CANDIDATE NAME: _____

HILL CRESCENT PVT SECONDARY SCHOOL

2021 MALAWI SCHOOL CERTIFICATE OF EDUCATION

MOCK EXAMINATION

CHEMISTRY

Subject Number: M038/I

Tuesday, 05 October, **2021** **Time allowed:2hrs**

PAPER I

(100 Marks)

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

11			

Instructions

1. This paper contains **9** printed pages. **Please check.**
2. Answer all questions in all sections in the spaces provided.
3. Write your **Name / Examination Number** on top of each answer sheet you have used.
4. In the table provided to the right of this page tick against the question you have answered.
5. Use of electronic calculators is allowed.

SECTION A (70 Marks)

Answer all the questions in the spaces provided in this section

1. a) State **two** branches of chemistry.

_____

_____(2 marks)

b) Give **any two** differences between an element and a compound

_____

_____

_____

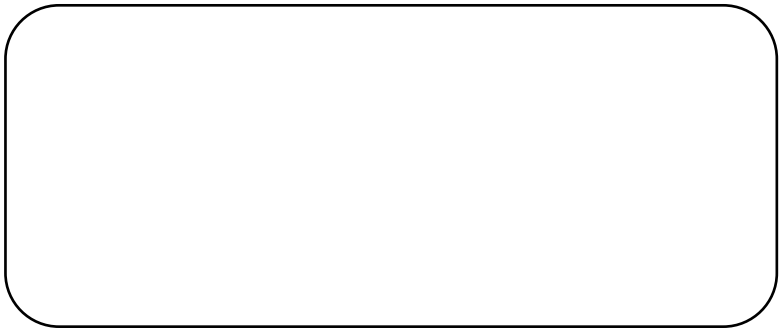
_____(4 marks)

c) Define an isotope

_____

_____(1 mark)

d) An atom of element X can be represented by the symbol $^{16}_{6}X$. If element X contains 70% of ^{16}X and 30% of ^{18}X. Calculate the relative atomic mass.



(3 marks)

2. **a)** Write a balanced chemical equation for the reaction between sodium metal and oxygen to form sodium oxide.

_____

_____

_____**(3 marks)**

b) Explain why hexane has higher melting point than ethane

_____

_____**(2 marks)**

c) State any **two** methods of separating mixtures.

_____

_____**(2 marks)**

d) Explain why metals have high boiling and melting points.

_____

_____**(2 marks)**

3. **a)** Describe any **two** effects of hard water in everyday life.

_____

_____

_____

_____**(4 marks)**

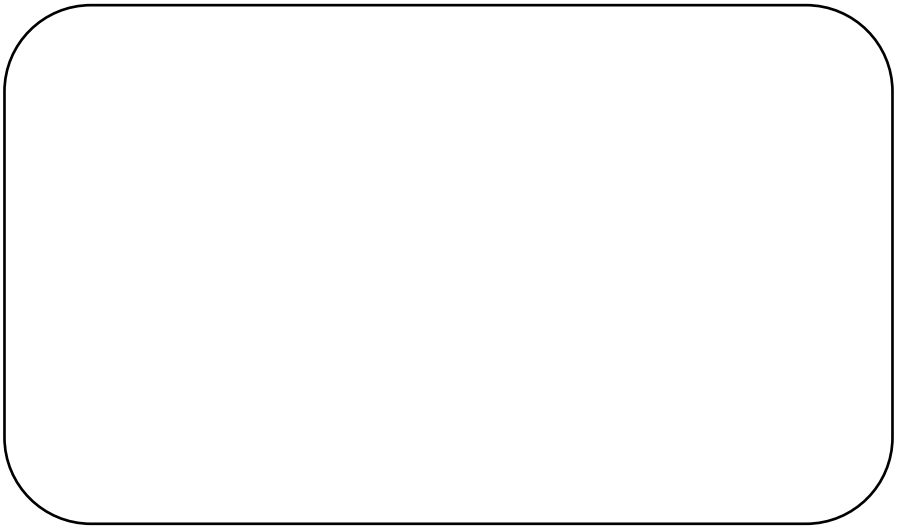
b) Explain how phosphorus can improve food security.

_____

_____**(2 marks)**

c) With the aid of a dot and cross diagram, draw the structure of methane molecule, CH_4 (C=6,

H=1)



(3 marks)

d) Define a condensation reaction

_____

_____**(1 mark)**

4. Ammonia is an example of a strong base.

   a) What is a "strong base"?

