

7500483



Centre Number										Examination Number									

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level



Chemistry

Paper 2 Theory

5070/2

Wednesday

15 JULY 2026

Additional Material:

Mathematical tables/Calculators (non-programmable)

Time: 2 hours

Marks: 80

Instructions to Candidates

- 1 Write the **centre number** and your **examination number** in the spaces provided on this page.
- 2 Write your **examination number** in the spaces provided on **every page** of this question paper.
- 3 There are two sections, **A** and **B**.
- 4 **Section A:** Answer **all** questions. Write your answers in the spaces provided within this question paper.
- 5 **Section B**
 - (i) There are **four** questions in this section. Answer any **three**.
 - (ii) Write your answers in the spaces in this question paper.
 - (iii) Enter the numbers for the questions you have answered in the grid under the column **'For Candidate's Use'**.

Information for Candidates

- 1 The number of marks is given in brackets [] at the end of each question or part question. Candidates are reminded that all quantitative answers should include appropriate units and accuracy.
- 2 Candidates are advised to **show all their working** in a clear and orderly manner, as marks are awarded for correct working and for correct answers.
- 3 The **Periodic Table** is on page 17.
- 4 Cell phones are **not allowed** in the examination room.

For Examiners' Use		
For Candidate's Use	Mark Obtained	Examiner's Initials
Section A		
1		
2		
3		
4		
5		
6		
7		
8		
Section B		
Total		

SECTION A: [50 MARKS]

Answer **all** questions in the spaces provided.

- A1 (a)** Explain why floor polish such as cobra should not be applied on the laboratory floor.

.....
 [2]

- (b)** Particles in gases and liquids easily move from a region of higher concentration to a region of lower concentration.

(i) Name the process: [1]

(ii) State **one** factor that would increase the rate of this process and explain how it increases the rate.

.....

 [2]

(iii) Give a reason why the named process in **(b)(i)** **cannot** take place in solids.

.....

 [1]

[Total: 6 marks]

- A2** Some methods of separation of mixtures are shown.

Crystallisation	Simple distillation
Sublimation/deposition	Chromatography
Sedimentation and decantation	Fractional distillation

State the method used to separate a mixture of:

- (a)** ethanol and water,

..... [1]

- (b)** sodium chloride crystals from a saturated sodium chloride solution,

..... [1]

- (c)** ammonium chloride and sodium chloride,

..... [1]

Examination Number													

(d) amino acids,

..... [1]

(e) muddy water.

..... [1]

[Total: 5 marks]

A3 Oxygen reacts with other elements to form oxides like hydrogen oxide and sodium oxide.

(a) Draw a 'dot' and 'cross' diagram for each of these oxides. Show all electrons.

--	--

[4]

(b) (i) Give **two** differences in the physical properties between these oxides.

..... [1]

..... [1]

(ii) Use your answer in (b)(i) to explain one of the differences you have stated.

..... [1]

[Total: 7 marks]

Examination Number											

A4 Magnesium metal burns and reacts with oxygen gas to produce the white crystalline solid of magnesium oxide as the only product.

(a) Construct a balanced chemical equation for this reaction. Include state symbols.

.....
.....

[2]

(b) 4.8g of magnesium reacts with 2.4dm³ of oxygen (measured at r.t.p) to produce 8.0g of magnesium oxide. Show that this data is consistent with the stoichiometric mole ratio in your balanced equation.

[4]

(c) Calculate the percentage (%) by mass of magnesium atoms in magnesium oxide.

[2]

[Total: 8 marks]

Examination Number											

A5 A forensic scientist codes elements on the Periodic Table using group number and period number. The elements sodium, oxygen and magnesium were coded as 1 : 3, 6 : 2 and 2 : 3 respectively.

(a) What will the code be for:

(i) Br: [1]

(ii) K: [1]

(b) Give the name of the element coded 5 : 3.

..... [1]

(c) Sodium and rubidium are found in Group I of the Periodic Table.

