Candidate's Name: .... Index No. ....

School Name: .... Signature: ....

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES

Section A consists of 10 structured questions. Answer all questions in this section.

Answers to these questions MUST be written in the spaces provided.

SECTION B - Consists of 4 semi-structured questions. Attempt any two questions from this section. Answers to the question must be written in the answer booklets provided. (1mole of gas occupies 24litres at room temperature)
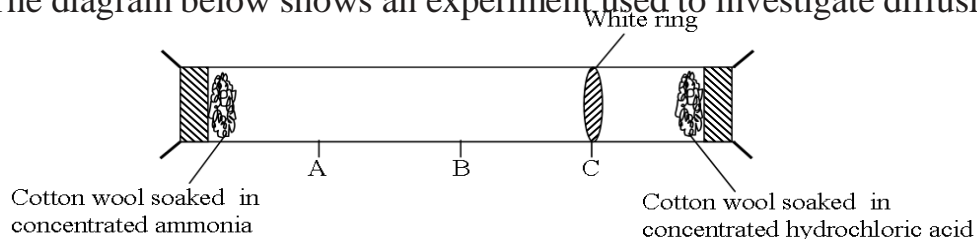
(1 mole of gas occupies 22.4l at s.t.p)

SECTION A
Answer **ALL** questions in this section.

1. (a) The diagram below shows an experiment used to investigate diffusion process.

(i)
....Write an equation for the reaction leading to the formation of white ri...........
....

(ii) Why is the white ring formed at position C but not at A or B.

....
....

(b) A sample of the white ring was dissolved in water and to the resultant solution, Lead (II) nitrate solution was added.

(i) State what was observed.

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....
....

(ii) Write an equation for the reaction that took place between Lead (II) nitrate and the solution.

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....

2. (a) What is meant by the following:

(i) a conductor,

....
....

(ii) an electrolyte.

....
....

(b) Name the particles which conduct electricity in;

(i) Liquids

....

(ii) Solids

....

(c) Dilute copper (II) chloride solution was electrolysed using graphite electrodes; Identify the substances formed at the;

(i) Anode

....

(ii) Cathode

....

(d) Write an equation for the reaction at the cathode.

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(e) State any one application of electrolysis process.

....

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3. (a) When an hydrous Iron (II) sulphate was heated strongly, a gas X which turned acidified Potassium dichromate solution green was formed.

    (i)   Identify gas X.

....

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    (ii) Write equation for the reaction that took place.

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(b) The residue formed in (a) was dissolved in dilute hydrochloric acid.

    (i)   State what was observed.

....

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    (ii) Write an equation for the reaction that took place.

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(c) The resultant solution in (b) was added ammonia solution dropwise until in excess.

    (i)   State what was observed.

....

....

    (ii) Write equation for the reaction that took place.

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....

4. A hydro carbon Q with vapour density 14, contains 4.8g of carbon and 0.8g of hydrogen.

(a) What is a hydrocarbon?

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....

(b) Determine the;

    (i)   empirical formula of Q.

....

....

....

    . molecular formula of Q.

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....

(c) (i) Name the reagent used to test for substance Q.

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(ii) State what would be observed.

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(iii) Write equation for the reaction that took place.

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5. (a) In each case, state what would be observed if aqueous Lead (II) nitrate added to;
   (i) dilute sulphuric acid

....

....

(ii) sodium iodide solution

....

....

(iii) Sodium chloride solution

....

....

(b) Write ionic equation for the reaction in
   (i) (a)(i) above

....

....

....

(ii) (a)(ii) above

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....

....

6. When aqueous ammonia was added dropwise to a solution containing Zinc Sulphate, until in excess.
   (a) (i) State what would be observed.

....

....

(ii) Write equation(s) for the reactions that took place.

....

....

(b) (i) Name a reagent that can be used to identify the sulphate ions in solution.

....

(ii) State what would be observed when the reagent you have named in (b)(i) is used.

....

....

(iii) Write ionic equation for the reaction that took place.

7. (a) (i) Name one process by which ethanol can be produced from sugar.

....

(ii) Write equation for the production of ethanol by the process you have named in (a)(i).

....

....

(b) Ethanol can be converted to ethene by dehydration.

(i) State the conditions under which the reaction takes place.

....

....

(ii) Write equation for the reaction leading to the formation of ethene from ethanol.

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....

(c) Write equation for the reaction between ethene and bromine.

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8. (a) Define the term enthalpy of neutralization.

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....

(b) $25cm^3$ of 2.0M sodium hydroxide was added to $25cm^3$ of 2.0M hydrochloric acid in a plastic beaker and the temperature of the resultant solution rose from 24.9^0C to 37.4^0C.

