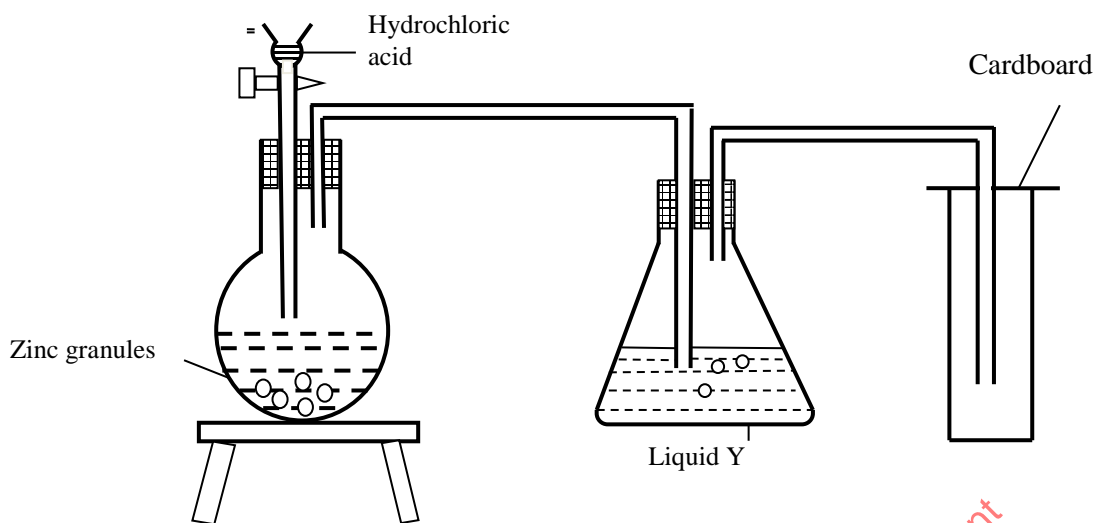
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12. The set up below was used to prepare dry hydrogen gas. Study it and answer the questions that follow.



(i) Identify the mistake in the set-up above. (1 mark)

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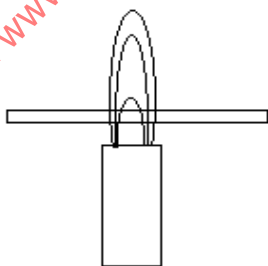
(ii) What would be liquid Y? (1 mark)

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(iii) Give two properties that hydrogen gas share with carbon II oxide (1 mark)

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13. Study the diagram below then use it to answer the questions that follow.

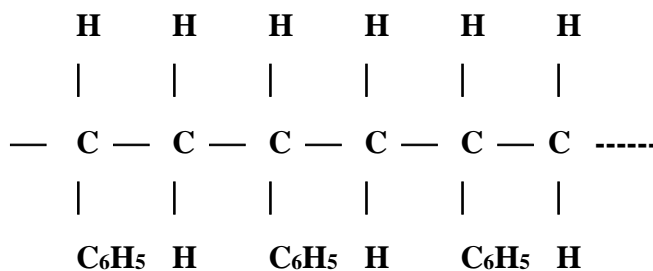


a) Draw the wooden splint at the end of experiment, if it was slipped in at that position then removed. (1 mark)

b) Explain the appearance of the wooden splint in a) above. (2 marks)

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14. Below is the structure of polymer



i. Draw the monomeric unit of polymer (1mk)

ii. Name the monomeric unit of polymer (1mk)

iii. State one use of the polymer (1 mk)

15. Name the process which takes place when

(i) Iodine changes directly from solid to gas (1mk)

(ii) $Fe^{2+}_{(aq)}$ changes to $Fe^{3+}_{(aq)}$ (1mk)

