

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

545/2
CHEMISTRY
Paper 2
Nov./Dec.2019
2 hours.

S.2

THE CHEMISTRY DEPARTMENT

END OF YEAR EXAMINATIONS-2019

CHEMISTRY

Paper 2

2 hours

INSTRUCTIONS:

Section **A** consists of 8 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]

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

SECTION A (50 MARKS)

Answer **all** questions in this section.

1. (a) Write the chemical name of rust (01 mark)

.....

- (b) State the conditions necessary for rusting to occur. (02 marks)

.....

.....

- (c) Figure 1 shows a set-up of apparatus that was used to investigate a condition necessary for iron nails to rust.

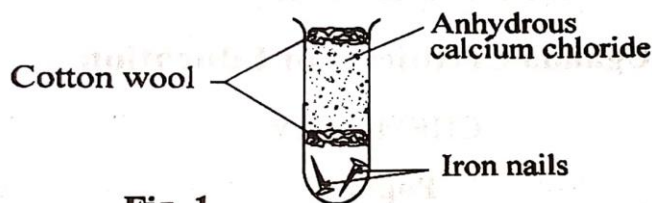


Fig. 1

- State the condition that was being investigated. (01 mark)

.....

- (d) State;

- (i) **one** disadvantage of rust. (01 mark)

.....

.....

- (ii) one method of preventing rusting. (01 mark)

.....

2. A piece of magnesium ribbon weighing 2.4g was burnt in air and it burnt with a brilliant white flame forming a white ash which weighed 4.0g

- (a)(i) State the type of change which magnesium underwent. (½ mark)

.....

- (ii) Name the white ash formed. (½ mark)

.....

(b) (i) From the observations made, state **three** reasons to justify your answer in (a)(i) above. (03 marks)

.....

.....

.....

(b) (i) State **one** way in which the type of change that took place when magnesium was burnt differs from sublimation of iodine. (01 mark)

-
3. **Table 1** shows the mass numbers and atomic numbers of elements W, X and Y. study the table below and answer the questions that follow.

Table 1

Element	Mass number	Atomic number
W	24	12
X	14	7
Y	39	19

(a) State the number of;

(i) Electrons in the atom of element Y. (01 mark)

.....

(ii) neutrons in the atom of element Y. (01 mark)

.....

(b) Write the electronic configuration of the ion that can be formed by the atom of element Y. (01 mark)

.....

(c) Identify the group in the Periodic Table to which element X belongs. (01 mark)

- (d) Element *W* reacted with element *X* to form a compound *Z*. State the type of bond in *Z*.
(01 mark)

4. The diagram below shows part of the Periodic Table with letters A, B, D, E, G and H in positions of some elements; although the letters are not the usual symbols of the elements.

GROUP	1	2		3	4	5	6	7	8
					A	B			
	D	E		G				H	

- (a) Identify which one of the elements will react

(i) To form an ion having two positive (2+) charges (½ mark)

(ii) Most violently with water to displace hydrogen gas. (½ mark)

- (b) Write the formula of the compound that would be formed if element H reacted with;

(i) Element A (01 mark)

(ii) Element G (01 mark)

- (c) State which one of the two compounds in (b) would conduct electricity in aqueous or molten state. (01 mark)

5. (a) A metallic element *T*, reacts with nitrogen to form a compound with the formula T_3N_2 .

(i) State the valency of T. (½ mark)

.....

(ii) Write the equation for the reaction between T and oxygen .(1 ½ marks)

.....

.....

(b) Calculate the relative formula mass of T_3N_2 . (Atomic mass of T is 40)

(02 marks)

.....

.....

.....

.....

6. Clean zinc granules were added to a solution of copper(II) sulphate.

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

.....

.....

(b) Explain your observation in (a) (02 marks)

.....

.....

(c) Write equation to support your answer in (b) (1 ½ marks)

.....

.....

7. Copper(II) sulphate is a useful catalyst that can be used during the preparation of gas, R, in the laboratory.

(a) Name;

(i) Gas, R. (½ mark)

.....

(ii) The reactant(s) that are catalyzed by copper(II) sulphate solution to prepare gas, R. (01 mark)

.....
.....

(b) Write equation for the reaction leading to formation of gas, R, from the reactant(s) you have named in (a)(ii). (1 ½ marks)

.....
.....

