



UNIVERSITI KUALA LUMPUR  
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

---

**FINAL EXAMINATION**  
**OCTOBER 2025 SEMESTER**

---

COURSE CODE : HSB10503  
COURSE TITLE : CHEMISTRY  
PROGRAMME NAME : BACHELOR OF OCCUPATIONAL SAFETY & HEALTH (HONOURS)  
DATE : 30 JANUARY 2026  
TIME : 9:00AM - 12:00PM  
DURATION : 3 HOURS



---

**INSTRUCTIONS TO CANDIDATES**

---

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet.  *Tick if applicable*
9. Refer to the attached Formula/ Appendies.  *Tick if applicable*

---

THERE ARE 6 PAGES OF QUESTIONS INCLUDING THIS PAGE

---

## SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

## Question 1

Calculate the number of electrons and neutrons for each of the element in the table.

Refer Below - Table1 : Elements .

(10 marks)

Table 1: Elements

Element	Symbol	Atomic Number	Nucleon Number	Electrons	Neutrons
Lithium	Li	3	7		
Sodium	Na	11	23		
Calcium	Ca	20	40		
Potassium	K	19	39		
Carbon	C	6	12		

## Question 2

Calculate the Relative Molecular Mass (RMM) for respective chemical formula.

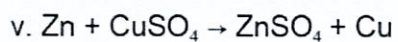
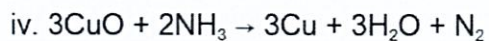
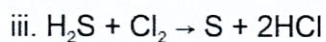
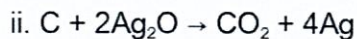
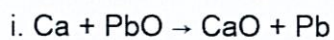
- Bromine gas,  $\text{Br}_2$
- Glucose,  $\text{C}_6\text{H}_{12}\text{O}_6$
- Aluminium sulphate,  $\text{Al}_2(\text{SO}_4)_3$
- Zinc nitrate,  $\text{Zn}(\text{NO}_3)_2$
- Calcium carbonate,  $\text{CaCO}_3$

Relative Atomic Mass;  $\text{Br}=80$ ,  $\text{C}=12$ ,  $\text{H}=1$ ,  $\text{O}=16$ ,  $\text{Al}=27$ ,  $\text{S}=32$ ,  $\text{Zn}=65$ ,  $\text{N}=14$

(10 marks)

**Question 3**

Examine the oxidation and reduction reaction in the chemical equation below.



(10 marks)

**Question 4**

Examine the functional group and classify each of the following compounds as saturated, unsaturated, or non-hydrocarbon.

i. Butane

ii. Propene

iii. Methanol

iv. Hexane

v. Ethanoic acid

(10 marks)

## SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

## Question 1

In a laboratory investigation to identify a mysterious white crystalline solid found in an unlabeled container, technicians performed an elemental analysis that revealed a composition of **32.4% sodium**, **22.6% sulfur** and **45.0% oxygen**. Relative atomic masses (Na=23, S=32, O=16).

Identify the empirical formula for the substance. Show your calculation in order to acquire the formula.

(20 marks)

## Question 2

Chemical bonding is a natural process where atoms interact to reach a lower, more stable energy state by completing their outermost electron shells. Most atoms are inherently unstable because they possess incomplete valence shells; to remedy this, they follow the octet rule, which is the tendency to seek a configuration of eight electrons similar to the highly stable noble gases.

Illustrate the formation of **ONE (1)** covalent compound and **TWO (2)** ionic compounds from the element give in the figure.

*Refer Below - Figure1 : Elements .*

(20 marks)



Figure 1: Elements

**Question 3**

The rate of a chemical reaction is simply a measure of how quickly reactants are converted into products over a specific period of time. Think of it as the "speed limit" of a chemical change: some reactions, like an explosion, have a very high rate, while others, like the rusting of a bridge, have a very low rate. This speed depends entirely on how often and how energetically molecules collide with one another.

Examine the **FOUR (4)** factors that will effect the rate of reaction based on the example given in the table.

*Refer Below - Table2 : Example of Factors that Effect the Rate of Reaction .*

(20 marks)

Table 2: Example of Factors that Effect the Rate of Reaction

Factor	Daily Life Example
Surface Area (Size)	<b>Chopping Sausages:</b> Small slices of sausage cook through much faster than one whole, thick sausage.
Temperature	<b>Refrigerating Milk:</b> Milk stays fresh in the fridge but sours quickly on a warm counter.
Concentration	<b>Dish Soap:</b> Using "Concentrated" soap cuts through grease faster than a watery, diluted version.
Catalyst	<b>Catalytic Converters:</b> A device in your car's exhaust system that cleans exhaust gases.

**Question 4**

Isomerism occurs when molecules share the same molecular formula but differ in how their atoms are arranged or oriented in space. These variations are split into structural isomers, where the chemical bonds themselves are connected differently and stereoisomers, where the connections are the same but the 3D shape differs.

Illustrate the all isomer for heptane ( $C_7H_{16}$ ). Provide the name for each chemical structure indicated.

(20 marks)

END OF EXAMINATION PAPER



