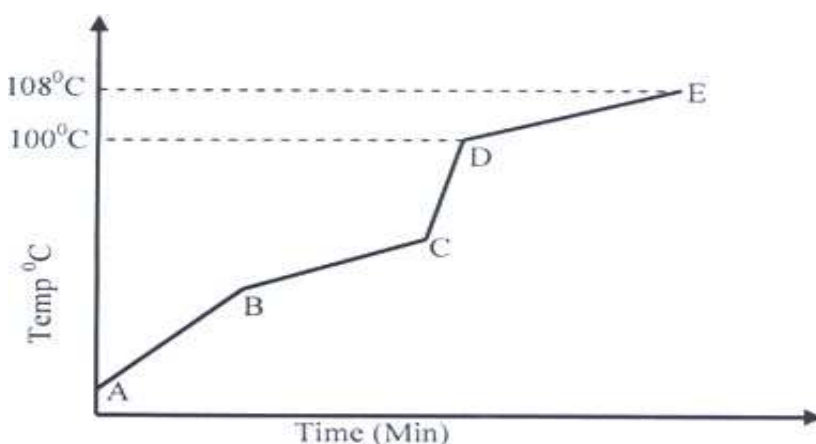


FORM FOUR CLUSTER KCSE MODEL10

CHEMISTRY PAPER 1 QUESTIONS

- Describe the non – luminous flame of a Bunsen burner and give a reason why it's preferred when heating substances in the laboratory.
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- Study the diagram shown below to answer the questions that follow. The curve shows heating curve of water in the laboratory.



i) At what temperature does the water boil? (1mark)

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ii) Is the curve for a pure water or impure water? Give a reason for your answer.(1mark)

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iii) Give the effect of impurities on the boiling point of water. (1mark)

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- Calcium carbonate reacts with dilute sulphuric VI acid to form a gas and a salt. i) Write an equation for the above reaction (1mark)

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ii) Why would the above reactants not be suitable for preparation of the above gas in the laboratory? (2marks)

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- Excess magnesium ribbon sample was heated in equal volumes of:-

i) Pure oxygen gas

ii) Air

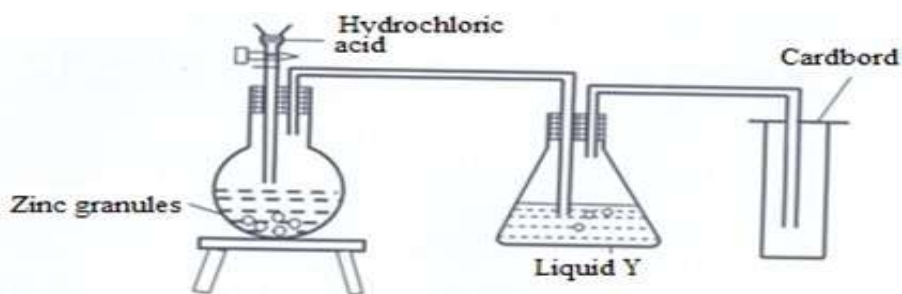
a) Why was the mass of the resulting product in (ii) more than in (i)? (1mark)

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b) Write the equations for the reactions in part (ii) (2marks)

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



i) Is the method of collecting the gas correct? Give a reason. (1mark)

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

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iii) Give two physical properties of hydrogen gas. (1mark)

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6. Study the information tabulated below to answer the questions that follow

Melting point	Element	Atomic number
97.8	P	11
1441	Q	14
-42	X	17
64	Y	19

a) Write the electron arrangement of the

(i) Atom of Y (1/2 mark)

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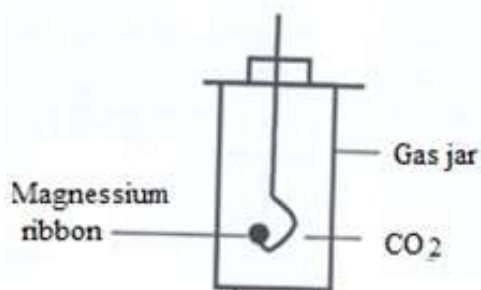
(ii) Ion of X (½ mark)

