

CANDIDATE'S NAME: _____

MZUZU DIOCESE

2022 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

CHEMISTRY

Subject Number: M038/I

Time Allowed: 2 hours

01:30 – 03:30pm

Wednesday, 13th July

PAPER I (100 marks)

Theory

Instructions:

1. This paper contains 14 printed pages. Please check.
2. There are **two** sections in this paper; **A** and **B**.
3. Answer **all** questions in **all** sections.
4. Write your **Name** on top of each page of your question paper.
5. 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 MZ Diocese

Turn over

Section A (70 marks)

Answer **all** questions in this section.

1. a. State two ways of presenting data for easy interpretation.

(2 marks)

- b. Observing laboratory safety rules is important in chemistry.

- i. Name two safety equipment that should be worn when using acids

(2 marks)

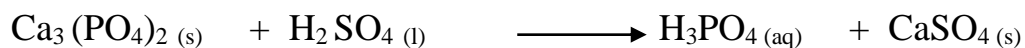
- ii. What should you do if acids spill on your skin?

(2 marks)

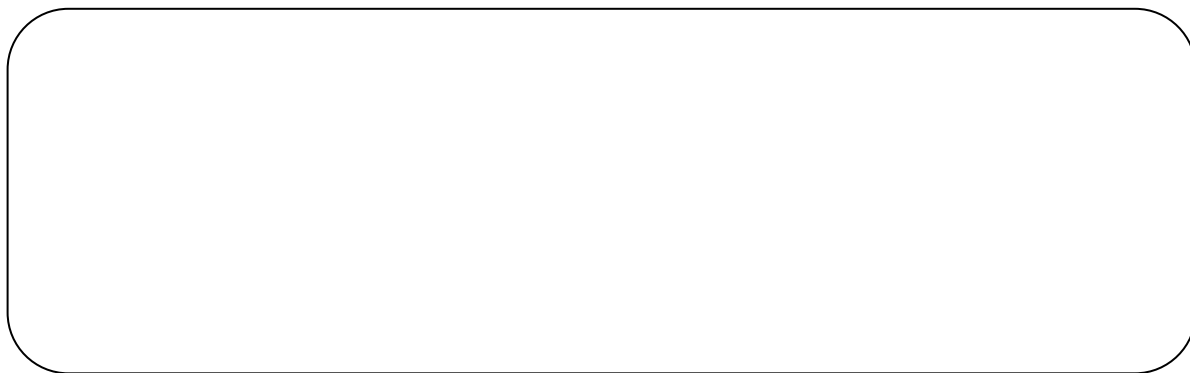
- c. State two ways of disposing laboratory wastes.

(2 marks)

2. Phosphoric acid is manufactured from calcium phosphate according to the following equation.



- a. Balance the equation.



(3marks)

- b. Calculate the mass in kg of phosphoric acid that would be obtained if 155kg of calcium phosphate reacted completely with the acid. (Ca = 40, P =31, S = 32, O =16, H=1)



(4 marks)

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

(1mark)

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

(2marks)

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



(4 marks)

- d. State one advantage of using the universal indicator to identify acids and bases over other indicators in the laboratory.

(1 marks)

4. An certain element could be represented as



- a. Find the number of

(i) neutrons

(1 mark)

(ii) electrons in the outermost energy level

(1 mark)

b. (i) To which group of the periodic table does X belong?

(1 mark)

(ii) Give a reason for your answer.

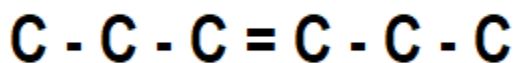
(1 mark)

5. a. What do you understand by term isomerism

(1 mark)

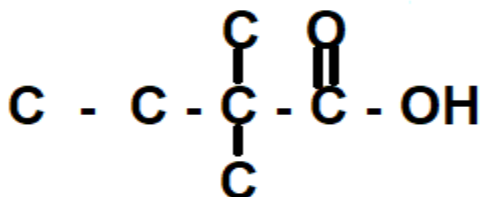
b. Name the following isomers

(i)



(1 mark)

(ii)



(1 mark)

- c. Using the structures of monomer, show how polyvinylchloride (PVC) is formed.



(3 marks)

- c. What type of polymer is PVC?

(1 mark)

6. a Define the term allotropy

(1 mark)

- b. Give a reason why graphite is able to conduct electricity?

(2 marks)

- c. State any two uses of diamond and for each use give a reason why diamond is a suitable material for that.

(4 marks)

- d. Name any two chemical properties of ionic compounds

(2 marks)

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

(1mark)

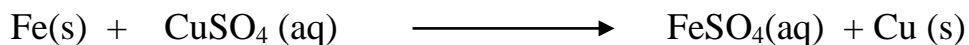
- b. Write any **two** effects of global warming.

(2marks)

- c. Explain term ion exchange in relation to removal of permanent water hardness

(2marks)

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



i. Write oxidation half equation for the reaction.

(1mark)

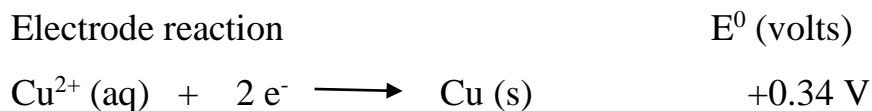
ii. Write reduction half equation for the reaction.