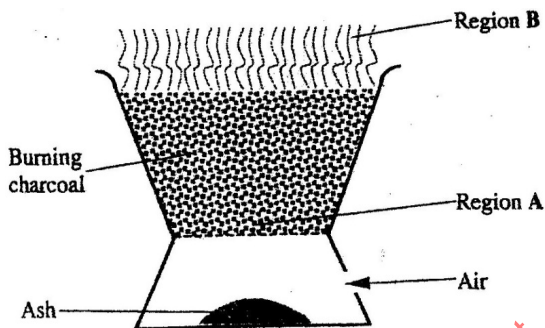
(iii) White sugar changes to black solid when mixed with excess concentrated sulphuric(VI) acid. (1mk)

16. a) State Grahams law (1 mk)

b) A sample of unknown compound gas X is shown by analysis to contain Sulphur and oxygen. The gas requires 28.3 seconds to diffuse through a small aperture into a vacuum. An identical number of oxygen molecules pass through the same aperture in 20 seconds. Determine the molecular mass of gas X. (O =16, S = 32) (2marks)

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17. The diagram below shows a “Jiko” when in use. Study it and answer the questions that follow.



(a).Identify the gas formed at region A. (1 mark)

(b).State and explain the observation made at region B. (2marks)

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18. The molecular formula mass of gas A is 28 and its empirical formula is **CH₂**.

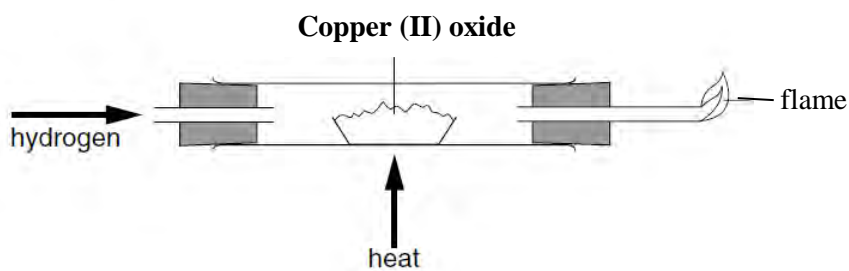
(a) Determine the molecular formula of gas A (**C = 12.0, H = 1.0**). (2mks)

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(b) Write the equation of the reaction between A and 1 mole of chlorine gas.

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19. Hydrogen gas was passed over heated copper (II) oxide in a combustion tube as shown below.



i) State and explain the observations made in the combustion tube. (2 marks)

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ii) Write equations for the reaction that took place;

I. In the combustion tube. (1 mark)

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20. a) Draw a pipette (1 mark)

b) Give two reasons why most laboratory apparatus are made of glass (1 mark)

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21. a) State Le'Chatelier's principle (1mk)

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b) When Calcium carbonate is heated the equilibrium shown below is established.



How would the position of the equilibrium be affected if the pressure is increased.

Explain (2mks)

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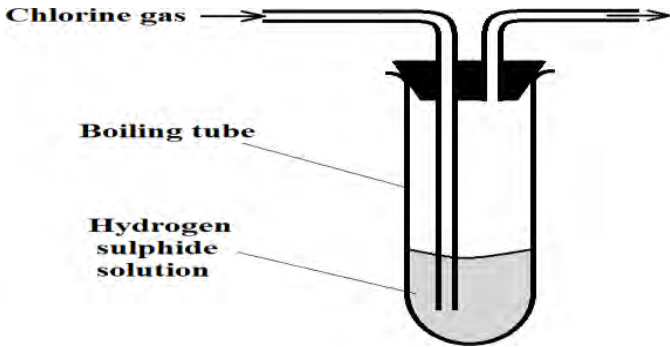
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22. Chlorine gas was bubbled into as solution of hydrogen sulphide as shown in the diagram below.



a. Explain the observation made in the boiling tube (2 Marks)

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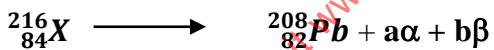
b) What precaution should be taken in this experiment? (1 Mark)

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23. A radioactive element X decays as shown below.



a) Give the atomic number of X. (1mk)

