EXAMINATION NO.: _____

SOUTH EAST EDUCATION DIVISION

2024 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

CHEMISTRY

Tuesday, 26 March

Subject Number: M038/I
Time Allowed: 2 hours
8:00 - 10:00 am

PAPER I
(100 marks)

Instructions:

1. **This paper contains 12 printed pages. Please check.**
2. Write your **Examination Number** at the top of each page of the question paper.
3. This paper contains **two** sections **A** and **B.** In Section **A** there are ten short answer questions and in section **B** there are three restricted **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 question number 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		

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Turn over/...

SECTION A (70 marks)

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

1. a. State any **two** ways of determining the purity of a substance.

_____

_____

(2 marks)

b. Sample **A** was analyzed in the laboratory and the results were recorded as shown in **Figure 1** below:

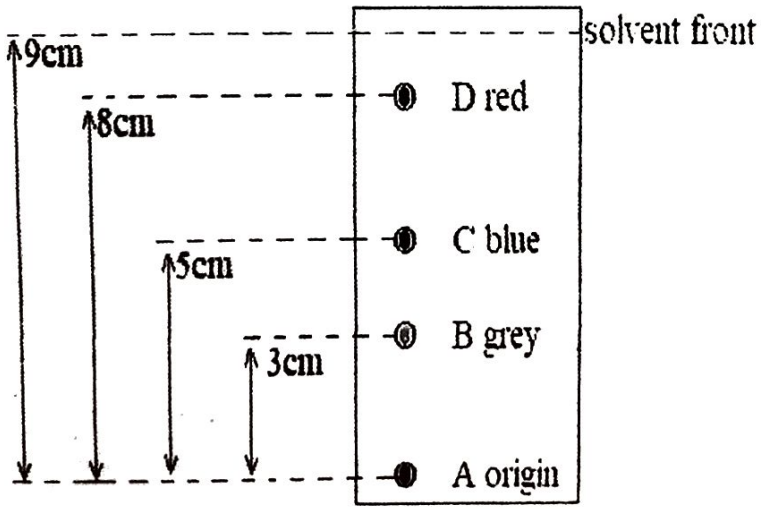


Figure 1

i. State whether sample **A** is a pure substance or not.

_____

(1 mark)

ii. Explain your answer in 1. b) i. above.

_____

_____

(1 mark)

Continued/...

1. **(Continued)...**

iii. Calculate the relative flow rate value of component **B**.

(3 marks)

2. a. State any **two** ways of determining the rate of a chemical reaction.

_____

_____

(2 marks)

b. Explain how temperature affects the rate of chemical reaction?

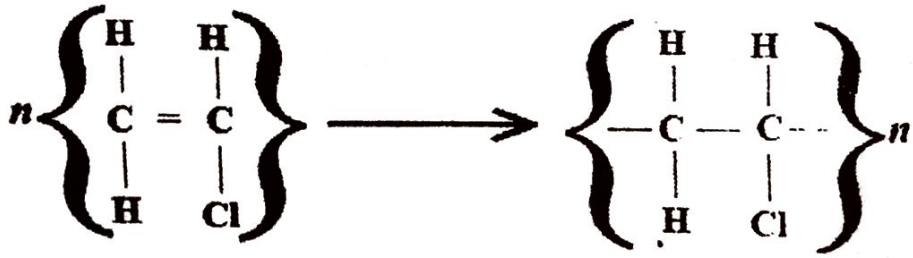
_____

_____

_____

(3 marks)

3. a. Polymerization of chloroethene can be represented by the equation below:



i. Name the polymer formed.

_____

(1 mark)

3. **(Continued)...**

ii. What kind of polymerization is represented in the equation above?

_____

(1 mark)

b. i. State any **two** examples of artificial polymers.

_____

_____

(2 marks)

ii. Explain why thermosetting plastics melt when subjected to heat.

_____

_____

(2 marks)

4. a. **Figure 2** is a structure of an element that is composed of 4 atoms to make a molecule.

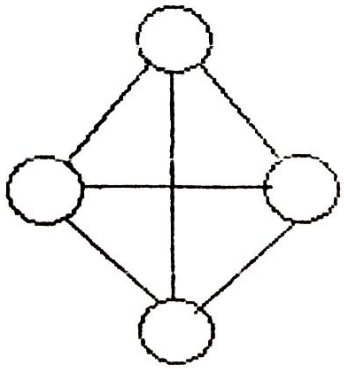


Figure 2

i. Identify the element with the structure above.

_____

(1 mark)

ii. State any **two** allotropes of the element.

_____

_____

(2 marks)

Continued/...

4. **(Continued)...**

iii. Mention **one** agricultural importance of the element.

_____

(1 mark)

b. State **two** methods of removing permanent water hardness.

