EXAMINATION NUMBER: ———————————————— CLASS: ——

ATIEL GIRLS ACADAMY

2021 MSCE MOCK EXAMINATIONS FOR CHEMISTRY

(100 MARKS) **M038/I**

DATE: **TIME ALLOWED:** 2 Hours

INSTRUCTIONS:

1. Write your Examination Number on each page.
2. This paper contains printed **11 printed** pages. Please check.
3. Show your working. Calculators may be used.
4. Answer **all** questions.

1a. What do you call Group II elements in the Periodic Table?

———————————————————————————— (1 mark)

b. Give any **two** uses of calcium metal.

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———————————————————————— (2 marks)

c. Discuss any **two** general trends of elements in the periodic table.

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———————————————— (4 marks)

d. What does the Halogen mean?

———————————————————————————— (1 mark)

f. **Table 1** shows melting and boiling points of halogens. Complete the table.

Halogens	Melting point (^oC)	Boiling point (^oC)	Physical state of matter
Fluorine	-223	-187	
Chlorine	-102	-35	
Bromine	7	59	
Iodine	114	183	

Table 1 (2 marks)

g. From **Table one** what is the trend in boiling points of halogens as one of physical properties?

---------- (1 mark)

2a. Explain how does temperature affect rate of reaction.

---------- (1 mark)

b. Write a well balanced chemical equation of an acid and a base and identify conjugate pairs for the reaction.

---------- (4 marks)

c. Calculate mass of sodium chloride produced when 5.3g of sodium carbonate reacts with dilute hydrochloric acid following the equation below:

(Hint: RAM for Na =23, C =12, O =16, H =1 and Cl =35.5).

$Na_2CO_{3(s)} + 2HCl_{(aq)} \longrightarrow 2NaCl_{(S)} + H_2O_{(l)} + CO_{2(g)}$

(4 marks)

3a. Alkanes and alkenes are hydrophobic.

(i) Define the word "Hydrophobic".

---------- (1mark)

(ii) What property do alkanes and alkenes display while showing that they are hydrophobic?

---------- (1 mark)

b. Apart from what mentioned in 3a(ii), give any other **two** physical properties of

ethane.

---------- (2 marks).

c. What is combustion reaction?

———————————————————————— (1 mark) d. Alkanes undergo substitution reaction. With the aid of chemical equations, discuss any **one** substitution reaction in alkanes.

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—————————————————————— (2 marks)

e. Calculate the percentage of nitrogen atoms in ammonium nitrate- NH_4NO_3.

(3 marks).

4a. Differentiate unsaturated hydrocarbons from saturated hydrocarbons. Give any **one** of them.

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———————————————————————— (2 marks)

b. Give any **two** examples of unsaturated hydrocarbons.

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———————————————————————— (2 marks)

c. Draw a structural formula for **one** of unsaturated hydrocarbons mentioned in “4b”.

(2 marks)

d. What is the product obtained when vinyl chloride undergoes

polymerisation?

---------- (1 mark)

e. Mention any **two** differences between thermosoftening plastics and thermosetting plastics.

---------- (4 marks)

f. An organic compound containing carbon, hydrogen and oxygen was subjected to combustion reaction analysis. 2g of the compound on complete combustion gave 4.56g of carbon dioxide and 1.862g of water. Calculate the empirical formula of the compound.

(4 marks)

5a. Define the term "chemical bond"

---------- (1 mark)

b. Explain why nitrogen molecule has strongest covalent bonds but it has low boiling point as it boils at -196^{o}C?

---------- (2 marks)

c. Give a reason why do elements that belong to groups I to VII undergo

different chemical reactions?

---------- (1 mark).

d. 23g of anhydrous calcium carbonate, $CaCO_3$ was dissolved in $250cm^3$. Calculate concentration in g/dm^3.

(4 marks)

6a . **Table 2** shows atomic number of elements D, Q, T, X and Z:

Element	Atomic number
D	3
Q	13
T	16
X	18
Z	19

Table 2

(i) Identify any **two** letters that represent elements which belong to Period 3 in the Periodic Table.

---------- (2 marks)

(ii) What type of chemical bonding would exist when elements Q and T react?

---------- (1 mark)

(iii) Write down a balanced chemical equation for the reaction between

elements D and T.

---------- (3 marks)

b. Outline the chemical equations of the **four** stages of the Contact process in production of sulphuric acid, H_2SO_4 starting from sulphur, S.

---------- (4 marks)

c. Mention any **three** optimum conditions required when manufacturing nitric acid by Ostwald process.

---------- (3 marks)

7. **Figure 1** shows a simple distillation. Use it to answer questions below:

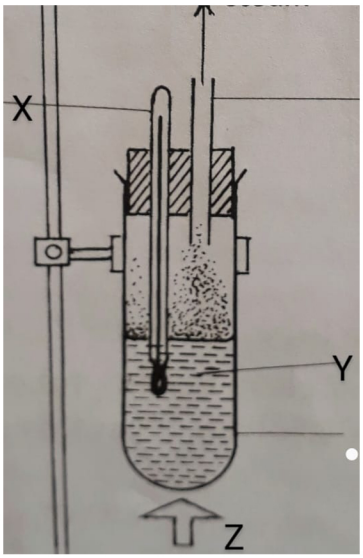

Figure 1

a. Name the parts marked **X, Y** and **Z**.

X ----------

Y ----------

Z ---------- (3 marks)

b. Explain why do we use heat in simple distillation when separating miscible liquids?

---------- (2 marks)

8a. What is chemical reaction?

---------- (1 mark)

b. Distinguish physical changes from chemical changes. Give any **two**.

-------- (4 marks)

c. **Figure 2** shows one of potential hazards associated with laboratory chemicals that are involved in chemical reactions:

Figure 2

(i) What does the **figure 2** explain to us?

---(2 marks)

(ii) Discuss the main use of these potential hazards put onto a bottle containing chemicals.

--- (2 marks)

d.i) State the Le Chatetier's Principle.

--- (1 mark)

ii) Describe how you can increase the product when it is endothermic reaction.

--- (1 mark)

9a. Define the term "isomerism".

--- (1 mark)

b.Differentiate positional isomers from chain or branched isomers.

--- (2 marks)

c. Draw any **three** positional isomers of $C_5H_{10}O$ and name them.

(3 marks)

c. Explain why branched chains of organic compounds have lower boiling points than unbranched chains of the same molecular formula?

---------- (2 marks)

10. With the aid of a well labeled diagram, design an experiment that could be carried out to prepare ammonia gas in the laboratory.

EXAMINATION NUMBER: ———————————————— CLASS: ——

---------- (10 marks)

The End of Question Paper