

Name:.....Index No.....

Signature:.....

545/2
CHEMISTRY
PAPER 2
2HOURS

BUIKWE DISTRICT JOINT MOCK EXAMINATIONS BOARD (BUSSHA)
UCE EXAMINATIONS 2023

CHEMISTRY

Paper 2

2hours

INSTRUCTIONS TO CANDIDATES:

- Answer all the questions in section A and any two questions in section B.
- Answers to questions in section A must be written in the spaces provided
ONLY
- Attempt only two questions in section B.
- Answers to questions in section B must be written on the answer sheets
provided.
- Do not use a pencil.

For examiner's Use Only

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Total |
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SECTION A: (40MARKS)

1. (a) Oxygen can be prepared in the laboratory at room temperature, by adding a solution of hydrogen peroxide onto manganese (IV) oxide.
(i) Write equation for the reaction that leads to the formation of oxygen

(01½ marks)

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.....

- (ii) State the role of manganese (IV) oxide. (½ mark)

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.....

- (b) State how the rate of production of oxygen under the conditions stated in (a) above, would compare with its rate of production, if the preparation was carried out.

- (i) Using a mixture of manganese (IV) oxide and a more dilute hydrogen peroxide solution. (01mark)

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- (ii) At a temperature above room temperature (01mark)

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.....

- (iii) Without using manganese (IV) oxide (01mark)

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.....

2. (a) Name **one** liquid which is

- (i) Miscible with water (½ mark)

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- (ii) Immiscible with water (½ mark)

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.....

- (b) (i) State a suitable method by means of which a mixture of miscible liquids with different boiling points can be separated. (01mark)

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(ii) Draw a labeled diagram of the set-up of apparatus, showing how a mixture of two immiscible liquids, A and E, can be separated.
(A is denser than E)

3. (a) Differentiate between the terms Acidic oxide and Basic oxide.

(02marks)

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(b) An oxide of element, M, consists of 56% by mass M.

Calculate the formula of the oxide. (O=16 M = 51)

(03marks)

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.....
(a) Name a gas

(i) X; which is produced when charcoal is burnt in a limited amount* of oxygen.
($\frac{1}{2}$ mark)

.....
(ii) Y, which is produced, when sodium reacts with water. ($\frac{1}{2}$ mark)

(b) Write equation to illustrate the reaction in (a) (ii). (01 $\frac{1}{2}$ mark)

.....
(c) State

(i) One chemical property, which shows difference between X and Y.

($\frac{1}{2}$ mark)

.....
(ii) Two chemical properties, which show similarities between X and Y.

(01mark)

(d) Y can react with nitrogen, forming a gas Z, on a large scale

Identify Z

(01mark)

.....

5. (a) Duralumin is used in making parts of aero planes

(i) State what duralumin is

(01mark)

.....

.....

(ii) Give one reason why duralumin is suitable for making parts of aero planes.

(01mark)

.....

.....

(b) Write an equation for the reaction that takes place when aluminium is added to dilute hydrochloric acid.

(1 $\frac{1}{2}$ marks)

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.....

(c) (i) State what is observed when aqueous ammonia is added to solution of aluminium chloride.

(01mark)

.....

.....

(ii) State what is observed when aqueous sodium hydroxide is added to resultant solution in c(i)

($\frac{1}{2}$ mark)

.....

.....

6. Element magnesium has 12 electrons and element nitrogen has 7 electrons.

(a) (i) Write an electron configuration of elements

(01mark)

Magnesium.....

Nitrogen.....

(b) Write an equation for the reaction between magnesium and (03marks)

(i) Oxygen.....

(ii) Nitrogen.....

(c) One of the product is (b) dissolves in water to form colourless gas that turns red litmus paper blue.

(i) Identify the product in (b)

.....
(ii) Identify the gas

(a) Explain why hydrogen chloride conducts electricity in aqueous solution but not in solution of methyl benzene. (02marks)

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(b) At room temperature, hydrogen chloride is a gas, whereas magnesium chloride is a solid.

Give a reason

(01mark)

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.....

(c) Some drops of acidified silver nitrate solution were added separately into test tubes containing aqueous hydrogen chloride and magnesium chloride.

(i) State what was observed in each case.

($\frac{1}{2}$ mark)

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(ii) Give an account of what was observed. (No equation is required).

(1½ marks)

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8. (a) During laboratory preparation of nitric acid, a mixture of potassium nitrate and reagent, R, is heated.

(i) Identify R (½ mark)

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(ii) Write equation for the reaction, which leads to the formation of nitric acid. (01 ½ marks)

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(iii) State the property of R, which makes it possible for the reaction, equation of which you have written in (a) (ii). (½ mark)

.....

.....

(b) Fuming nitric acid is yellow in colour.

(i) Give a reason (½ mark)

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.....

(ii) Write equation to show the effect of heat on fumes of nitric acid.

(01 ½ marks)

.....

.....

(c) Nitric acid reacts with zinc, producing oxides of nitrogen instead of hydrogen.

Give a reason

($\frac{1}{2}$ mark)

9. (a) Sodium hydroxide solution forms a white precipitate when left in an open reagent bottle for some time.

Name the white precipitate

(01mark)

(b) State

(i) the main purpose for which sodium hydroxide is used as a laboratory reagent.

(01mark)

(ii) one commercial use of sodium hydroxide.

(01mark)

(c) Aqueous sodium carbonate solution contains a mixture of carbonic acid and sodium hydroxide.



