NAME……Index No……/…….

545/2

CHEMISTRY

PAPER 2

June/July 2017

2 hours

MWALIMU EXAMINATIONS BUREAU

UCE RESOURCE PRE-MOCK EXAMINATIONS 2017

CHEMISTRY

PAPER 2

2 hours

INSTRUCTIONS TO CANDIDATES:

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

Answer 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 questions **must** be written in the answer sheet(s)/booklet(s) provided.

In both sections all working must be clearly shown.

Where necessary use;

(H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32, Cl = 35.5, Cu = 64, Fe = 56)

1 mole of a gas occupies 24 l at room temperature.

1 mole of a gas occupies 22.4 l at s.t.p.

For Examiners' Use Only														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total

SECTION A: (50 marks)

Answer **all** questions in this section

1. Complete the table below by stating the **one** mixture which can be separated by the named method. (05 mks)

Method	**Mixture**
Use of a magnet	
Fractional distillation	
Mechanical sorting	
Fractional cystallisation	
Sublimation	

2. The atomic number of element **A** is 13.

(a) (i) Write the electronic configuration of an atom of **A**. (01 mk)

……

(ii) State the period in the Periodic Table to which **A** belongs (0½ mk)

……

(b) (i) Write the formula of the oxide of **A**. (01 mk)

……

(ii) State the type of bonding in the oxide of **A**. (01 mk)

……

3. (a) The table below shows the oxides formed by some elements. In each case classify the oxide as acidic, basic, neutral or amphoteric. (02 mks)

Element	**Oxide**	**Class**
Lead	PbO	
Carbon	CO_2	
Sodium	Na_2O	
Nitrogen	NO	

(b) Write equation to show how the oxide of

(i) carbon reacts with aqueous calcium hydroxide solution. (1½ mks)

……

……

(ii) sodium dissolves in water. (1½ mks)

……

……

4. 15.7 g of a mixture of copper and copper (II) oxide required a warm 150 cm^3 of 2 M hydrochloric acid solution for complete neutralisation. Calculate the percentage of copper(II) oxide in the mixture. (05 mks)

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5. (a) Ethanol reacts with sulphuric acid to form a gas **W** that turns reddish brown bromine water to colourless.

(i) Identify the gas **W**. (01 mk)

……

(ii) State the conditions for the reaction. (01 mk)

……

……

…….....

(iii)Write the equation leading to the formation of the gas **W**. (1½ mks)

……

……

(b) Write the equation for the reaction between the gas **W** and excess oxygen.

(1½ mks)

……

……

6. (a) What is meant by the term **hard water**? (01 mk)

……

……...

(b) (i) Name **two** substances which when present in water can cause permanent hardness of water. (01 mk)

……

……

(ii) State **one** chemical method of removing permanent hardness of water. (0½ mk)

……

(iii) Write equation for the reaction involved in (b)(ii) above. (1½ mks)

……

……

(c) Soap was used for washing in hard water.

(i) State what was observed. (0½ mk)

……

……

(ii) Write equation for the reaction that took place. (1½ mks)

……

……

7. (a)(i) Name **two** substances from which hydrogen chloride can be prepared in the laboratory. (02 mks)

……

……

…….....

(ii) Write equation for the reaction between the substances you have named in (a)(i). (1½ mks)

……

…….

(b) State what would be observed and write equation for the reaction that would take place if hydrogen chloride was bubbled through aqueous lead(II) nitrate solution.

(i) Observation. (0½ mk)

……

(ii) Equation.

……

……

8. (a) Write an ionic equation for the reaction between dilute suphuric acid and dilute sodium hydroxide solution. (01 mk)

……
……

(b) When 25 cm^3 of a 0.25 M sulphuric acid was added to 25 cm^3 of a 0.5 M sodium hydroxide solution, the temperature of the mixture rose from 25.0°C to 28.4°C. Calculate the molar enthalpy of neutralisation of sodium hydroxide. (Specific heat capacity of water = 4.2 $J\ g^{-1}\ ^oC^{-1}$, density of water = 1 g cm^{-3}).
(03 mks)

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9. Chlorine reacts with hydrogen sulphide according to the following equation.

$$Cl_2(g) + H_2S(g) \rightarrow HCl(g) + S(s)$$

(a) State what was observed when dry chlorine is mixed with dry hydrogen sulphide.
(0½ mk)

……

…….....

(b) Name the type of the reaction that took place in (a). (0½ mk)
……

(c) Identify the substance which acts as:
(i) an oxidising agent. (01 mk)

……...

(ii) a reducing agent. (01 mk)

……

10. Aluminium sulphate crystals were dissolved in distilled water, the resultant solution divided into **two** parts and treated as below.

(I) To the first part was added three drops of lead(II) nitrate solution followed dilute nitric acid.

