EXAMINATION NO: _____

DESHA EXAMINATION BOARD

2024 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

CHEMISTRY

Subject Number: M038/I

Tuesday 26th March, 2024 **Time Allowed: 2 hours**

PAPER I

(100 marks)

THEORY

Instructions

- This paper contains **14 pages**. Please check.
- Before beginning, fill in your **Examination Number** at the top of each page of this question paper.
- This paper contains sections **A** and **B.** Answer all the questions in all the sections. Some can be answered quickly, but others require considerable thought and may take longer time.
- Write your answers on the questions paper in the spaces provided. The maximum number of marks for each answer is indicated against each question.
- In the table provided on this page, **tick** against the number of questions you have answered.
- You should hand in your question paper to the invigilator when you are called to stop writing.

Question number	Tick of answered	Do not write in these columns	
1			
2			
3			
4			
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12			
13			

Turn over….

SECTION : A (70 marks)

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

1. a. Give any **two** uses of sulphuric acid.

_____

_____

_____

_____ **(2 marks)**

b. Explain how volcanoes contributes to global warming.

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_____

_____ **(3 marks)**

2. **a**. Figure 1 is a chromatogram showing analysis of different types of ink

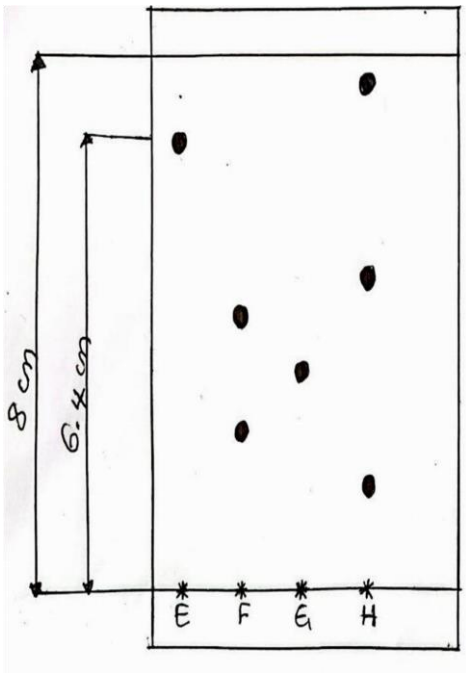


Figure 1

i. Which of the analyzed samples were pure substances?

_____

_____ **(2 marks)**

ii. Give a reason for your answer in 2.a. (I

_____

_____ **(1 marks)**

iii. Work out the Rf value of sample **E**

(3 marks)

3. **a.** Ammonium chloride reacts with Calcium hydroxide to produce Calcium chloride, ammonia gas and water. Write balanced chemical equation.

(3 marks)

b. Explain how surface area affect rates of reaction.

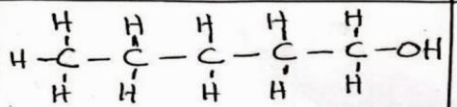
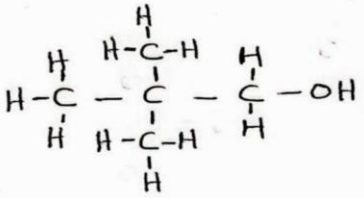
_____

_____

_____

_____ **(2 marks)**

4. **a. Table 1** Shows formulae and boiling points for isomers of pentanol, $C_5H_{11}OH$.

Isomer	Formula	Boiling point (°C)
A		36.0
B		9.5

i. Name the isomers **A** and **B.**

A _____

B _____ **(2 marks)**

ii. Explain why Isomer **B** has a lower boiling point than **A**.

_____

_____

_____

_____ **(3 Marks)**

b. Mention any **two** ways of preparing salt.

_____

_____

_____

_____ **(2 marks)**

5. **a**. State any **two** conditions that are necessary for rusting to take place.

_____

_____

_____

_____ **(2 marks)**

b. Briefly explain how galvanizing is used to prevent rusting.

_____

_____

_____

_____ **(3 marks)**

b. Describe an experiment that can be done to find out if a given clear liquid is water using anhydrous copper II sulphate.