(i) State whether the reaction is endothermic or exothermic and give a reason for your answer.

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....

....

(ii) Calculate the molar heat of neutralisation of sodium hydroxide by hydrochloric acid (density of solution is $1g/cm^3$, s,h,c of solution is $4.2kJg^{-1}$ ^0C)

9. A hydrated salt T, consists of 20.2% Iron, 11.5% sulphur, 23% oxygen and 45.3% water crystallization.

(a) Calculate the empirical formula of T. (Fe = 56, S = 32, O = 16, H = 1)

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(b) Determine the molecular formula of T. (RFM of T = 278)

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(c) Write equation for the reaction between a solution of T and chlorine.

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10. (a) Complete the following equations. (Your equations should be balanced)

(i) $NaNO_3 \xrightarrow{\text{heat}}$ ....

(ii) $Pb(NO_3)_2 \xrightarrow{\text{heat}}$ ....

(iii) $AgNO_3 \xrightarrow{\text{heat}}$ ....
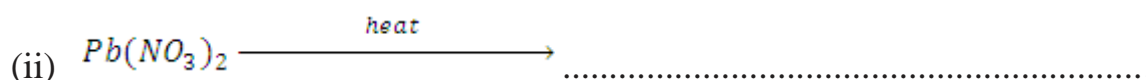
(b) Concentrated nitric acid was added copper metal and the mixture heated.

(i) State what was observed.

....

....

(ii) Write an equation for the reaction.

....

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11. (a) (i) With the aid of a labelled diagram, explain how a pure dry sample of Sulphur dioxide can be prepared in the laboratory using sodium sulphate and sulphuric acid.
    (ii) Write an equation for the reaction leading to the formation of Sulphur dioxide.
    (b) Name one reagent that would be used to confirm the presence of Sulphur dioxide, and state what would be observed if the reagent you have named was treated with Sulphur dioxide.
    (c) Write an equation to show the reaction between Sulphur dioxide.
    (i) Water
    (ii) Oxygen in the presence of hot platinum.
    (d) The product of the reaction in (c)(ii) was mixed with water and barium nitrate solution added to the resultant mixture.
    (i) State what was observed
    (ii) Explain what took place.

12. (a) Briefly describe how a dry sample of hydrogen chloride can be prepared in the laboratory. (Diagram not required)
    (b) Hydrogen chloride was bubbled through a solution of Lead (II) nitrate.
    (i) State what was observed and explain your answer.
    (ii) Write an equation for the reaction that took place.
    (c) Concentrated hydrochloric acid is commonly used for removing oxides from metal surfaces (pickling). Explain why concentrated nitric acid is not used for the same purpose.
    (d) A sample of hydrogen chloride gas was dissolved in water to make $250cm^3$ of solution, $25.0cm^3$ of this solution required, $46cm^3$ of sodium hydroxide for complete neutralisation. Determine the mass of hydrogen chloride that was dissolved to make $250cm^3$ of solution. (H = 1, cl = 35.5)

13. (a) Describe how a dry sample of hydrogen can be prepared in the laboratory. (diagram is not required)
    (b) Hydrogen burns in air to form liquid L.
    (i) Identify L.

    (ii)   Name a reagent that can be used to test for L and State what would be observed if L was treated with the reagent you have named.

(c)   Write equation to show the reaction of hydrogen with chlorine.

(d)   State the condition(s) under which hydrogen can react with copper (II) oxide and write equation for the reaction.

(e)   Hydrogen reacts with Iron (III) oxide according to the following equation.

$$Fe_3O_4(s) + 4H_2(g) \longrightarrow 3Fe(s) + 4H_2O(l)$$

Calculate the volume of hydrogen measured at room temperature that would be required to produce 3.36g of Iron.

[Fe = 56; 1 mole of gas occupies 24dm^3 at room temp]

(f)   State one industrial use of hydrogen.

14. (a) (i) Without the use of a diagram(s) and equations briefly outline an experiment that can be carried out to show that the rate of reaction between dilute Hydrochloric acid and calcium carbonate depends on the surface area of calcium carbonate.

    (ii) Other than surface area, state 2 conditions that can affect the rate of reaction in (i) above.

(b)   A reaction between magnesium ribbon and dilute sulphuric acid was carried out to study the rate of reaction. The flask in which magnesium and the acid reacted was weighed at time interval of 10 minutes for a total time duration of 50 minutes. the table of results got is as follows.

Time (minutes)	0	10	20	30	40	50
Mass of flask + content (g)	95	64.5	39	24.4	15	11.9

    (i)   Plot a graph of mass of flask + content against time.

    (ii)   Determine the rates of the reaction after 15 minutes and 27.5 minutes respectively and give a comment about your results.

END