EXAMINATION NO.: _____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2025 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

CHEMISTRY

Subject Number: M038/I

Thursday, 10 July

Time Allowed: 2 hours
8:00 – 10:00 am

PAPER I

(100 marks)

Theory

Instructions

1. **This paper contains 12 printed pages. Please check.**
2. Write your **Examination Number** at the top of each page of this question paper.
3. This paper contains two sections, **A** and **B**. In Section **A** there are **ten** short answer questions while in section **B** there are **three** restricted essay questions.
4. Use of scientific calculator is allowed.
5. The maximum number of marks for each answer is indicated against each question.
6. In the table provided on this page, **tick** against the number of the question you have answered.
7. Hand in your question paper to the invigilator when time is called to stop writing.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
	Total		

Section A (70 marks)

Answer **all** the **ten** questions in this section in the spaces provided for each question.

1. a. Give any **one** way of disposing solid waste.

_____

(1 mark)

b. Describe how purity of water can be determined by using its melting point.

_____

_____

_____

(2 marks)

c. Give any **one** substance that could be used to test the presence of water.

_____

(1 mark)

2. a. **Figure 1** shows a method of waste disposal.

Figure 1

(i) Identify the type of waste disposal in **Figure 1**.

_____

(1 mark)

(ii) Give any **two** disadvantages of the method identified in **(i).**

_____

_____

_____

(2 marks)

2. (Continued)

b. Describe incineration as a way of waste treatment and disposal.

_____

_____

_____

_____

(3 marks)

3. a. Explain any **two** uses of nitrogen in relation to its properties.

_____

_____

_____

_____

(4 marks)

b. Give any **two** uses of Sulphur.

_____

_____

(2 marks)

c. Give any **one** raw material for preparation of ammonia.

_____

(1 mark)

4. a. Give any **one** difference between a pure covalent bond and a dative covalent bond.

_____

_____

_____

(1 mark)

b. (i) State any **one** use of gold.

_____

_____

(1 mark)

(ii) Give any **two** properties of alloys.

_____

_____

(2 marks)

Continued/…

5. a. Draw the structure of pentan-2-ol.

(2 marks)

b. **Figure 2** shows an indigenous way of preparing ethanol.

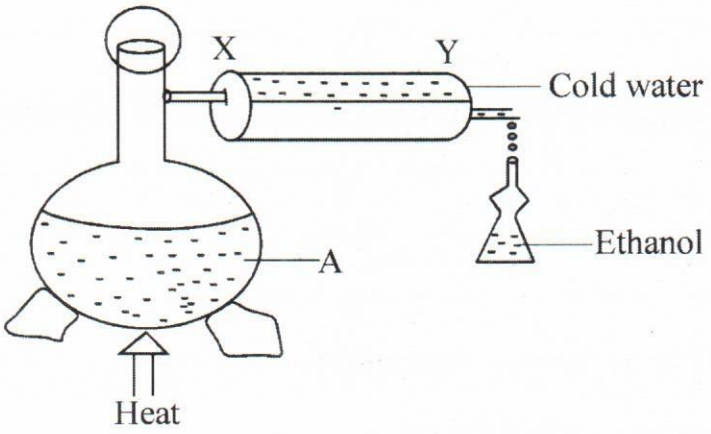


Figure 2

(i) Give any **two** raw materials in the part labelled **A**.

(2 marks)

(ii) Explain the importance of using cold water in the preparation.

(4 marks)

(iii) Give any **two** ways of improving the production of the ethanol in **Figure 2**.

(2 marks)

c. State any **two** dangers of excessive consumption of alcoholic drinks.

(2 marks)

Continued/…

6. a. Why is the boiling point of ethanoic acid higher than the boiling point of ethanol?

_____

_____

_____

_____

(3 marks)

b. Define isomers.

_____

_____

(1 mark)

c. Name any **two** isomers of pentane.

_____

_____

(2 marks)

d. State the **two** types of polymerisation.

_____

_____

(2 marks)

e. Give any **one** use of polychloroethane.

_____

_____

(1 mark)

Continued/…

7. a. **Figure 3** is an energy level diagram of a reaction.

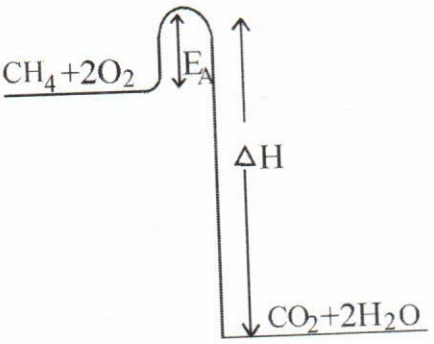


Figure 3

(i) Identify the type of reaction shown in **Figure 3**.

_____

(1 mark)

(ii) State the use of E_A in the diagram.