(i) State whether the pH of the solution would be below 7. Equal to 7 or above 7

(01mark)

(ii) Give a reason for your answer in (c) (i)

(01mark)

10. (a) (i) Write equation to show how polyethene can be formed from ethene.

(01mark)

(ii) State **one** use of polyethene.

($\frac{1}{2}$ mark)

(b) Differentiate between the terms natural polymer and synthetic polymer

(01mark)

(c) Other than polyethene, name

(i) **one** natural polymer

($\frac{1}{2}$ mark)

(d) (i) State what is meant by the term, thermosetting plastics

(01mark)

(ii) Give **one** example of thermosetting plastic

($\frac{1}{2}$ mark)

SECTION B:

Answer any **two** questions only in this section. Extra-questions answered will not be marked.

11. (a) Write equation for the reaction that takes place when chlorine is bubbled into water. (01mark)
- (b) A glass tube filled with aqueous solution of chlorine was inverted in a beaker of water and left to stand for some time in bright sunlight.

- (i) State what was observed (1 ½ marks)
(ii) Explain your observation in (b) (i) (03marks)
- (c) Dry chlorine was passed over strongly heated iron wire.
State what was observed and write equation for the reaction that took place.
(03 ½ marks)
- (d) State the condition(s) in each case; and write equation for the reaction of chlorine with
(i) Sulphur (02marks)
(ii) Turpentine (02marks)
- (e) Write an ionic equation for a reaction which can show that chlorine is more reactive than bromine. (1 ½ marks)
12. (a) Lemon juice turns blue litmus, paper pink; which means it contains a weak acid.
(i) Define the term "acid" (01mark)
(ii) State what is meant by the term weak acid (01mark)
(iii) Write the name of acid which is in lemon juice (01mark)
- (b) Limestone is an impure calcium carbonate, which is often used in the laboratory preparation of carbondioxide because it readily reacts with acids forming the gas according to the following ionic equation.

$$\text{CO}_3^{2-}(\text{s}) + 2\text{H}^+(\text{aq}) \longrightarrow \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$$

(i) State the condition(s) under which acids react with limestone. (½ mark)
(ii) Briefly explain why sulphuric acid is not suitable for preparing carbondioxide from limestone. (02marks)
(iii) Explain how carbon dioxide can be dried and collected during its preparations. (02½marks)
- (c) During the preparation of carbon dioxide, excess dilute hydrochloric acid was added to 3.0g of a sample of limestone, which yielded 2888cm³ of the gas at room temperature.
Calculate the percentage purity of the limestone.
(C = 12, O = 16, Ca = 40; 1mole of a gas occupies 24dm³ at room temperature.
(03marks)

- (d) Write
- the chemical name of the reagent which is used to test for the presence of carbondioxide. (1 $\frac{1}{2}$ marks)
 - equation for the reaction that confirms the presence of carbondioxide. (1 $\frac{1}{2}$ marks)
- (e) (i) Write equation for the reaction that would take place, if carbon dioxide was passed over heated coke. (1 $\frac{1}{2}$ marks)
- (ii) State the industrial application of the reaction in (e) (i) ($\frac{1}{2}$ mark)
13. (a) Sodium is extracted from its ore by electrolysis of the ore. Calcium chloride is added the ore prior to its electrolysis. The ore is then electrolyzed in a cell, having anode and cathode.
- Name the sodium ore and state the role of calcium chloride (01mark)
 - State the condition(s) under which the ore is electrolyzed. (01mark)
 - Name the substance(s) used as anode and cathode respectively, for the electrolysis of the sodium ore. (01mark)
 - Write equation(s) for the reaction(s) that take(s) place at the cathode. (01mark)
 - State the purpose of the iron gauze cylinder
- (b) (i) The sodium produced, is collected under dry nitrogen gas. Give a reason (01mark)
- (ii) Name the by-product during the extraction of sodium. ($\frac{1}{2}$ mark)
- (c) State one use of
- Sodium ($\frac{1}{2}$ mark)
 - the by-product ($\frac{1}{2}$ mark)
- (d) When sodium is exposed to air;
White solid develops on the surface
- State the identity of the white solid. ($\frac{1}{2}$ mark)
 - Write equation(s) only, to show the reaction(s) which lead(s) to the development of the white solid. (04 $\frac{1}{2}$ marks)
- (e) Write equation for the reaction that would take place, if burning sodium was lowered into a gas jar containing.
- Oxygen (01 $\frac{1}{2}$ marks)

(ii) Hydrogen

(01½ marks)

14. (a) State what the term "hydrocarbon" means

(01mark)

(b) When 2 moles of a gaseous hydrocarbon, J, molecular formula, C_nH_{2n} , was burnt in excess oxygen, 6 moles of carbon dioxide and 6 moles of water were produced.

(i) Determine the value of n and write equation for complete combustion of J.

(03marks)

(ii) Name the class of hydrocarbons that J belongs.

(01mark)

(c) Write the structural formula and name of;

(i) J

(02marks)

(ii) a saturated hydrocarbon with number of carbon atoms as J.

(02marks)

(d) (i) Name one reagent that can be used to distinguish J from the hydrocarbon whose structural formula and name you have written in

(c)(ii).

(01mark)

(ii) State what would be observed in each case, if J and the hydrocarbon in (c)(ii) were treated separately with the reagent you have named in

(d) (i).

(02marks)

(e) Incomplete combustion of J can cause environmental pollution.

Give a brief explanation. Write equation to illustrate your answer.

(03marks)

END