NAME_____ EXAMINATION NO.: _____

NGULUDI CLUSTER EXAMINATIONS BOARD

2021 MALAWI SCHOOL CERTIFICATE MOCK EXAMINATIONS

CHEMISTRY

Tuesday, 10 August   **Time Allowed: 2 hours**
                                          (2: 00 – 4:00 pm)

PAPER I
THEORY
(100 marks)

Instructions

1. T**his paper contains 10 printed pages. Please check.**

2. **Write your name** and **Examination Number** at the top of each page.

3. This paper contains **two** sections **A** and **B**. In **Section A** there are short answer questions while in **Section B** there are restricted essay questions.

4. **Answer all the ten** questions in the spaces provided.

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 number of the question you have answered.
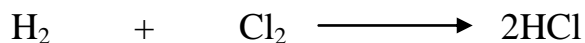
Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Turn over

Section A (70 marks)

Answer all the questions

1. a. Hydrogen gas (H_2) and Chlorine (Cl_2) gas react to form Hydrogen chloride (HCl).

$$H_2 \quad + \quad Cl_2 \quad \longrightarrow \quad 2HCl$$

If the total energy required to break the reactants bonds is 678kJ and total energy produced is 862kJ,

  i. is the reaction endothermic or exothermic?

_____**(1 mark)**

  ii. Give a reason for the answer in 1.a. i.

_____

_____**(1 mark)**

  iii. Draw the energy level diagram for the reaction.

(3 marks)

b. i. Explain how milk of magnesia regulates stomach pH.

_____

_____

_____

_____**(3 marks)**

ii. Describe the amphoteric oxides.

_____

_____**(2 marks)**

c. Hydrocarbon containing 92.3% Carbon and 7.7% Hydrogen by mass. Determine its empirical formula.   (Hint: RAM C=12, H=1

(4 marks)

2. a. i. Write half equations for the reaction between magnesium (Mg) and silver nitrate ($AgNO_3$).

_____

_____

_____ **(2 marks)**

ii. Name the reducing agent in 2. a. i.

_____ **(1 mark)**

b. i. Define "electron configuration".

_____**(1 mark)**

ii. Describe the metallic bonding.

_____

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_____ **(3 marks)**

c. i. Mention any two similarities between carbon diamond and silicon dioxide.

_____

_____

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_____ **(2 marks)**

ii. Explain why steels are used in constructions.

_____

_____

_____

_____ **(3 marks)**

d. i. What is a heterogeneous mixture?

_____ **(1 mark)**

ii. Describe how a mixture of sand and salt can be separated.

_____

_____

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_____

_____ **(4 marks)**

3. a. i. What is the difference between precision and accuracy of an experimental result?

_____

_____

_____

_____ **(2 marks)**

ii. State any one way of disposing flammable wastes.

_____ **(1 mark)**

b. **Figure 2** is a setup for an experiment to test the presence of hydrogen gas.
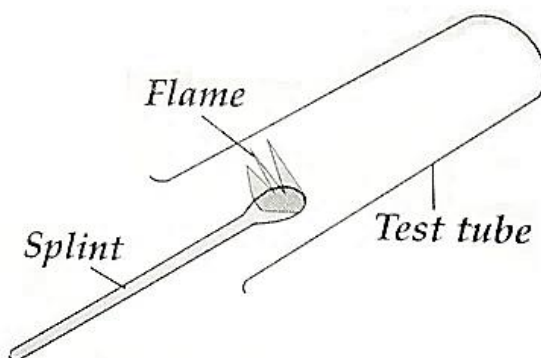

Figure 2

    i. Why the production of popping sound indicates the presence of hydrogen gas?

_____ **(1 mark)**

    ii. Write a chemical equation for the reaction in the test tube.

_____**(2 marks)**

c. i. Explain how impurities affect the boiling point of a substance.

_____

_____

_____ **(2 marks)**

    ii. Write 0.075×10^6 moles in a standard form.

_____ **(1 mark)**

    iii. Explain how the boiling point can be used to determine the purity of a substance.

_____

_____

_____**(2 marks)**

4. a. i. What are green – house gases.

_____

_____ **(1 mark)**

    ii. Describe how ion – exchange method is applied to soften hard water.

_____

_____

_____

_____ **(4 marks)**

5. a. i. State any two natural sources of organic compounds.

_____

_____ **(2 marks)**

    ii. With relevant examples, differentiate saturated hydrocarbons from unsaturated hydrocarbons.

_____

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_____**(2 marks)**

  b. i. Draw a molecular structure of a tertiary alcohol with 5 carbons.

(2 marks)

    ii. Explain why only small alkanols dissolve in water.

_____

_____

_____ **(3 marks)**

6. a. **Figure 1** is the skeletal formula of an organic compound.

                                     Figure 1

    i.   Name the compound.

_____ **(1 mark)**

    ii. Write the molecular formula of this compound.

_____ **(1 mark)**

    iii. In which homogenous series is the compound?

_____ **(1 mark)**

  b. Draw all the isomers of butane (C_4H_{10}).

(2 marks)

7. a. i. Explain how nuclear charge affects atomic radius.

_____

_____

_____ **(2 marks)**

ii. Explain how nitrogen can be used to preserve food in plastic containers.

_____

_____

_____

_____ **(3 marks)**

b. **Table 1** shows ionisation energies of Beryllium (Be).

IONIZATION ENERGY NUMBER	ENTHALPY (kJ/MOL)
1st	899
2nd	1 800
3rd	14 390

Table 1

i. What is an ionisation energy?

_____ **(1mark)**

ii. Explain the reasons for the trend shown in the ionisation of Beryllium.

_____

_____

_____ **(3 marks)**

Section B (30 marks)

Answer all the questions

8. a. Describe fractional distillation as a means of separating petroleum components.

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_____**(5 marks)**

b. Describe how aldehydes can be distungished from ketones using silver mirror method.

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_____**(5 marks)**

9. With an aid of a diagram(s) describe how the sodium chloride salt can be prepared from sodium hydroxide and dilute hydrochloric acid.

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.   **(10 marks)**

10. With the aid of a well labelled diagram, describe an experiment that could be done to distinguish a strong base from a weak base using conductivity apparatus.

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(10 marks)

END OF QUESTION PAPER

NB: This paper contains 10 printed pages.