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b) Compare the ionic radius of Y with its atomic radius (2marks)

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7. A student lowered burning magnesium in a gas jar of carbon (IV) oxide as shown in the diagram



a) State and explain the observation made in the gas jar. (2marks)

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b) Write the equation of the reaction that takes places in the gas jar. (1mark)

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8. a) Using a dot (.) and cross (x) to represent the outer most electrons, draw diagrams to show the bonding in magnesium sulphide. (1 ½ marks)

b) State the structure of the above compound. (½ mark)

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c) Give two properties of substances with the above structure. (½ mks)

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9. Given sodium carbonate solid, lead (II) nitrate solid and water, explain how you can obtain a solid sample of Lead (II) carbonate.

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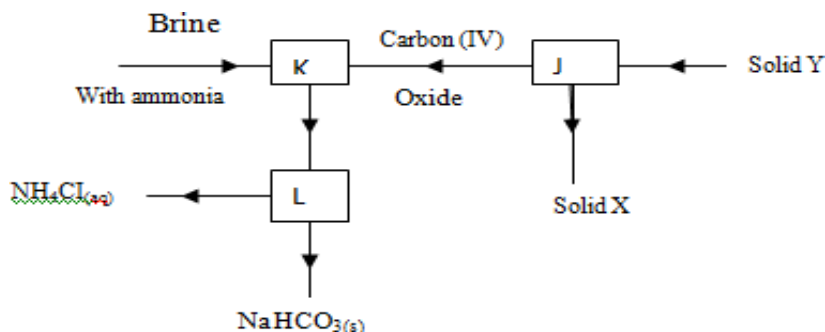
10. a) State and explain the observations made when chlorine gas is bubbled through a solution of potassium bromide. (2marks)

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b) Write the ionic equation for the reaction that took place in the above reaction. (1mark)

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11. The diagram below shows part of Solvay process.



a) Name solid X (1mark)

.....

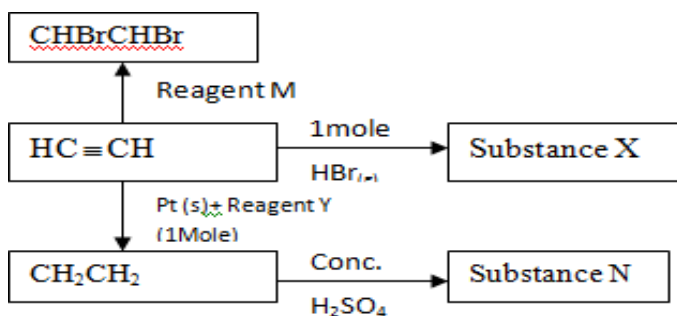
b) State the process taking place in chamber L (1mark)

.....

c) State two uses of sodium carbonate (1mark)

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12. 100cm³ of methane gas diffused through a porous partition in 40 seconds. How long would it take 90cm³ of ozone gas to diffuse through the same partition. C=12, H=1, O =16
13. 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) Molar gas volume at s.t.p= 22.4dm³
14. The scheme below shows some reactions starting with ethene. Study it and answer the questions that follow



a) Name substance

(i) X... (1mark)

(ii) N... (1mark)

b) Name reagent M... (1 mark)

c) Ethene undergoes polymerization to form a polymer. Give an equation for the reaction and name the product. (1 ½ marks)

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15. Hydrogen sulphide gas was bubbled through a solution of zinc nitrate for some time. i) State the observation made. (1mark)

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ii) Where should the experiment be carried out and why? (1mark)