_____

_____

_____

_____

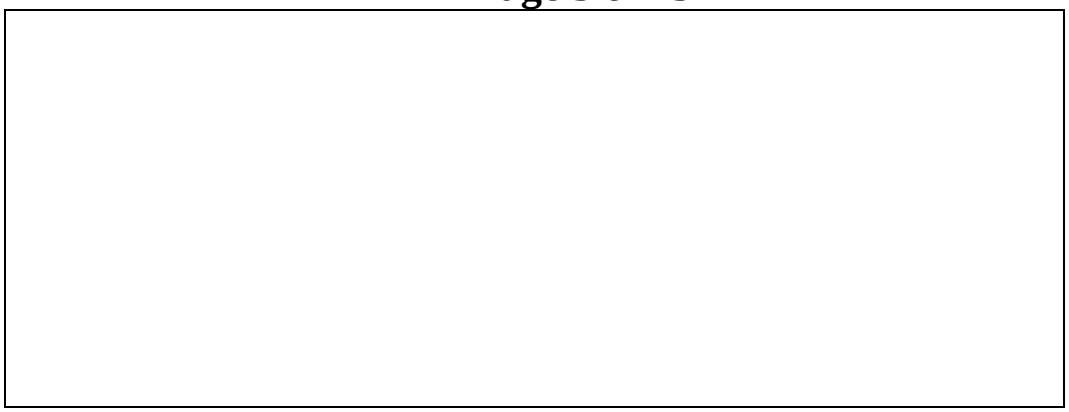
_____ **(4 marks)**

6. **a.** Hydrogen gas and chloride gas react to form hydrogen chloride according to the following equation.

$$H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$$

If the total energy required to break H - H and Cl –Cl bonds is 678 KJ and the total energy release is 862 KJ.

i. Work out the value of heat change, ΔH of the reaction.



(2 marks)

ii. State whether the reaction is exothermic or endothermic

_____ **(1 mark)**

iii. Give a reason to the answer in 6.a.

_____

_____ **(1 marks)**

b. List down any **two** differences between polar and non-polar compounds.

_____

_____

_____

_____ **(2 marks)**

c.i. Complete the following equation

i. $Pb(NO3)\ 2(aq) + 2NaCl(aq) \rightarrow$ _____ $+ 2NaNO3(aq)$

(1 mark)

ii. Write down the net ionic equation in 6.c.i above.

_____

_____ **(2 marks)**

7. a. Define the term "alloy"

_____

_____

_____ **(1 marks)**

b. state any **two** uses of alloys.

_____

_____

_____ **(2 marks)**

c. Aluminium reacts with copper II sulphate solution according to the following equation.

$2_{(s)} + 3CuSO_{4(aq)} \rightarrow Al_2\ (SO_4\ )3(aq) + 3Cu_{(s)}$

If 1.56g of aluminium reacts with excess copper II sulphate to produce 2.58g of copper,

(RAM; Al = 27, Cu = 63.5). Calculate the percentage yield of copper

8. a. **Figure 2** shows how carbonate ions can be tested,

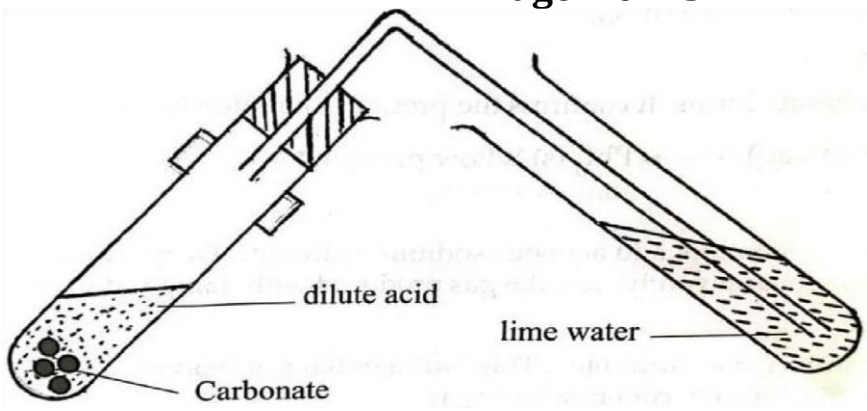


Figure 2

a. Explain what will happen to the lime water after 3 to 4 days?