   _____**(1 mark)**

   b) Write a chemical equation to show the ionization of ammonia in water

   _____

   _____

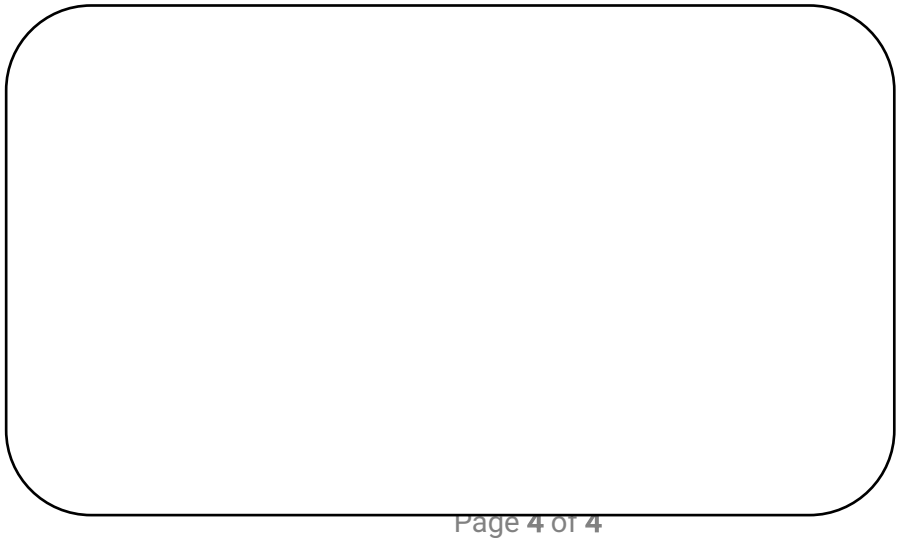
   _____**(3 marks)**

   c) Identify one conjugate acid base pair from the equation in 4**b**

   _____**(1 mark)**

5. **a)** Draw an energy level diagram for the following chemical reaction.

   $NaOH_{(aq)} + HCl_{(aq)} \longrightarrow NaCl_{(aq)} + H_2O_{(l)}$, $\Delta H = -57kj/mol$



(3 marks)

b) Is the reaction in 5(a) endothermic or exothermic?

_____(1 mark)

c) Give a reason for the answer to 5(b)

_____

_____(2 marks)

d) What is the meaning of (aq) and (l) in the equation?

_____

_____(2 marks)

6. **a)** Table 1 shows atomic numbers and electron configuration of some elements

Table 1

Element	Atomic Number	Electron configuration
A	18	2, 8, 8
B	10	2, 8
C	20	2, 8, 8, 2
D	12	2, 8, 2
E	2	2
F	9	2, 7

i) Identify an element that comes first in period 2

_____**(1 mark)**

ii) Which two elements can form positive ions?

_____

_____**(2 marks)**

iii) Give a reason for the answer to 6a (ii)

_____

_____**(2 marks)**

b) What are hydrocarbons?

_____**(1 mark)**

c) Figure below shows formula of some organic compounds A, B, C and D.

C_3H_7OH	C_5H_{10}	C_2H_5COOH	C_9H_{20}
A	**B**	**C**	**D**

i) Which compounds are hydrocarbons?

_____

_____(2 marks)

ii) Name compound A

_____

_____(1 mark)

iii) Draw molecular structure of compound C.

(2 marks)

iv) Draw the structure of the two isomers of butane (C_4H_{10})

(2 marks)

7. **a)** The following is part of a reactivity series

Magnesium (Mg)
Aluminium (Al)
Zinc (Zn)
Iron (Fe)

↑ Increasing reactivity

Copper (Cu)

i) Which **two** elements will displace zinc (Zn) from its oxide?

_____

_____(2 marks)

ii) Give a reason for your answer to 7a(i)

_____

_____(1 mark)

b) The following are half equations for the reaction between magnesium (Mg) and Silver nitrate ($AgNO_3$):

$2A_g^+(aq) + 2e \longrightarrow 2A_g^0(s)$

$M_g^o(s) - 2e \longrightarrow M_g^{2+}(aq)$

i) Write a full chemical equation for the reaction

_____

_____**(2 marks)**

ii) Name the reducing and oxidizing agents in 7b(i)

_____

_____**(2 marks)**

8. **a)** Define air pollution

_____

_____**(1 mark)**

b) List down any **two** common pollutants of air.

_____

_____**(2 marks)**

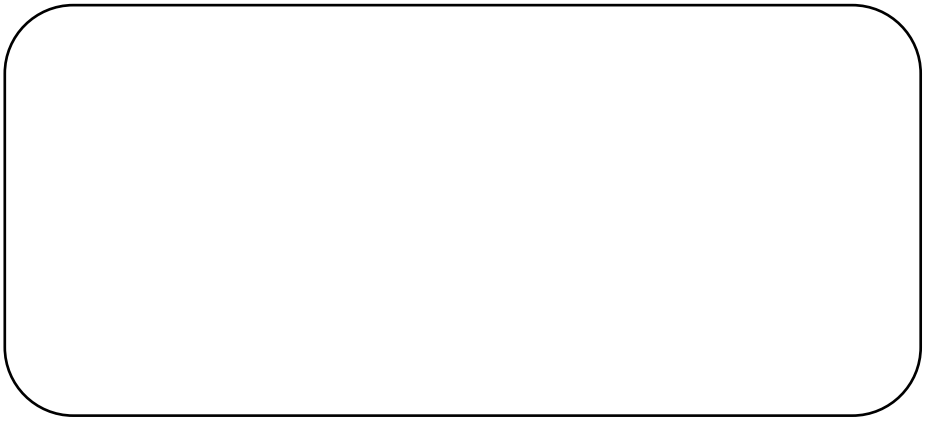
c) Give any **three** major sources of wastes

_____

_____**(3 marks)**

d) A hydrocarbon is found to contain 24g of carbon and 4g of hydrogen. Workout its

empirical formula.



(3 marks)

SECTION B (30 Marks)

- ✓ Answer all the questions in this section

9. With the aid pf a well labelled diagram, explain what happens during the electroplating of an iron nail with copper using copper chloride as electrolyte.

(10 marks)

10. Describe how you would prepare 250cm^3 of a 1.8M solution of sodium hydroxide, NaOH using sodium hydroxide pellets.

__(10 marks)

11. With the aid of a well labelled diagram, design an experiment to investigate the conditions necessary for rusting.

_____(10 marks)

END OF QUESTION PAPER