

Name Index No: U .I .

School: Signature:

545/2

CHEMISTRY PAPER 2

18 July 2014

2 hours

ENTEBBE JOINT EXAMINATION BUREAU Uganda

Certificate of Education CHEMISTRY

Paper 2

2 Hours

INSTRUCTIONS TO THE CANDIDATES

Section A consists of 10 - structured questions. Attempt all questions in this Section

Answers to Section A must be filled in the spaces provided.

Section B consists of 4 semi - structured questions. Attempt any two questions from this Section. Answers to this Section must be written in the answer pages provided overleaf

In both Sections, all your working must be clearly shown.

1 mole of any gas occupies $22,400 \text{ cm}^3$ at s.t.p.

1 mole of any gas occupies $24,000 \text{ cm}^3$ of room temperature.

[Pb=207, K=39, O= 16, Cl=35.5, C= 12, H= 1]

FOR EXAMINERS' USE ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL

C-1 2014

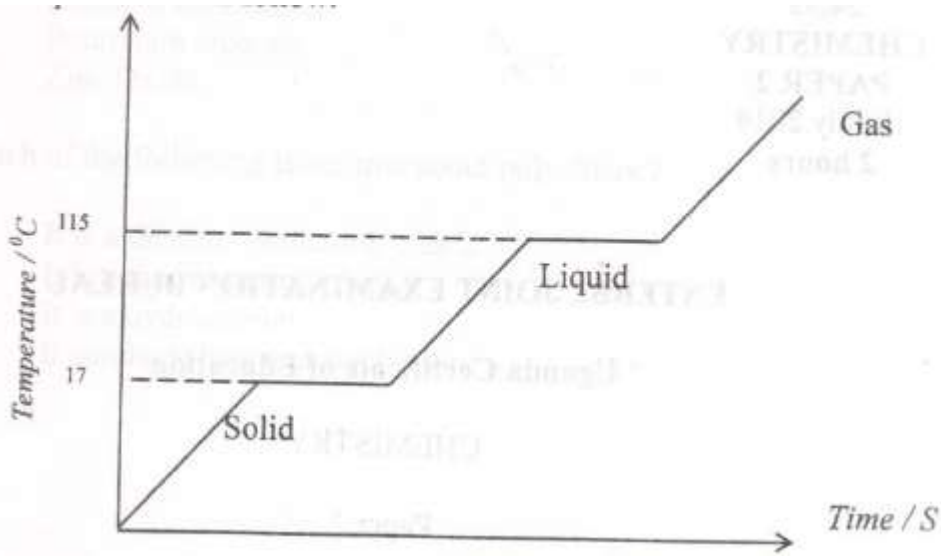
e- JEB Mocks: Chemistry

Turn Over

SECTION A:

(50 marks)

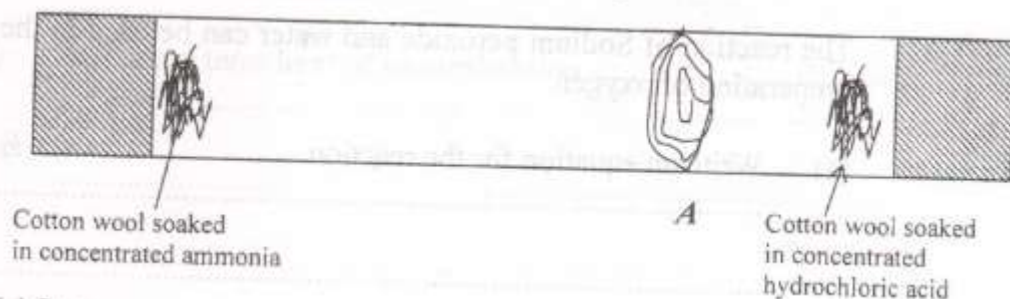
1. The graph below is a heating curve for a pure substance. Use it to answer the questions that follow.