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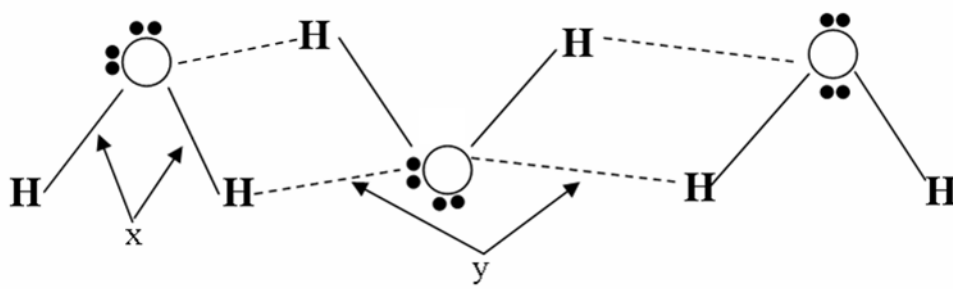
b) Determine the values of a and b in the equation. (2mks)

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24. The diagram below shows a structure of water molecules.



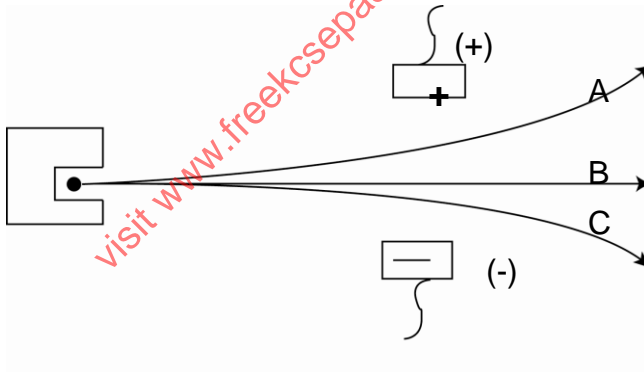
(a) Name the bonds (1mk)

X.....

Y.....

b) Using dots (•) and crosses (X) to represent electrons, draw diagrams to represent the bonding in: NH_4Cl (2mk)

25. A radioactive material emitted radiation as shown below



i) Identify A and B (1mk)

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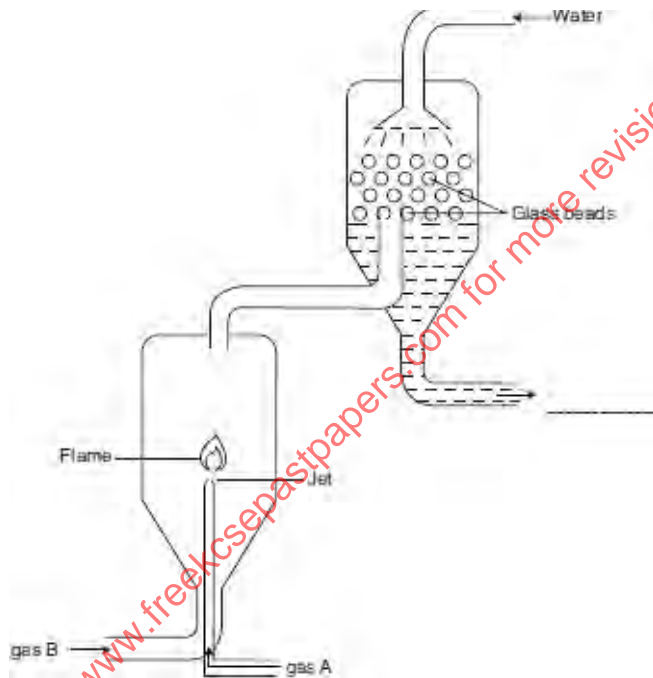
ii) Which radiation has the lowest ionizing power? (1mk)

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iii) State one use of radioisotope in agriculture (1mk)

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26. The following diagram represents a section of the plant for the large scale manufacture of hydrochloric acid.



(a) Name gases A and B. (1 mark)

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(b) State the role of the glass beads in the plant(1 mark)

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(c) Why is gas A introduced into the reaction chamber through a jet?(1 mark)

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27. a) What does the abbreviation CFCs stand for?(1 mark)

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(b) State two factors which make chlorofluorocarbons serious gaseous pollutants. (2 marks)

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