_____

_____

(2 marks)

c. Explain how the car manufacturing industry contributes to global warming.

_____

_____

_____

(2 marks)

5. a. Define molarity.

_____

_____

(1 mark)

b. A 0.9g tablet of a drug with a molecular formula C_9H_8O was completely dissolved in 10ml of water. Calculate the concentration of the solution in **moles per** litre. (RAM: C = 12, H = 1, O = 16).

(4 marks)

Continued/...

5. **(Continued)...**

c. Work out the molecular formula of a hydrocarbon which has a carbon to hydrogen ratio of 1:1 and its relative formula mass is 78. (RAM: C = 12, H = 1)

(4 marks)

6. **a. Define enthalpy change.**

_____

_____

(1 mark)

b. Draw an energy level diagram for the following equation.

$NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l) \quad \Delta H = -57kJ/mol$

(4 marks)

7. a. Give any **two** sources of alkanoates.

_____

_____

(2 marks)

b. Draw the structure of a secondary alkanol with 3 carbon atoms.

(1 mark)

c. **Figure 3** shows a flow diagram of soap making process.

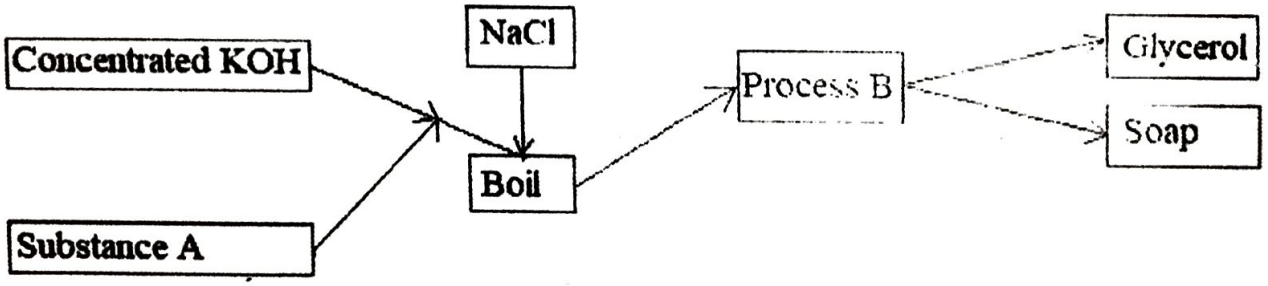


Figure 3

i. Name the homologous series of substance A.

_____

(1 mark)

ii. Why is process **B** necessary in soap making?

_____

_____

(1 mark)

d. Write the condensed formulae of any **two** isomers of an alkanol with a molecular formula C_4H_9OH.

_____

_____

(2 marks)

Continued/...

8. a. Give **two** examples of acidic oxides.

_____

_____

(2 marks)

b. Below are conjugate acid – base pairs for a chemical reaction between an acid and a base.

H_2CO_3 / HCO_3^- and NH_4^+ / NH_3

Write an equation for the reaction using the conjugate acid base pairs above.

_____

_____

(2 marks)

c. State any **two** benefits of recycling wastes.

_____

_____

_____

(2 marks)

9. **Table 1** shows boiling points of some chlorides which are represented by letters A, B, C, D and E. Use it to answer questions 9 a (i) and (ii).

Table 1

Chloride	Boiling point
A	~~98~~ 898
B	-80
C	50
D	1380
E	98

9. **(Continued/...**

a. i. Which **two** chlorides are ionic compounds?

_____

_____

(2 marks)

ii. Which of the compounds is hydrogen chloride gas?

_____

(1 mark)

b. Explain why preparation of composite manure is one way of solid waste disposal.

_____

_____

_____

(2 marks)

c. i. Define allotropy.

_____

_____

(1 mark)

ii. State **two** allotropes of oxygen.

_____

_____

(2 marks)

10. a. Using dot and cross diagrams, explain the difference between pure and dative covalent bonding.

_____

_____

_____

_____

_____

(4 marks)

Continued/...

b. With the aid of relevant chemical equations, describe preparation of ethanoic acid by oxidation of ethanol.

(5 marks)

SECTION B (30 marks)

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

11. a. Describe how ammonia is produced in industries by the Haber process.

(6 marks)

Continued/...

b. Explain how rusting of iron metal can be prevented by galvanizing.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4 marks)

12. With the aid of a flow diagram, describe how methanol, ethanal and propanone could be identified using 2,4 – DNPH and Tollens reagents.

(10 marks)

Continued/...

13. Describe how pure and dry crystals of Copper (II) sulphate can be prepared from Copper oxide and dilute Sulphuric acid.

(16 marks)

END OF QUESTION PAPER

NB: This paper contains 12 printed pages.