

NAME: \_\_\_\_\_ SCHOOL: \_\_\_\_\_

# THYOLO DISTRICT EXAMINATIONS

2023 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

## CHEMISTRY

Tuesday, 28 March 2023

Subject Number: M038/I

Time Allowed: 2 hours

8:00 -10:00 am

### PAPER I

### THEORY

(100 marks)

#### Instructions

1. This paper contains 10 printed pages. Please check.
2. Fill in your **Examination Name** and **School** at the top of each page.
3. This paper contains **two** sections, **A** and **B**. In **Section A** there are **ten** short answer questions while **Section B** there are **three** restricted essay questions.
4. Answer all the **thirteen** questions in the spaces provided.
5. Use of electronic calculators is allowed.
6. The maximum number of marks for each answer is indicated against each question.
7. In the table provided on this page, **tick** against the number of question you have answered.

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

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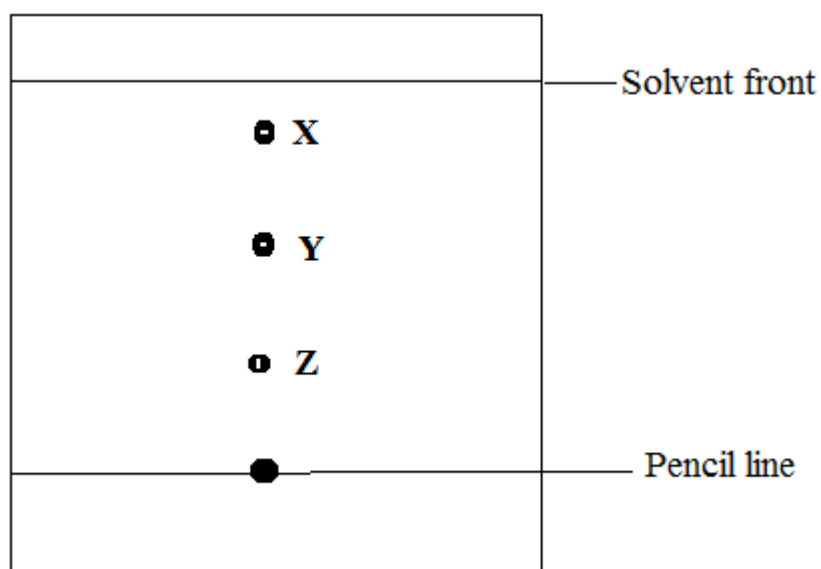
**Section A (70 marks)**

Answer **all** the questions in this section

1. a. Define the term 'hypothesis'.

\_\_\_\_\_  
\_\_\_\_\_  
(1 mark)

- b. **Figure 1** shows a pattern left on absorbent paper after chromatography.



**Figure 1**

- (i) What name is given to the pattern? \_\_\_\_\_ (1 mark)
- (ii) Workout the relative flow value of **Y**.

(3 marks)

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c. Explain how magnesium hydroxide is used to treat stomach upsets.

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(3 mark)

2. a. Name the main property that enables metals to be;

(i) drawn into wires.

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(1 mark)

(ii) used for making bells.

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(1 mark)

b. Explain why covalent compounds are more volatile than ionic compounds.

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(3 marks)

c. Draw the ionic structure of potassium hydroxide.



(2 marks)

3. a. State any **two** physical properties of phosphorus.

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(2 marks)

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b. Explain the importance of sulphur in agriculture.

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**(3 marks)**

c. Describe how hydrous copper sulphate can be used to demonstrate reversible reaction.

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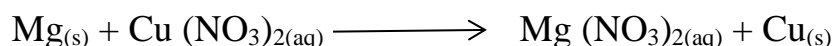
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**(5 marks)**

4. Magnesium metal reacts with copper nitrate according to the following equation:



a. Write an ionic equation of the reaction.

**(3 marks)**

b. Identify a reducing agent and reduced species.

Reducing agent: \_\_\_\_\_

Reduced species: \_\_\_\_\_

**(2 marks)**

c. Which metal is more reactive? Explain.

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**(3 marks)**

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5. a. Define the following term 'conformers'.

\_\_\_\_\_  
\_\_\_\_\_(1 mark)

b. Explain the structural difference between propanal and propanone.

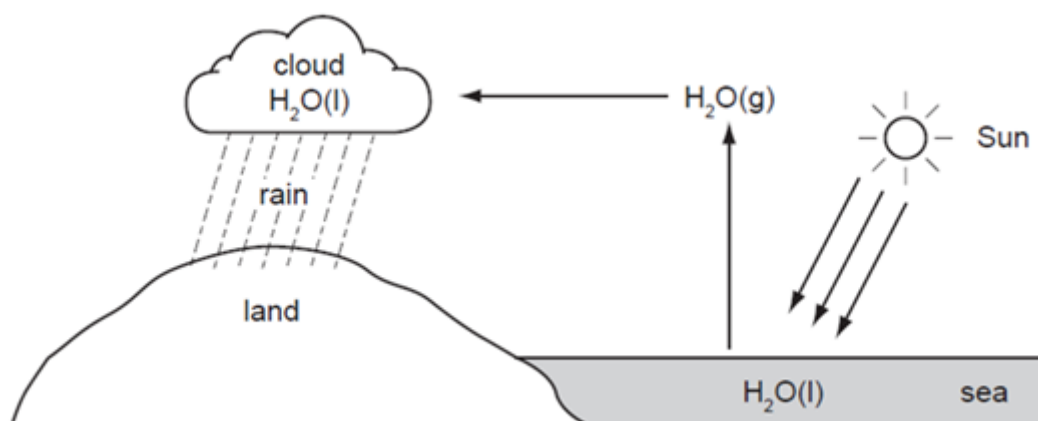
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_(2 marks)

c. Draw the structure of a tertiary alkanol with four carbon atoms.