(c) Gas, R, was passed over hot lead(II) oxide.

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

.....
.....

(ii) What property is exhibited by gas, R, in the reaction in (b) above? (½ mark)

.....

(d) Give one industrial use of gas, R. (½ mark)

.....

8. Sodium peroxide reacts with liquid Q to form oxygen gas.

(a) Identify Q. (01 mark)

.....

(b) State the effect of the solution formed on litmus solution. (01 mark)

.....

(c) Write an equation for the reaction leading to formation of Q. (1 ½ marks)

.....

.....

(d) (i) Air free hydrogen explodes with oxygen gas to form a liquid Y. Name Y.

(½ mark)

-
- (ii) State how liquid Y can be tested and give the observation with the reagent used. (01 mark)
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SECTION B (30 MARKS)

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

9. (a) Differentiate between **miscible** and **immiscible liquids**. (02 marks)

- (b) (i) Name **two** compounds that can form a miscible liquid mixture and draw a diagram for the set-up of apparatus that can be used to separate the mixture.

(04 marks)

- (ii) State **one** method that can be used to determine the purity of the components in the mixture in (b)(i) (01 mark)

- (a) Table 2 shows variation in temperature with time when a solid X, was heated to cooling.

Table 2

Temperature(°C)	25	47	80	80	162	218	218
Time(minutes)	0	1.0	2.5	4.5	7.0	8.7	9.5

- (i) Draw a graph of temperature against time. (04 marks)

- (ii) Explain the shape of the graph. (04 marks)

10. (a) Name the fundamental particles that make up matter. (02 marks)

- (b) Water exists as a liquid, steam or vapour and ice under certain conditions.

Name the process by which:

- (i) Liquid water changes to ice. (01 mark)

- (ii) Steam changes to liquid. (01 mark)

- (iii) State the conditions necessary for the process(b)(ii). (02 marks)

- (c) (i) state the kinetic theory of matter (01 mark)

- (ii) using the kinetic theory of matter, describe the nature of ice. (02 marks)

- (d) a drop of blue ink was added to water in a beaker at room temperature and the set up allowed to stand for some time.

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

- (ii) Explain your observation in (d)(i) above. (02 marks)

- (e) The water in the beaker was warmed and another drop of blue ink added to the water and left to stand for sometime.

- (i) State what was observed. (01 mark)
- (ii) Explain your answer in (e)(i) above. (02 marks)
11. (a) The reaction between iron fillings and copper(II) sulphate solution is both a displacement and redox reaction. A redox reaction involves both a reducing agent and an oxidizing agent.
Define a redox reaction. (01 mark)
- (b) State what is observed when the two substances are allowed to react. (2 ½ marks)
- (c) Write an equation for the reaction that takes place. (1 ½ marks)
- (d) State which of the substances above is
- (i) reduced
- (ii) oxidised (02 marks)
- (e) Write half reactions to show how the substance in
- (i) (b)(i) is reduced
- (ii) (b)(ii) is oxidized (03 marks)
- (f) (i) Give a reason why the reaction above is possible. (01 mark)
- (iii) Identify any other metal element that can be used other than iron. (01 mark)
- (g) The experiment in (a) was repeated using silver instead of iron.
- (i) State what was observed. (01 mark)
- (ii) Give a reason for your answer in (g)(i) above. (01 mark)
12. (a) Hydrogen peroxide produces gas bubbles slowly when exposed to air, but when aqueous iron(III) chloride is added, the production of gas bubbles becomes more rapid at room temperature.
- (i) Name the gas produced when hydrogen peroxide is exposed to air. (01 mark)
- (ii) Write equation for the reaction that takes place. (1 ½ marks)
- (iii) State the role of iron(III) chloride in the reaction. (01 mark)
- (iv) Name another substance that can affect the production of the gas in the same way as iron(III) chloride. (01 mark)
- (b) Draw a well labelled diagram only to show how a dry sample of the gas in (a) can be collected using the substance in (a)(iv) above. (05 marks)
- (c) State any **two** other ways by which the rate of formation of the gas in (a) can be made faster other than use of iron(III) chloride or the substance in (a)(iv) above (02 marks)
- (d) State;
- (i) the test that can be carried out to confirm the gas named in (a)(i) above. (01 mark)

(ii) what would be observed if the test you have stated in (d)(i) was carried out?
(01 mark)
END