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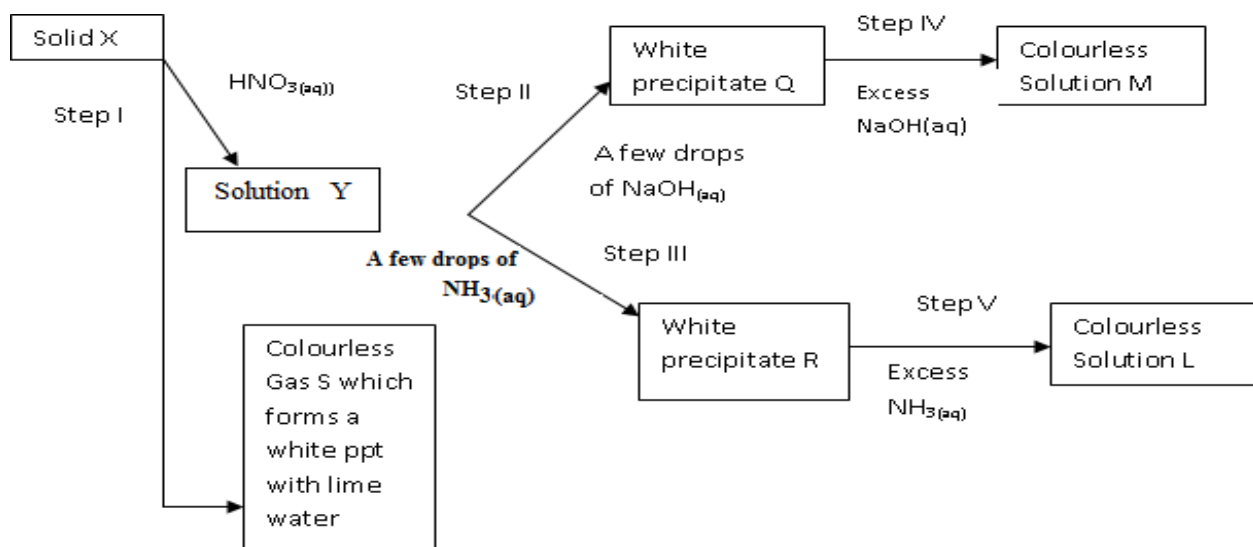
iii) Write the equation of the reaction that occurs (1mark)

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16. A solution of hydrogen chloride gas in water conducts an electric current, while that of hydrogen chloride in methylbenzene does not conduct . Explain.

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17. The scheme below represents reactions starting with X solid



i) Identify solid X (1mark)

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ii) Write an ionic equation to show formation of white precipitate. (1mark)

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iii) Why would gas S not form a white precipitate with solution of sodium hydroxide (1mark)

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18. The following results were obtained trying to determine the solubility of copper (II) sulphate in water at 40°C. Mass of empty dish 16.8g, mass of dish + saturated solution at 40°C = 26.9g, mass of dish + solid CuSO₄ after evaporation to dryness = 17.8g. Calculate the mass of saturated solution containing 70g of water at 40°C.

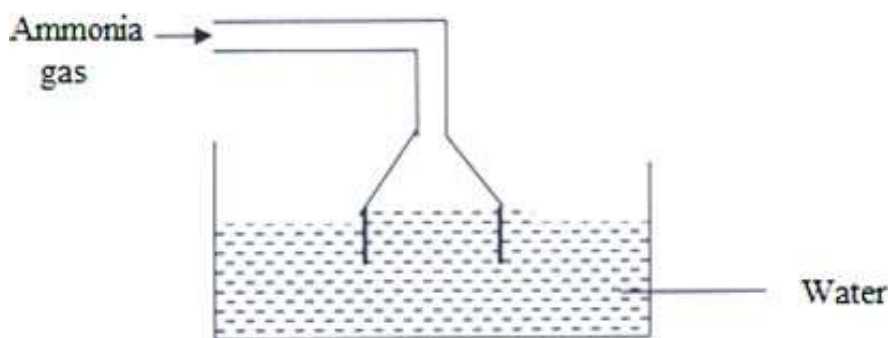
19. When 16g of ammonium nitrate was dissolved in 100cm³ of water at 25°C, the temperature of the solution drops to 19°C. a) Calculate the molar enthalpy of solution of ammonium nitrate (3mk)

(N = 14, O = 16, H = 1 Specify heat capacity of water = 4.2kJkg⁻¹k⁻¹)

b) Is the enthalpy change endothermic or exothermic? Give a reason (1mark)

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20. Ammonia gas was passed into water as shown below.