(3 marks)

6. **Figure 2** is a diagram showing part of the water cycle



**Figure 2**

a. State the name of each of the following changes.

H<sub>2</sub>O (l) → H<sub>2</sub>O (g) \_\_\_\_\_

H<sub>2</sub>O (g) → H<sub>2</sub>O (l) \_\_\_\_\_

(2 marks)

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b. Explain the role of the sun in the water cycle.

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(3 marks)

7. a. Mention any **two** dangers associated with excessive consumption of alcoholic drinks.

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(2 marks)

b. Explain why thermosetting plastics do **not** melt when heated.

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(3 marks)

c. Explain how galvanization prevents rusting.

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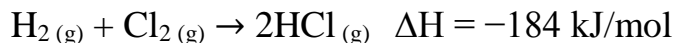
(2 marks)

8. a. Define the term 'concentration'.

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(1 mark)

b. Hydrogen gas reacts with chlorine gas according to the following thermochemical equation;



(i) Is the reaction exothermic or endothermic? Give reason.

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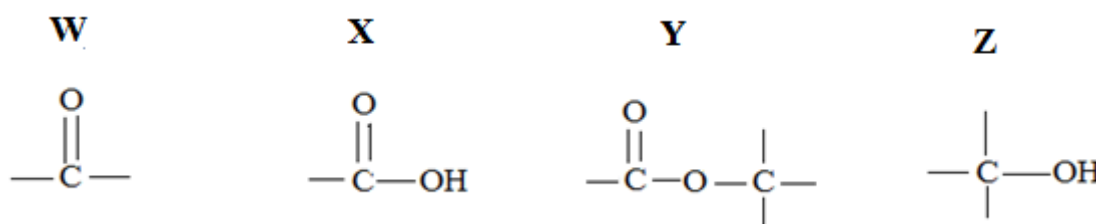
(2 marks)

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- (ii) Calculate the net heat of reaction if 10 g of hydrogen gas reacted with excess chlorine gas. (RAM of H = 1)

(3 marks)

9. **Figure 3** shows functional groups of organic compounds.



**Figure 3**

- a. Identify homologous series of compounds with functional formula **W** and **Y**.  
W \_\_\_\_\_  
Y \_\_\_\_\_ (2 marks)
- b. Mention any **two** uses of **Z**.  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)
- c. Draw the skeletal structure of **Z** with six carbon atoms.

(2 marks)

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10. a. Mention any **two** greenhouse gases.

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(2 marks)

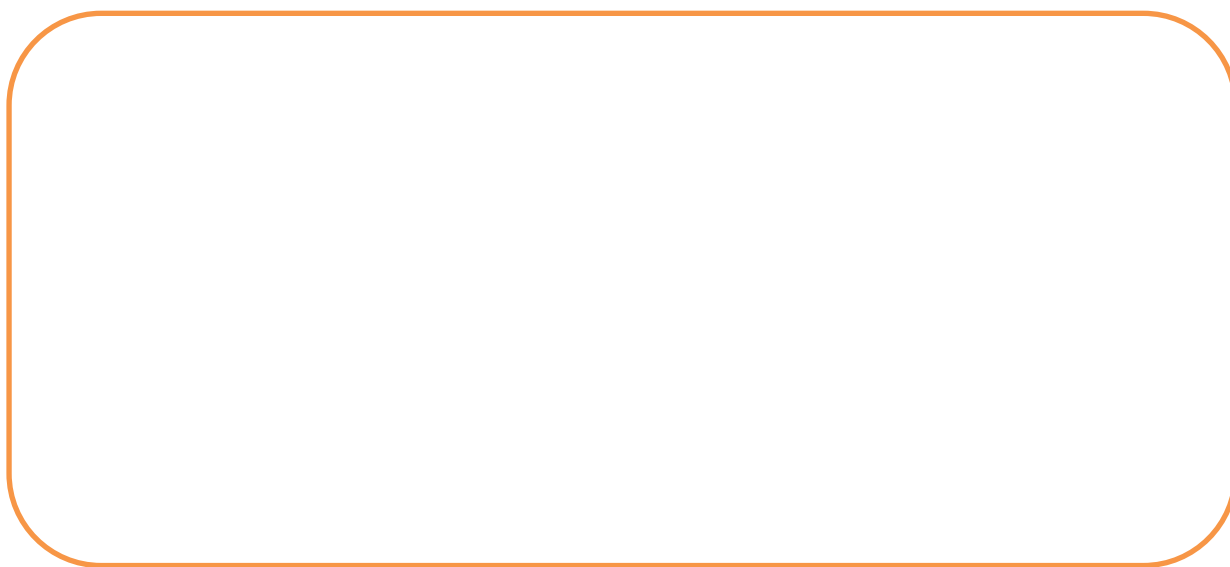
b. Explain the disadvantage of disposing wastes in landfills.

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(2 marks)

c. Calculate the mass of oxygen gas that occupies a volume of  $112 \text{ dm}^3$  at standard temperature and pressure. (RMM  $\text{O}_2 = 32$ )



(3 marks)

### SECTION B (30 marks)

Answer **all** the questions in this section

11. a. Using chemical equations, describe how nitric acid is prepared by oxidation of Ammonia.

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**(6 marks)**

b. Describe how burning causes global warming.

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**(4 marks)**

12. Using chemical equations, describe how ethanoic acid is prepared using ethanol.

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**(10 marks)**

13. Describe an experiment that could be carried out to determine the percentage of water in a hydrated compound.

**(10 marks)**

**END OF QUESTION PAPER**

**NB: This paper contains 10 printed pages**