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_____

_____

_____ **(3 marks)**

b. State any **two** applications of electroplating.

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_____

_____**(2 marks)**

c. State any **two** ways of minimizing wastes.

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_____ **(2 marks)**

9. **a.** Define the term "addition polymerisation."

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_____ **(2 marks)**

b. Give any **two** properties of polyvinyl chloride (PVC)

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_____ **(2 marks)**

c. Figure 3 is a diagram showing the process for electrolysis of molten lead bromide.

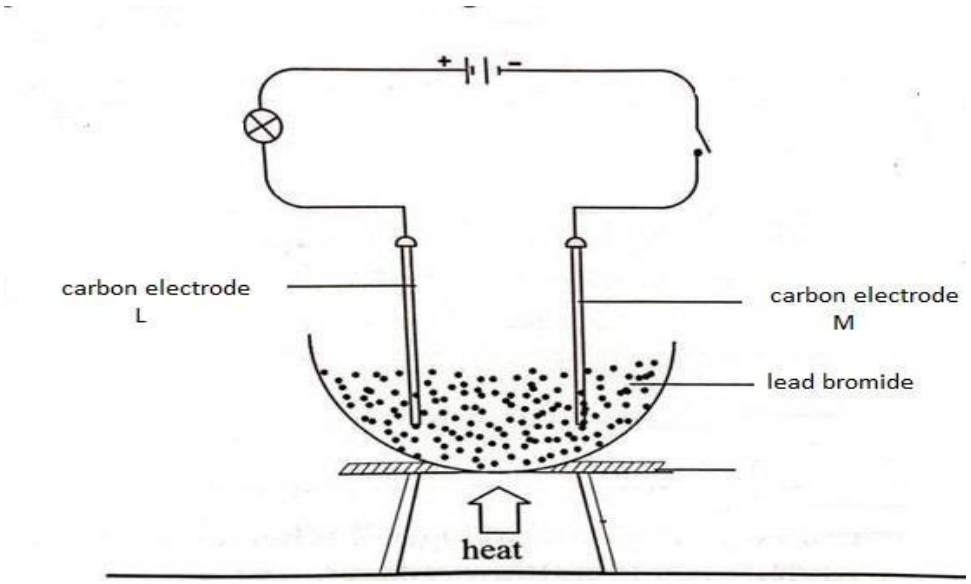

Figure 3

i. Give any **two** observations that will be made in the experiment after some time.

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_____

_____ **(2 marks)**

ii. Write down a half equation at carbon electrode **M**

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_____ **(2 marks)**

10.a. **Figure 4** shows the Molecular formulae of some compounds

C_2H_5CHO	CH_3COOH	C_3H_6O	$C_3\ H_7$OH
A	**B**	**C**	**D**

i. To which homologous series does compound **C** belong?

C _____ **(1 mark)**

ii. State any **one** chemical property of compound B

_____

_____ **(2 mark)**

iii. Draw the structural formula for compound A.

(1 mark)

b. Calculate the molecular formula of a compound if its empirical formula is CH_2O and has a molar mass of 180. (RAM: C=12, H=1 O = 16)

(2 marks)

Section B (30 marks)

11.a. Describe the water cycle.

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_____ **(7 marks)**

b. Explain why water has high boiling point compared to many other covalent compounds of similar mass.

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_____ **(3marks)**

12. **a.** With the aid of equations describe the reaction between copper sulphate solutions and zinc metal in terms of oxidation and reduction**.**

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_____ **(6 marks)**

b. Explain why density of octanol $C_8H_{17}OH$ is higher than ethanol, C_2H_5OH

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_____ **(3marks)**

13. Describe an experiment that can be carried out to investigate the percentage of water in hydrated copper (II) sulphate.

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_____ **(10 marks)**

END OF QUESTION PAPER

NB: This paper has 14 printed pages.