

CANDIDATE'S NAME: _____

ZINGWANGWA EDUCATION CLUSTER

2022 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

CHEMISTRY

Subject Number: M038/I

Time Allowed: 2 hours

08:00 – 10:00am

PAPER I (100 marks)

Theory

Instructions:

1. There are **two** sections in this paper; **A** and **B**.
2. Answer **all** questions in **all** sections.
3. Write your **Name** on top of each page of your question paper.
4. In the table provided on this page, **tick** against the question number 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			

© 2022 Zingwangwa Education Cluster

Turn over

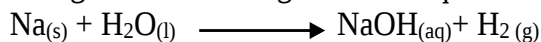


CANDIDATE'S NAME: _____

Section A (70 marks)

Answer **all** questions from this section.

1. Sodium (Na) reacts with water (H₂O) to produce sodium hydroxide (NaOH) and hydrogen gas (H₂) according to the following chemical equation:



- a. Balance the equation.

_____ (2marks)

- b. Propane (C₃H₈) burns in oxygen to produce carbon dioxide (CO₂) and water (H₂O) according to the equation. $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$. Work out:

- i. The mass of CO₂ produced if 88g of propane is used

(2marks)

- ii. The mass of propane required if 20g of water is produced

(2marks)

- c. (i) Explain how surface area of reactants affect the rate of chemical reaction.

_____ (1mark)

- (ii) Explain why catalyst do not affect the position of the equilibrium in a reversible chemical reaction.

_____ (1mark)

CANDIDATE'S NAME: _____

2. a. Define an acid according to Lowry-Bronsted theory.

(1mark)

b. Outline any **two** properties of a base.

(2 marks)

c. Complete the following by writing the conjugate acid-base



(4marks)

d. Explain how hydronium ion is produced.

(2marks)

d. Explain how you can test the strength of an acids.

(2marks)

3.a. Define Preferential discharge.

(1mark)

b. Mention **two** factors affecting preferential discharge.

(2 marks)

CANDIDATE'S NAME: _____

c. Give **two** uses of electrolysis.

(2 marks)

d. Give the name of the precipitate formed when Lead Nitrate solution is mixed with Sodium bromide.

(1 mark)

4. a. Mention any **two** allotropes phosphorus.

(2marks)

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

(2 marks)

5. a. (i) Which element is more reactive between Sodium (Na) and Magnesium (Mg)?

(1mark)

(ii) Give reason for your answer to question 5. a. (i).

(1mark)

b. Gabriellium is a newly discovered metal element by form 4 learners at Mantegna CDSS. After taking a series of tests, they found that the element is very soft and reacts vigorously with water giving out a gas that produces a pop sound to a glowing splint. Its solution turns red litmus paper to blue.

(i) Suggest the family of this element.

(1mark)

(ii) Would this element be found along the banks of river?

(1mark)

(iii) Suggest a reason for your answer to question 5 b(ii).

(1mark)

CANDIDATE'S NAME: _____

(iv) Suggest how you can safely keep Gabriellium in the laboratory.

(1mark)

(v) Give the name of the gas that was produced from the reaction.

(1mark)

6. a. Define the term waste management.

(1mark)

b. Give any **three** major sources of wastes.

(3 marks)

c. Explain how compost manure is one way of solid waste disposal.

(1mark)

d. Give any **two** benefits of recycling waste.

(2marks)

7. a (i) Give the importance of ozone layer.

(1mark)

(ii) Explain how car manufacturers contribute to the damage of ozone layer

(2marks)

(iii) Explain how combustion is a source of greenhouse gases.

(1mark)

CANDIDATE'S NAME: _____

b. Write any **two** effects of global warming.

(2marks)

8. a. Differentiate between hard water and soft water.

(1 mark)

b. Give **two** methods of removing hardness in water.

(2marks)

c. Mention **two** importance of hard water to everyday life.

(2marks)

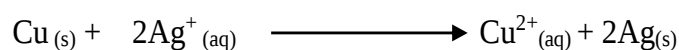
d. Work out the concentration in g/dm³ of 0.08M Sodium Carbonate (Na₂CO₃) solution.

(3 marks)

9. a. What is oxidation in terms of redox reaction?

(1mark)

b. Study the chemical equation below and use it to answer questions that follow:



Write:

i. Oxidation half equation

(1mark)

ii. Reduction half equation

(1mark)

iii. Oxidizing agent

(1mark)

CANDIDATE'S NAME: _____

10. a. Define ionization energy.

(1mark)

b. Two elements S and T form ions with the electron configuration as shown below.

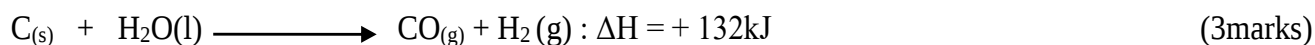
$S^- = 2:8$ and $T^+ = 2:8:8$

(i). Draw the electron arrangement of the atoms of S and T. (2marks)

(ii). Write the formula of the compound formed between S and magnesium metal. (1mark)

(iii). What type of bond is formed in the compound of magnesium and S? Explain. (2marks)

c. Draw the heat energy level diagram for the reaction below:



CANDIDATE'S NAME: _____

Section B (30 marks)

11. a. Explain how white anhydrous copper sulphate turns blue when reacted with water.

[illegible]

b. Describe how a knife is silver plated.

[illegible]

CANDIDATE'S NAME: _____

12. Design an experiment that can be conducted to prepare 250cm³ Na₂CO₃ solution of 0.5M concentration by dissolution.

[illegible]

CANDIDATE'S NAME: _____

13. With the aid of a flow chart, describe the industrial preparation of Sulphuric (VI) acid.

[illegible]

END OF QUESTION PAPER