- (a) What is the:
- (i) melting point of the substance? (1/2 mark)
- (ii) boiling point of the substance? (1/2 mark)
- (b) Give a reason to suggest that the substance is not water. (01 mark)
- (c) In the space below, sketch a heating curve for pure water. (03 marks)

2. One piece of cotton wool was soaked in concentrated Ammonia and the other in

concentrated Hydrochloric acid. The two pieces of cotton wool were placed in a glass tube as shown in the figure below.



(i) what was observed at point A. (1/2 mark)

(ii) what the experiment shows. (1/2 mark)

(b) Explain why the product was formed at A not in the middle of the tube. (01 mark)

(c) Write the equation for the reaction. (1/2 marks)

(d) If concentrated hydrochloric acid and concentrated Ammonia were warmed before the experiment:

(i) State what would be observed. 1/2 mark)

Turn Over

(ii) Explain the observation in d (ii) above. (01 mark)

3. The reaction of Sodium peroxide and water can be used in the laboratory preparation of oxygen.

(a) Write an equation for the reaction. (1 1/2 marks)

(b) Dry oxygen gas was passed over 160g of heated Zinc in combustion tube.

(i) State what was observed. (01 mark)

(ii) Write an equation for the reaction that took place, (1 ½ marks)

(iii) Calculate the volume of oxygen gas that reacted completely with Zinc at room temperature. (02 marks)

4. Water was added to paraffin in a separating funnel.

(a) (i) Draw a diagram to show what would be observed. (02 marks)

(iii) Explain your diagram in (i) above. (02 marks)
.....

5. (a) Define the term **heat of neutralisation**. (01 mark)

(b) 20cm³ of 2M hydrochloric acid at 15.0⁰C was added to 20cm³ of 2M sodium hydroxide at 15.4⁰C. The final temperature was 28.2⁰C. Calculate the heat of neutralisation of Sodium hydroxide by Hydrochloric acid. (04 marks)

(a) 3.0g of a mixture of Lead (II) carbonate and Lead (II) chloride was dissolved in excess dilute nitric acid.

(i) Name the gas given off. (1/2 mark)

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

(2 marks)

Turn Over

(b) If 240cm^3 of the gas measured at room temperature was evolved, calculate the percentage of Lead (II) carbonate in the mixture.

(3 1/2 marks)

7. Part of the periodic table is shown below.

A						
		D			E	
				F		
B	C					

(a) Write

(i) The atomic number for element C. (01 mark)

(ii) The formula of the compound formed when **C** reacts with **F**. (01 mark)

(iii) An equation for the reaction between **C** and **F**. (1/2 mark)

(b) State:

(i) the type of bond formed when **D** combines with **F**. (1/2 mark)

(ii) which one of the elements **E** and **F** is more reactive.

(1/2 mark)

(iii) which one of the elements **A** and **B** is less reactive.

(1/2 mark)

8. A mixture of a known mass of magnesium and a certain volume of 2M hydrochloric acid was weighed at intervals.

(a) Sketch a graph to show how the mass of the mixture varies with time. (1 1/2 marks)

(b) (i) On the same axes in (a), draw a graph that would be observed when the same mass of magnesium and the same volume of 1M hydrochloric acid. (01 mark)

- (ii) Which factor that affects reaction rates is being investigated in this experiment?
(01 mark)

Turn Over

- (c) Write an ionic equation for the reaction that took place.

(1 ½ marks)

9. (a) Sulphuric acid is manufactured by the contact process.

- (i) Name the catalyst used. (01 mark)

- (ii) Write an equation for the reaction catalysed by the catalyst in *a (i)* above.
(1 ½ marks)

- (iii) State the other conditions necessary for the optimum yield.

(1/2 mark)

- (b) Sulphuric acid was used in the manufacture of a fertiliser by reacting the dilute acid with ammonia solution.

- (i) Name the fertiliser. (1/2 mark)

(ii) Calculate the percentage of nitrogen in the fertiliser.