(i) Explain why sodium is less reactive than rubidium despite both reacting by losing one electron.

.....
 [2]

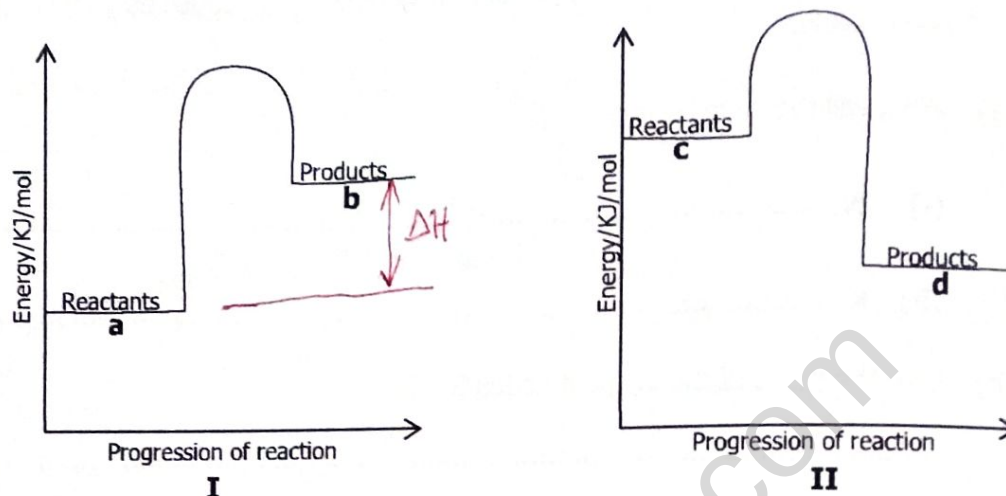
(ii) Which element between chlorine and fluorine would react faster with sodium? Give a reason for your answer.

.....

 [2]

[Total: 7 marks]

A6 Study the energy profile diagram shown in **I** and **II**.



(a) (i) On diagram **I**, label the part which shows the enthalpy change, ΔH . [1]

(ii) Which energy profile diagram represents photosynthesis?

..... [1]

(b) Ethane burns in air according to the equation



(i) Apart from C—C bonds, which other bonds are broken during the burning?

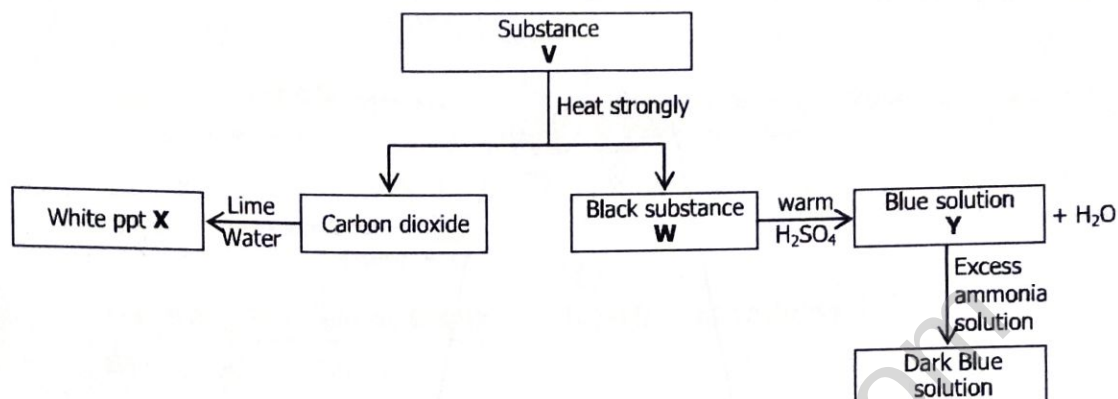
..... [2]

(ii) Explain why the combustion of ethane in air is a redox reaction.

..... [2]

[Total: 6 marks]

A7 Study the reaction flowchart of substance **V**.



(a) Name substances **V** and **X**.