(1 mark)

iii. Write the net ionic equation for the reaction

(1 mark)

b. Use the E^0 values given to answer the the questions that follow



i. Calculate the electromotive force for the electrochemical cell



(3 marks)

b. Will the reaction in 4 (a) above take place. Give a reason for answer.

(2 marks)

9. a Define the term molarity

(1 mark)

b. (i) Define the term retention flow value as used in chromatography.

(1 mark)

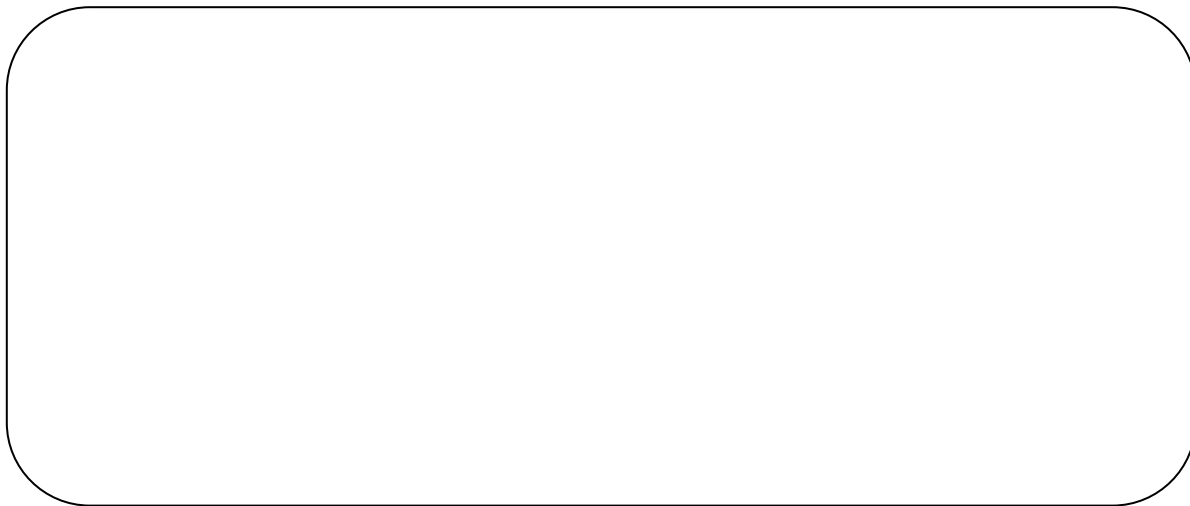
(ii) Explain how you can test for water in anhydrous cobalt(II) chloride(CoCl_2).

(3 marks)

10.a Explain how surface area of reactants affects the rate of reaction.

(2 marks)

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



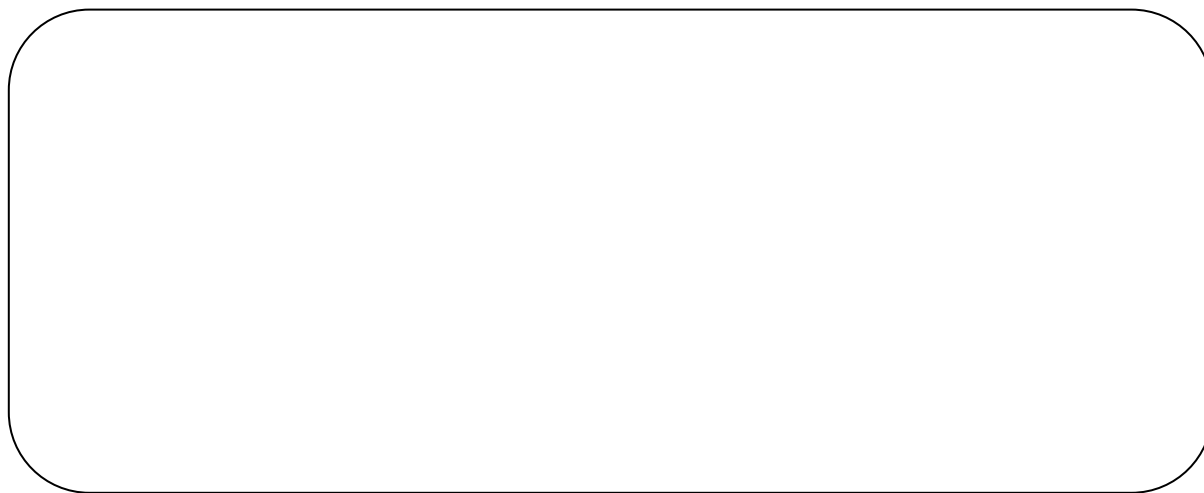
(3 marks)

(ii) Identify the type of reaction 10 b(i)

(1 mark)

Section B (30 Marks)

11.a. Illustrate the **dative bond** using Ammonium ion (NH_4^+).



(3 marks)

b) 20g of sodium hydroxide pellets were dissolved in water to make 400cm³ of solution. 100cm³ of 2M sodium hydroxide solution was added to this solution.

What is the molarity the solution? (Na = 23, O =16, H =1)



(7 marks)

12. With the aid of a well labelled diagram, explain how the electrolysis of concentrated sodium chloride solution occurs. In your explanation,. Include the half equations.

[illegible]

(10 marks)

13. a) With the aid of a well labelled diagram, explain how ethanol is prepared in the laboratory by fermentation of glucose.

[illegible]

(7marks)

b) Write the chemical equation for the reaction above.

(3 marks)

END OF QUESTION PAPER

NB: This paper contains 14 printed pages.