

Name:.....Signature:.....Stream:.....

545/2
CHEMISTRY
Paper 2
Mar./April.2020
2 hours.

S.4

THE CHEMISTRY DEPARTMENT
MIDTERM ONE EXAMINATIONS-2020

CHEMISTRY

Paper 2

2 hours 30 minutes

INSTRUCTIONS:

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. Answer any two questions from this section. Answers to these questions must be written in the answer 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]

1 mole of gas occupies 24l at room temperature

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

For Teachers' 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. (a) Name two liquids that are;

(i) miscible (01 mark)

.....

.....

(ii) immiscible (01 mark)

.....

.....

(b) State a method, which can be used to separate components of the liquid mixture in;

(i) a(i) above. (01 mark)

.....

(ii) a(ii) above. (01 mark)

.....

(c) Name two substances that would form a mixture that can be separated by fractional crystallization. (01 mark)

.....

.....

2. A hoe left in the garden for some weeks, was found coated with some brown solid deposits.

(a) (i) Write the chemical formula of the brown solid. (01 mark)

.....

(ii) State the conditions which led to the formation of the solid. (01 mark)

.....

(b) (i) State two methods by which formation of the brown solid can be prevented. (02 marks)

.....

.....

(ii) Give one reason why formation of the brown solid needs to be prevented. (01 mark)

.....
.....

3. When element Q, was heated with copper(II) oxide, a brown solid and substance QO was formed. Substance QO was yellow when hot and white when cold.

(a) Identify;

(i) element Q ($\frac{1}{2}$ mark)

.....

(ii) the brown solid ($\frac{1}{2}$ mark)

.....

(iii) substance QO ($\frac{1}{2}$ mark)

.....

(b) Write equation for the reaction that took place when copper(II) oxide was heated with the element you have identified in (a) above. (1 $\frac{1}{2}$ marks)

.....

.....

(c) (i) State what is observed when element Q is dipped into a solution of copper(II) sulphate and allowed to stand for sometime. (01 mark)

.....

.....

.....

(ii) Give a reason for your answer. (01 mark)

.....

.....

4. The figure below shows part of the Periodic Table. The letters are not the usual symbols of the elements used.

I	II	III	IV	V	VI	VII	VIII
					L		Y
		M		H			
X	R		J			D	
Q	Z						

(a) State the general name given to the elements belonging to the group of : (1 ½ marks)

(i) X.....

(ii) Z.....

(iii) D.....

(b) Arrange elements Q, R, M, X and Z in their order of increasing reactivity. (01 mark)

.....

(c) State whether the compound formed between the following pairs of elements conducts or doesnot conduct electricity in solution.

(i) J and D.....

(ii) M and L.....

(01 mark)

(d) Name the conducting particles in;

(i) Element Z.....

(ii) Compound formed between M and L.....

(02 marks)

5. Hydrogen gas can be prepared in the laboratory, by reaction between magnesium and sulphuric acid.

(a) (i) Write an ionic equation for the formation of hydrogen from magnesium. (1 ½ marks)

.....

(ii) State the condition(s) for the reaction (01 mark)

.....
(iii) State the method by which the hydrogen is collected after its preparation . ($\frac{1}{2}$ mark)

.....
(b) State the reason why the following acids are not suitable for the preparation of hydrogen.

(i) nitric acid. (01 mark)

.....
(ii) ethanoic acid (01 mark)

.....
(c) Write equation for the reaction between hydrogen and copper(II) oxide. (1 $\frac{1}{2}$ marks)

.....
6. (a) Iron(II) sulphide can be prepared by direct synthesis.

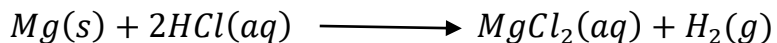
(i) Write equation for the reaction leading to the direct synthesis of iron(II) sulphide. (1 $\frac{1}{2}$ marks)

.....
(ii) Name any other salt that can be prepared by direct synthesis. ($\frac{1}{2}$ mark)

.....
(iii) Write equation for the reaction between iron(II) sulphide and dilute sulphuric acid. (1 $\frac{1}{2}$ marks)

.....
(b) State the method that can be used to prepare lead(II) sulphate in the laboratory. (01 mark)

7. Magnesium was added to 100 cm³ of 1M hydrochloric acid and hydrogen evolved according to the following equation.



- (a) If 720 cm³ of hydrogen at room temperature were evolved. Calculate the percentage of the unreacted acid. (1 mole of gas at room temperature occupies 24dm³) (03 marks)

.....
.....
.....
.....
.....
.....

- (b) Two portions of the resultant solution in (a) above were obtained and treated as follows. Sodium hydroxide solution was added to the first portion dropwise until in excess. To the second portion was added drops of silver nitrate solution.

- (i) State what was observed on treatment of the first portion as stated above. (01 mark)

.....
.....

- (ii) Write equation for the reaction in (b)(i) above. (1 ½ marks)

.....
.....

- (iii) State what was observed on treatment of the second portion as stated above. (½ mark)

.....

8. (a) (i) Write equation to show how polyethene can be formed from ethene. (01 mark)

.....
.....