(II) To the second part was added dilute ammonia drop wise until in excess.

State what was observed in each case and write ionic equation for the reaction that took place.

(a) (**I**)

Observation

……

Equation

……

…….....

(b) (**II**)

Observation ……

Equation

……

…….....

SECTION B:

11. (a) Describe how a dry sample of sulphur dioxide can be prepared in the laboratory. (Diagram is not required) (05 mks)

(b) Sulphur dioxide reacts with excess air in the presence of a catalyst X.

(i) Identify catalyst X. (0½ mk)

(ii) Write equation for the reaction that took place. (1½ mks)

(c) The product in (b) dissolves in water to form compound Z.

(i) Write equation to show how the product reacts with water to form compound Z. (1½ mks)

(ii) Give a reason why it is not advisable to form compound Z by directly dissolving the product in (b) in water. (01 mk)

(iii) State **two** uses of compound Z. (01 mk)

(d) Write equation to show how compound Z acts as

(i) an oxidising agent. (1½ mks)

(ii) a dehydrating agent. (1½ mks)

(e) Briefly describe a test you would carry out to confirm the anion in a dilute aqueous solution of compound Z. State what would be observed. (1½ mks)

12. (a) Excess zinc reacts with dilute hydrochloric acid according to the following equation.

$$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$$

(i) Name a compound that can be added to the reaction mixture to speed up the reaction rate. (01 mk)

(ii) Apart from the compound named in (a)(i), state **two** factors that affect the rate of the reaction above. (01 mk)

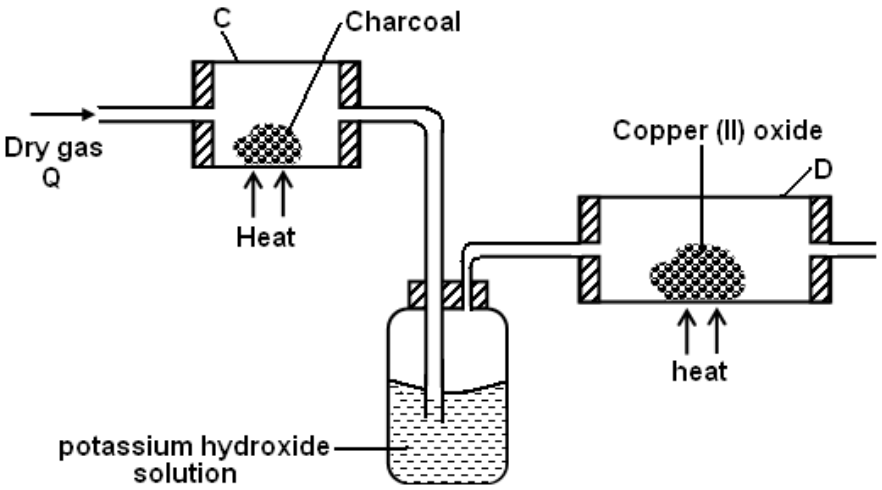
(iii) Explain how **one** of the named factors in (a)(i) affects the rate of the above reaction. (05 mks)

(b) (i) Draw a well labeled diagram of the setup of apparatus that can be used to measure the volume of hydrogen evolved in the reaction in (a). (03 mks)

(ii) Sketch a graph to show how the volume of hydrogen evolved in reaction(a) varies with time. (02 mks)

(iv) Describe how the graph in (b)(ii) can be used to measure the rate of evolution of hydrogen. (03 mks)

13. An experiment to prepare carbon monoxide and investigate its effect on copper(II) oxide was carried out using apparatus in the diagram below in a fume cupboard. Use it to answer questions that follow.



a) (i) Name gas Q. (01 mk)

(ii) Write equation for the reaction that took place in tube C. (1½ mks)

b) (i) Explain using an equation the purpose of potassium hydroxide solution. (2½ mks)

(ii) State what was observed in the tube D. (01mk)

(iii) Write equation for the reaction that took place in (b)(ii). (1½ mks)

c) (i) Give a reason why is this experiment was carried out in a fume cupboard. (01 mk)

(ii) State **one** industrial application of carbon monoxide gas. (0½ mk)

d) Using equations, briefly describe what happens when burning magnesium ribbon is lowered in to gas jar of carbon dioxide. (06 mks)

14. Explain each of the following observations.

(a) Molten sodium chloride conducts electric current whereas solid sodium chloride does not. (02 mks)

(b) When carbon dioxide was passed through a saturated solution of calcium hydroxide until no further change, a white solid was formed which dissolved to form a colourless solution. (05 mks)

(c) A brown solid is formed when magnesium dust is added to an aqueous copper(II) sulphate solution. (04 mks)

(d) Moist red litmus paper turns white when dropped in a jar of dry chlorine. (04 mks)

End