(1 ½ marks)

(a) Hydrogen chloride gas was poured over heated fillings.

(b) (i) State what was observed. (01 mark)

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

(1 ½ marks)

(b) (i) To the product in *a (ii)* was added water and shaken. Dilute sodium hydroxide was then added drop wise until in excess. State what was observed. (01 mark)

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

SECTION B

- (a) Describe how you would prepare a sample of sulphur dioxide in the laboratory.
(Diagram not required) . (04 marks)
- (b) Describe how sulphur dioxide prepared in (a) above can be used to manufacture sulphuric acid. (07 marks)
- (c) 25.0cm^3 of 0.1M Sulphuric acid required 20.0cm^3 of Sodium hydroxide solution for complete reaction. Calculate the molar concentration of Sodium hydroxide. (04 marks)

Turn Over

12(a) When concentrated Hydrochloric acid was added onto Potassium manganate (VII) crystals, a greenish yellow gas was evolved.

- (i) Name the greenish yellow gas. (01 mark)
- (ii) State what would be observed when an aqueous solution of the greenish yellow gas is exposed to sunlight. (01 mark)
- (iii) Write equation(s) for the reaction(s) which takes place in a (ii) above. (03 marks)

(iv) State what would be observed if the greenish yellow gas bubbled through potassium iodide solution. Write an ionic equation for the reaction. (2 ½ marks)

(b) The greenish yellow gas was passed over heated iron fillings.

- (i) State what was observed. (01 mark)
- (ii) Write an equation for the reaction that took place. (1 ½ marks)

(c) The product in (b) above was dissolved in water and the resultant solution divided into two portions.

(i) To the first was added silver nitrate solution. State what was observed and write an ionic equation for the reaction. (2 ½ marks)

(ii) Sodium hydroxide was added to the second portion drop wise until in excess. State what was observed and write an equation for the reaction that took place. (2 ½ marks)

13. (a) (i) Write an equation for the reaction between dilute Nitric acid

and Calcium carbonate.

(1 Y, marks)

(ii) Show how temperature can affect the rate of reaction in *a (i)* above.

(01 mark)

(iii) Give a reason why a large surface area can speed up the rate of the reaction in *a (i)* above.

(02 marks)

(b) Magnesium can react with _____ acid to form hydrogen. (2 ½ marks)
State the conditions and write an _____ for the reaction.

(c) The table below shows the volumes of Hydrogen evolved when various lengths of Magnesium were reacted with fixed volumes of Hydrochloric acid.

Length of ribbon (cm)	1.0	2.0	3.0	5.0	6.0
Volume of hydrogen (cm ³ /min)	2.2	3.6	5.2	9.2	10.8

(i) Plot a graph of volume of hydrogen against the length of magnesium ribbon.

(05 marks)

(ii) Explain the shape of the graph. (02 marks)

(iii) Using the graph, determine the rate of the reaction if 4.0cm of magnesium ribbon was used. (01 mark)

14. Under suitable conditions, oils and fats can be used to make soap.

(a) (i) Define soap and give one example. (1 ½ marks)

(ii) Write the word which means formation of soap.

(01 mark)

(b) Name one:

(i) locally available material in each case which is a source of oil and fat.

(01 mark)

(ii) substance which when reacted with oil or fat can produce soap.

(01 mark)

(c) Describe briefly how solid soap can be prepared in the laboratory using oil and fat from the source you have named in *b (i)* and the substance you have named in *b (ii)*.

(03 marks)

- (d) Soap solution was shaken separately with a sample of
- (i) rain water;
- (ii) water in which calcium hydrogen carbonate has been dissolved.

Turn Over

In each case, state what would be observed and write an equation, if any, for the reaction that
(3 ½ marks)

(e) A synthetic detergent can be obtained from petroleum products.

(i) Briefly outline how a synthetic detergent is prepared.
(Equation not required) (02 marks)

(ii) State one advantage and one disadvantage of using a synthetic detergent over ordinary soap. (02 marks)