_____

(1 mark)

(iii) Give any **two** applications of such type of reactions shown in **Figure 3**.

_____

_____

_____

_____

(2 marks)

7. (Continued)

b. **Table 1** shows bond energies of some chemical bonds.

Table 1

Bond	Bond energy (Kj/mol)
C – C	346
C – H	414
O = O	497
C = O	749
H - O	461

Calculate the enthalpy change for the following reaction:
$2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$

(5 marks)

Continued/…

8. a. Give any **two** disadvantages of hard water.

_____

_____

_____

_____

(2 marks)

b. Describe any **two** sources of carbon dioxide as a greenhouse gas.

_____

_____

_____

_____

(4 marks)

9. a. Give any **two** examples of medical source waste.

_____

_____

(2 marks)

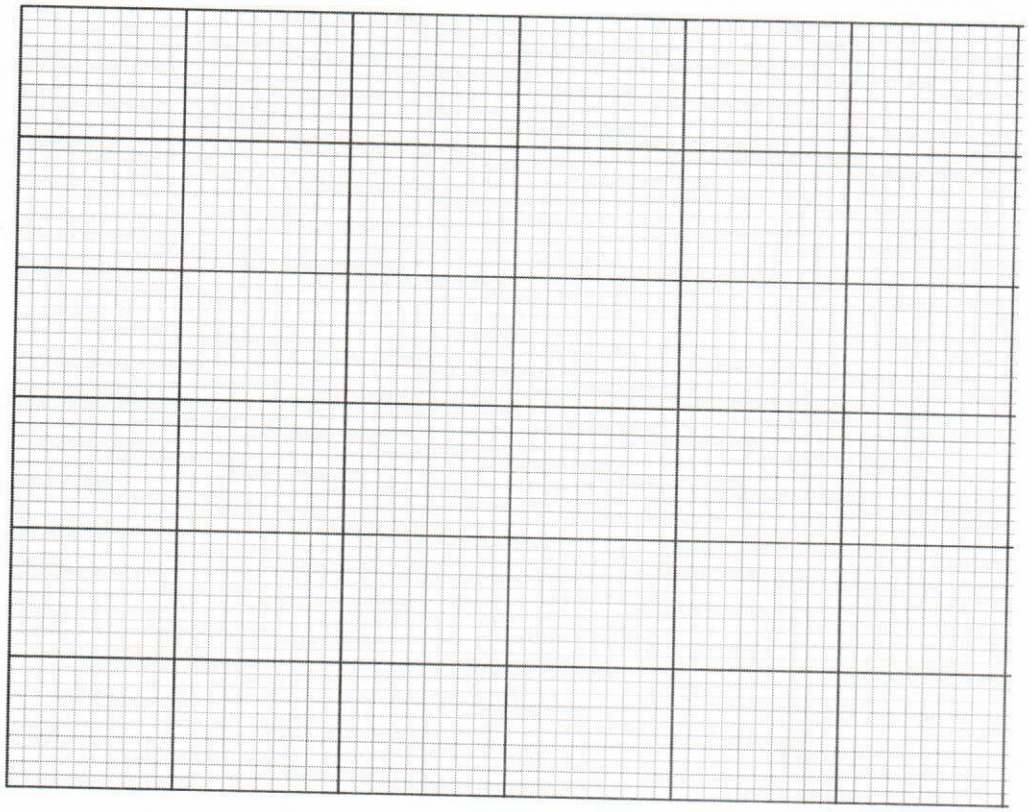
b. **Table 2** shows results of an experiment for a chemical reaction that produced a gas.

Table 2

Time (s)	0	1	2	3	4	5
Volume of gas (cm^3)	60	40	27	17	10	4

(i) Plot a graph of volume of gas against time on the graph paper on **page 9**.

9. b (i) (Continued)



(ii) How long did the reaction take? **(4 marks)**

_____

(1 mark)

(iii) What could be the effect of introducing a catalyst in this experiment?

_____

_____

(1 mark)

10. a. Calculate the volume of 4M HCl stock solution that could be diluted to make 200 ml of 0.2M HCl solution.

(3 marks)

b. Write the half equation for the oxidation process of the following chemical equation: $2Al(s) + 3Cl_2(g) \longrightarrow 2AlCl_3(s)$

(2 marks)

Section B (30 marks)

Answer **all** the **three** questions in this section in the spaces provided.

11. a. With the aid of well labelled diagrams, describe the difference between rhombic Sulphur and monoclinic Sulphur.

(5 marks)

Continued/…

11. (Continued)

b. Describe how the percentage of water could be determined in sugar.

(5 marks)

12. With the aid of a well labelled diagram describe how you would find the concentration of an acid using a standard solution of a base.

(10 marks)

Continued/…

13. Describe the process of soap making.

(10 marks)

END OF QUESTION PAPER

This paper contains 12 printed pages.