V: [1]

X: [1]

(b) Give the chemical equation with state symbols for the reaction between **W** and sulphuric acid.

..... [2]

(c) A small quantity of ammonia solution is added to the blue solution **Y**.

(i) Give the formula of the substance that will be formed.

..... [1]

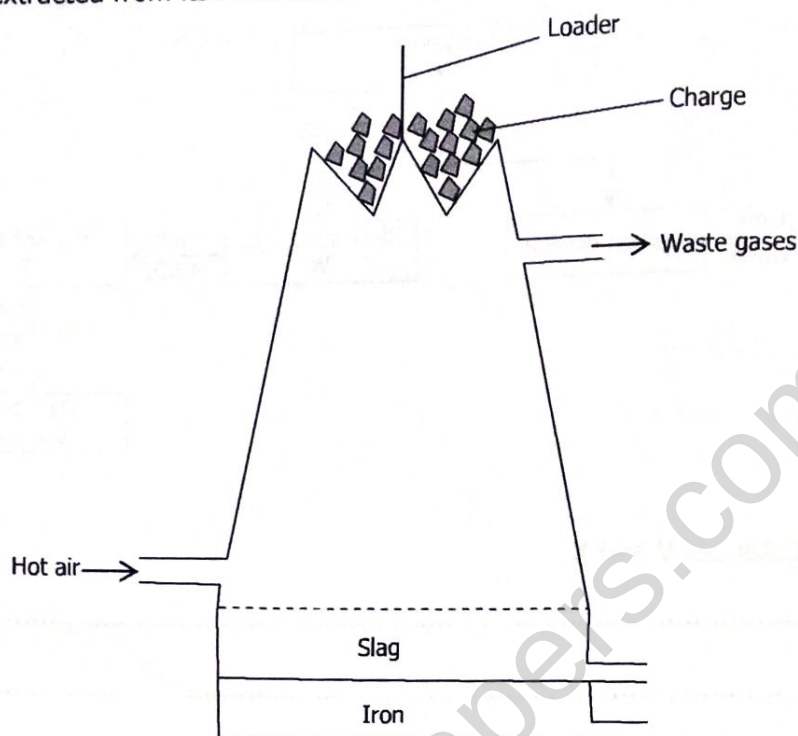
(ii) What observation will be made as a result of the formation of the substance whose formula you have given in **(c)(i)**.

..... [1]

[Total: 6 marks]

Examination Number											

A8 Iron is extracted from its main ore **X**. The process takes place in a blast furnace as shown.



(a) Give the name of ore **X**.

..... [1]

(b) Apart from the ore, state **two** other components loaded into the furnace to form the charge.

..... [1]

..... [1]

(c) Which component removes the main impurity sand from the ore?

..... [1]

(d) Write the balanced chemical equation for the reaction that produces iron from the ore.

..... [1]

[Total: 5 marks]

Examination Number														

SECTION B: (30 MARKS)

There are **four** questions in this section; answer **three** questions. Write your answers in the spaces provided in this question paper from page 11 to 19.

- B9** Two Grade 12 learners G1 and G2 carry out an experiment on electrolysis of copper (II) sulphate. G1 uses carbon electrodes while G2 uses copper electrodes.

- (a) Copy and complete **Table 9.1** showing the electrode reactions that would take place.

Table 9.1

Learner	Reaction at anode	Reaction at cathode
G1		
G2		

[4]

- (b) For which learner will the blue colour of copper (II) sulphate

- (i) fade away,
(ii) remain the same?

Explain each of these observations.

[4]

- (c) State the formula of all the ions present in the electrolyte copper (II) sulphate solution.

[2]

[Total: 10 marks]

- B10** An experiment was carried out to investigate the rate of the following reaction:



In the experiment, marble chips and an excess of 1M hydrochloric acid were used.