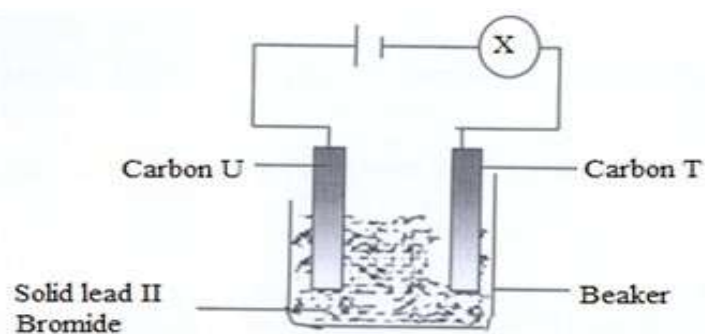
a) What is the use of the inverted funnel. (1mark)

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b) Explain why the pH of the solution is above 7. (1mark)

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21. The set-up below was used to carry out electrolysis of lead bromide. Study it and answer the questions that follow.



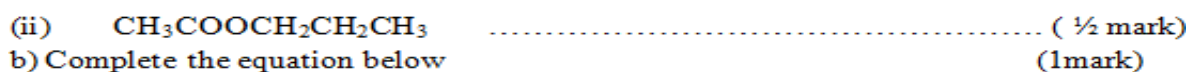
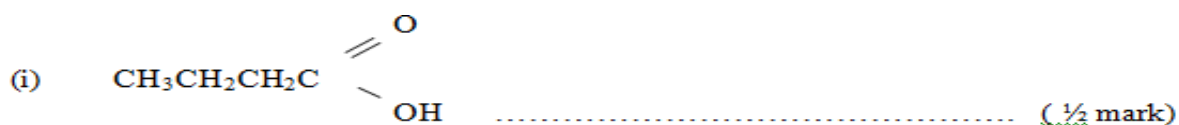
a) Identify electrodes U and T. (1mark)

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b) Identify with reason one missing condition in the above set up. (2marks)

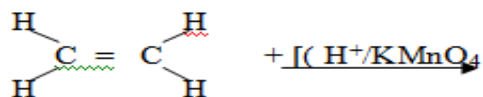
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22. a) Name the following compounds



b) Complete the equation below

(1mark)



23. 25cm³ of 0.12M Potassium Hydroxide solution required 30cm³ of a solution of a dibasic acid (H₂X) for complete neutralization. The acid contained 3.15g per 500cm³ solution. Calculate

(i) The molarity of the acid solution. (2marks)

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(ii) The relative molecular mass of the acid. (2marks)

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24. A mixture of ammonium chloride and sodium nitrate was heated together in a round bottomed flask to produce gas X.

i) Identify gas X (½ marks)

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ii) Write equations to show how gas X is formed. (2marks)

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iii) Why would gas X not be collected over cold water? (½ marks)

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25. Solid P when heated gives a black powder Q and a colourless gas that forms a white precipitate in lime water. When dilute Sulphuric (VI) acid is added to the powder Q, a pale blue solution is formed.

a) Give the chemical formula of i) Solid P (1mark)

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ii) Solid Q (1mark)

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iii) Write an equation for the reaction that takes place (1mark)

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26. In an experiment, sulphur (IV) oxide gas was bubbled into water followed by chlorine gas. The resulting colourless solution gave a white precipitate when mixed with barium chloride solution. Explain these observations.

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27. 5.0g of calcium carbonate were allowed to react with 25cm³ of 0.1M hydrochloric acid until there was no further reaction. Calculate the mass of calcium carbonate that remained unreacted. (Ca =40, C= 12,O=16) (3marks)

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