EXAMINATION NO.:_____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2024 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

CHEMISTRY

Subject Number: M038/II

Thursday, 4 July

Time Allowed: 2 hours
10:00 am onwards

PAPER II

Practical

(40 marks)

Instructions

1. **This paper contains 6 printed pages. Please check.**
2. Write your **Examination Number** at the top of each page.
3. Answer **all** the **four** questions in the spaces provided.
4. Use of scientific calculators 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 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			

Section A (20 marks)

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

1. With the aid of well labelled diagrams, describe an experiment that could be conducted to show that molten lead bromide conducts electricity while solid lead bromide does not.

(10 marks)

2. With the aid of an equation, describe the preparation of ethyl ethanoate.

(10 marks)

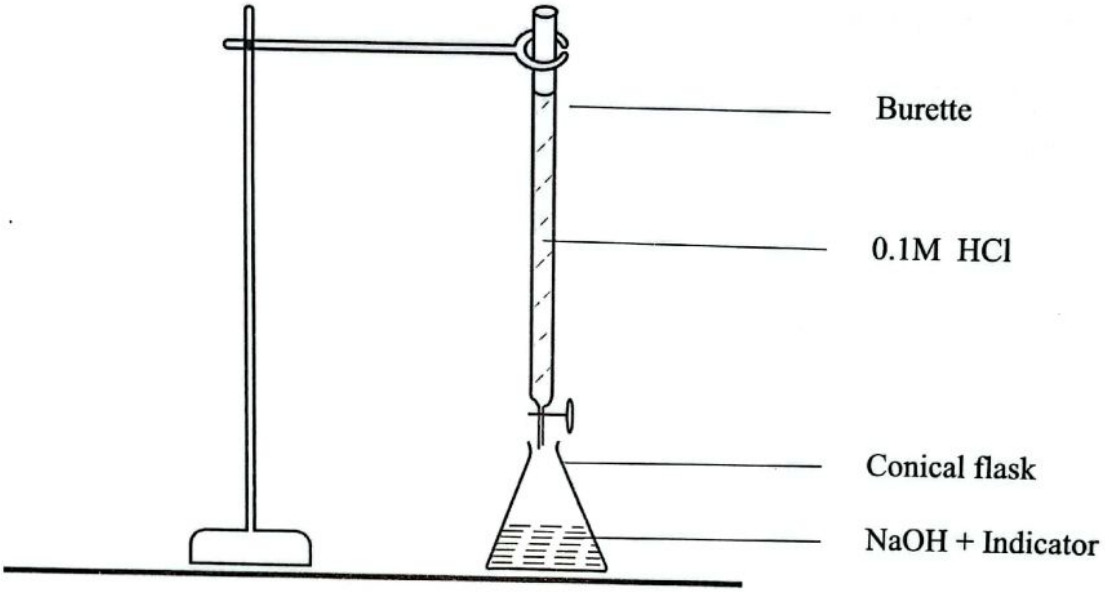
Continued/…

Section B (20 marks)

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

3. You are provided with 0.1M hydrochloric acid (HCl) solution, sodium hydroxide (NaOH) solution of unknown concentration, phenolphthalein indicator in a dropper bottle and distilled water in a wash bottle. You are also provided with a burette, a conical flask, a measuring cylinder, a white tile/paper, funnel, a clamp and stand.

a. Set up the apparatus as shown below:



b. Put 15cm^3 of sodium hydroxide (NaOH) solution in the conical flask.

c. Add 3 drops of phenolphthalein indicator to the NaOH in the conical flask.

d. Fill the burette to the brim with hydrochloric (HCl) acid solution.

e. Record the initial volume of HCl solution in the burette in **Table 1** under 1st run on **page 5**.

f. Gradually add the HCl solution from the burette into the NaOH in the conical flask. Swirl the conical flask while adding. Stop adding HCl when the solution just changes to colourless.

g. Record the final volume of HCl solution in **Table 1.**

h. Find the volume of the HCl solution used.

i. Rinse the conical flask and repeat steps **b** to **h**. Record the volumes under 2nd run.

Continued/…

3. (Continued)

Table 1

Volume of HCl (cm^3)	**1st Run**	**2nd Run**
Initial volume		
Final volume		
Volume of HCl used		

(4 marks)

j. Calculate the average volume of the HCl used.

(1 mark)

k. Write a balanced chemical equation for the reaction between HCl solution and NaOH solution.

(2 marks)

l. Calculate the concentration of the NaOH solution.

(3 marks)

4. You are provided with solutions **P, Q, R** and **S** in dropper bottles.
You are also provided with anhydrous copper sulphate powder, 4 pieces of white paper and a spatula.

a. Put one spatula of anhydrous copper sulphate on a piece of white paper.

b. Add 3 drops of solution **P** onto the anhydrous copper sulphate on the white piece of paper.

c. Observe and record any colour change in **Table 2.**

d. Repeat steps **a** to **c** with solutions **Q, R** and **S**, using fresh pieces of white paper.

Table 2

Solution added to anhydrous copper sulphate	Colour change
P	
Q	
R	
S	

(4 marks)

e. Classify the solutions into those that contain water and those that do not contain water.

Solutions that contain water: _____

Solutions that **do not** contain water: _____

(4 marks)

f. Explain the answer in **4(e).**

_____

_____

(1 mark)

g. Apart from anhydrous copper sulphate, what other substance could have been used in this experiment?

_____

(1 mark)

END OF QUESTION PAPER

NB: This paper contains 6 printed pages.