The following data shown in **Table 10.1** was collected:

Table 10.1

Time (s)	0	20	40	60	80	100	120	140
Volume of carbon dioxide (cm ³)	0	100	148	174	190	200	200	200

- (a) State the piece of apparatus used to measure the:

- (i) volume of carbon dioxide formed, [1]
(ii) time. [1]

- (b) (i) Plot a graph of volume of carbon dioxide against time, on the graph provided on page 14. [4]
(ii) Explain why the slope of the graph changes with time until the reaction is complete. [2]
(iii) How will you tell from the experiment that the reaction is over? [1]

Examination Number											

- (iv) On the same axes, sketch a graph you would expect if powdered calcium carbonate was used instead of marble chips, all other factors remain unchanged. Label your sketch **X**. [1]

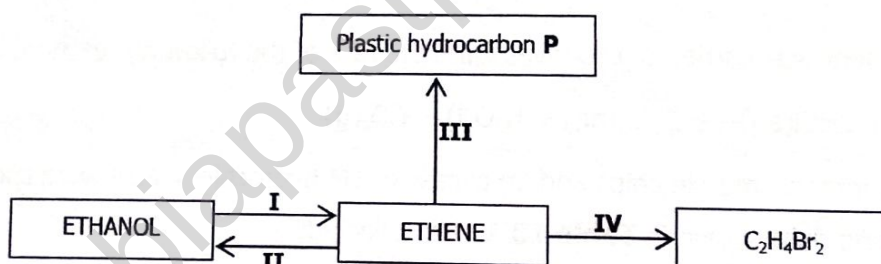
[Total: 10 marks]

B11 Ammonia is made industrially from nitrogen and hydrogen by Haber process.

- (a) (i) Write the balanced chemical equation for this process. [2]
 (ii) Name the natural sources from which hydrogen and nitrogen are obtained. [2]
 (iii) The reaction between hydrogen and nitrogen is reversible. Give **two** essential conditions used in this process to obtain a high yield of ammonia. [2]
- (b) (i) Apart from making nitric acid, give **one** other use of ammonia. [1]
 (ii) In the production of nitric acid, ammonia is mixed with air in the presence of a catalyst. Name the catalyst and write a balanced chemical equation for this reaction. [3]

[Total: 10 marks]