- (ii) State one use of polyethene (½ mark)

.....
(b) Differentiate between the terms "natural polymer" and "synthetic polymer" (01 mark)
.....
.....

.....
(c) Other than polyethene, name:

(i) One natural polymer ($\frac{1}{2}$ mark)

.....
(ii) One synthetic polymer ($\frac{1}{2}$ mark)

.....
(d) (i) State what is meant by the term "thermosetting plastic" (01 mark)
.....
.....

(ii) Give one example of a thermosetting plastic. ($\frac{1}{2}$ mark)

.....
9. State what is observed when the following solutions are reacted. In each case, write the ionic equation for the reaction that takes place.

(a) Lead(II) nitrate and ammonia solution

Observation (01 mark)

.....
Ionic equation (1 $\frac{1}{2}$ marks)
.....
.....

(b) Lead(II) nitrate and potassium iodide

Observation (01 mark)

.....
Ionic equation (1 $\frac{1}{2}$ marks)

.....
.....
10.(a) State what would be formed if burning magnesium was lowered into a gas jar containing;

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

.....
(ii) Nitrogen ($\frac{1}{2}$ mark)

.....
(b) (i) Name one substance that can be used to distinguish between the reaction products that you have stated in (a)(i) and (a)(ii) above. (01 mark)

.....
(ii) State what would be observed if cold samples of the products that you have stated in (a)(i) and (a)(ii) above were separately treated with the substance you have named in (b)(i) above. (1 $\frac{1}{2}$ marks)

.....
(ii) Write equation for the reaction between the substance you have stated in (a)(ii) and the substance you have named in (b)(i) (1 $\frac{1}{2}$ marks)

SECTION B (30 MARKS)

*Answer any two questions from this section.
Any additional question(s) answered will not be marked.*

11. (a) (i) State one reason why air is considered a mixture and not a compound. (01 mark)
- (ii) Name one method by which the components of air can be separated. (01 mark)
- (b) Oxygen gas can be prepared in the laboratory by addition of water to substance Q.
- (i) Identify Q. (01 mark)
- (ii) Write the equation for the reaction between water and Q. (1 ½ marks)
- (i) Draw a well labeled diagram of the set up that can be used to prepare oxygen from substance Q. (2 ½ marks)
- (c) A piece of burning Sulphur was lowered into a gas jar of oxygen.
- (i) State what was observed. (02 marks)
- (ii) Write equation for the reaction that took place. (1 ½ marks)
- (d) Water was added to the gaseous product in (c) and to the resultant solution was added blue litmus solution.
- (i) State what was observed (01 mark)
- (ii) Write equation for the reaction between water and the gaseous product in (c). (1 ½ marks)
- (iii) Explain your observation in d(i) above. (02 marks)
- 12.(a) Explain the reactions that lead to formation of hydrated sodium carbonate crystals, $Na_2CO_3 \cdot 10H_2O$ from sodium hydroxide solution. (08 marks)
- (b) State what would be observed and in each case, write an equation for the reaction that would take place if;
- (i) hydrated sodium carbonate crystals were left to stand in air for some time. (02 marks)
- (ii) sodium carbonate solution was added to copper(II) sulphate solution. (2 ½ marks)
- (iii) anhydrous sodium carbonate is added to excess dilute hydrochloric acid. (2 ½ marks)

- 13.(a) Draw a well labeled diagram to show how a dry sample of ammonia gas can be prepared in the laboratory using ammonium chloride. (04 marks)
- (b) Briefly explain why ;
- (i) ammonia gas reacts with hydrogen chloride gas. (3 $\frac{1}{2}$ marks)
- (ii) ammonia cannot be dried using fused calcium chloride. (02 marks)
- (c) Explain the reaction(s) of ammonia with oxygen. Illustrate your answer with equation(s). (5 $\frac{1}{2}$ marks)

- 14.(a) Conversion of Sulphur dioxide to Sulphur trioxide in the contact process is a reversible reaction, which takes place in presence of finely divided catalyst under low temperature and high pressure conditions.
- (i) State what is meant by a reversible reaction and write equation for the reversible reaction, leading to formation of sulphur trioxide by the contact process. (2 $\frac{1}{2}$ marks)
- (ii) Name the catalyst used in the contact process and suggest why it needs to be finely divided. (1 $\frac{1}{2}$ marks)
- (iii) In each case, give a reason why formation of Sulphur trioxide by the contact process is favoured by low temperature and high pressure. (02 marks)
- (b) Explain how sulphuric acid is obtained from the Sulphur trioxide formed by the contact process. (*no equations required*) (2 $\frac{1}{2}$ marks)
- (c) 50.0 cm³ of a 4M sulphuric acid was measured out into a volumetric flask. Distilled water was then added to the acid until the total volume of the dilute solution was 250cm³. Calculate;
- (i) the concentration of the diluted acid in moles per litre. (02 marks)
- (ii) the volume of a 1M sodium hydroxide solution that would be required to react completely with 12.5 cm³ of the dilute sulphuric acid solution. (2 $\frac{1}{2}$ marks)
- (d) State what would be observed and write an ionic equation for the reaction that would take place if dilute sulphuric acid was added to barium chloride solution. (02 marks)

END