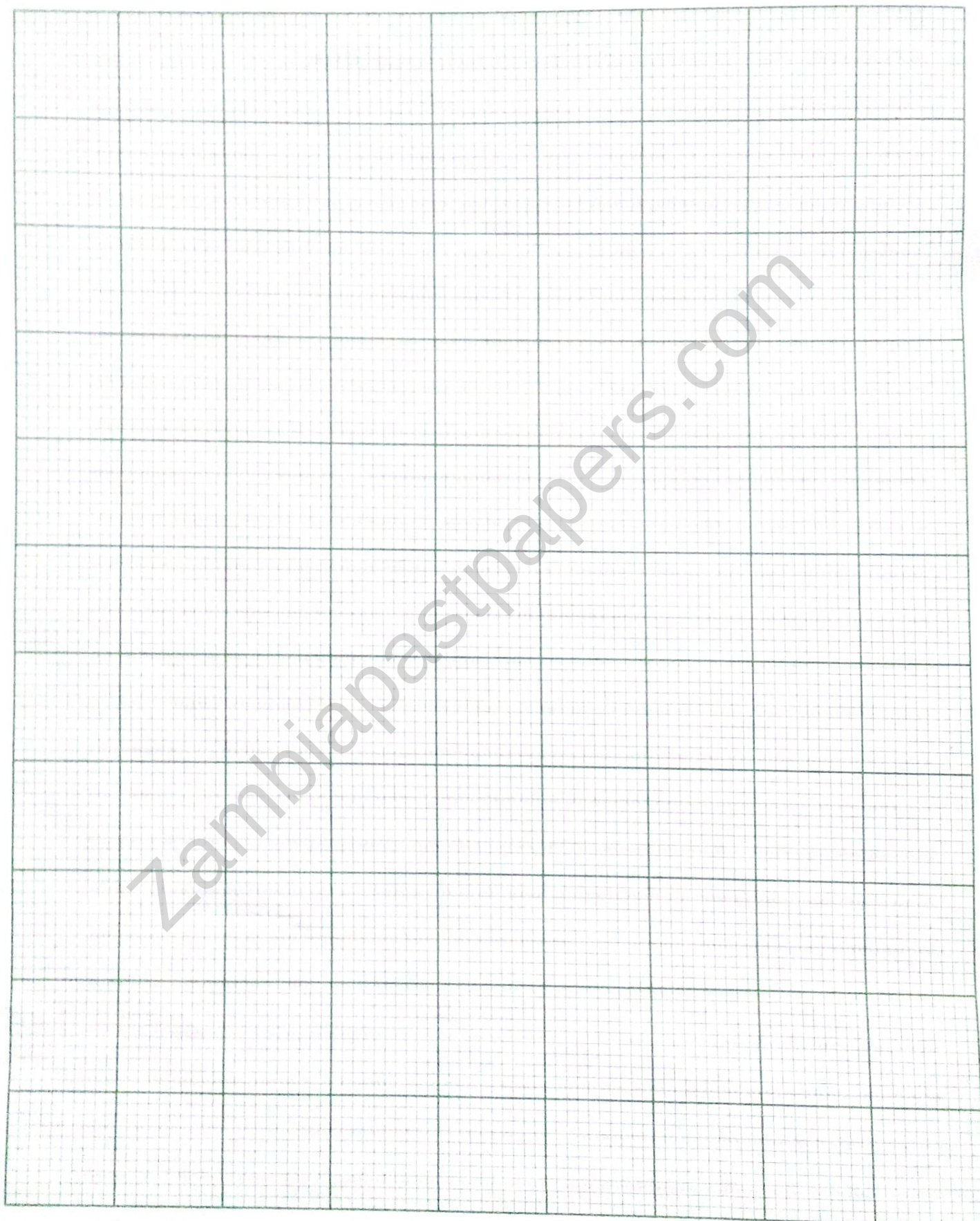
B12 Consider the following reaction scheme involving ethene, C_2H_4 .



- (a) (i) What name is given to the reaction labelled **II**? [1]
 (ii) State **two** essential conditions needed for the same reaction in (a) (i). [2]
- (b) The plastic hydrocarbon **P**, is a product of addition polymerisation.
 (i) What is meant by addition polymerisation? [1]
 (ii) Show the displayed structure of **P** showing four repeating units. [2]
- (c) Reaction **IV** serves as the chemical test for unsaturation. What is observed in this reaction? [1]
- (d) If propene were to be used in place of ethene for reaction **II**, there would be two products formed. What are the **two** products. [2]
- (e) Why do manufacturers avoid reaction **I**? [1]

[Total: 10 marks]

Examination Number												



The Periodic Table of the Elements

140	Ce Cerium 58	141	Pr Praseodymium 59	144	Nd Neodymium 60	146	Pm Promethium 61	150	Sm Samarium 62	152	Eu Europium 63	157	Gd Gadolinium 64	159	Tb Terbium 65	162	Dy Dysprosium 66	165	Ho Holmium 67	167	Er Erbium 68	169	Tm Thulium 69	173	Yb Ytterbium 70	175	Lu Lutetium 71
232	Th Thorium 90		Pa Protactinium 91	238	U Uranium 92		Np Neptunium 93		Pu Plutonium 94		Am Americium 95		Cm Curium 96		Bk Berkelium 97		Cf Californium 98		Es Einsteinium 99		Fm Fermium 100		Md Mendelevium 101		No Nobelium 102		Lr Lawrencium 103

a = relative atomic mass

X = atomic symbol

o = proton (atomic) number

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The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.) and 22.4 dm^3 at s.t.p.

$$N_A = 6.0 \times 10^{23}/\text{mol}; 1^\circ\text{F} = 9/5 500^\circ\text{C}.$$

2026