

# **CHEMISTRY ENTRANCE TEST SAMPLE PAPER**

sample paper only provide  
10 MCQ and 2 SAQ

Actual Paper  
Total 30 MCQ + 4 SAQ

Each MCQ is 2 marks  
Each SAQ is 10 marks

## Instructions

1. This is a **closed-book** test.
2. It has a time limit of **90 minutes** and allows for only **ONE attempt (submission)**.
3. Alert the invigilator if you are facing technical difficulties.
4. You are to **ensure** that:
  - your laptops, computers and any other devices used for this test is in good functioning order and have uninterrupted power supply and internet connection throughout the duration of the test.
  - you are in a conducive environment throughout the duration of the test.
  - your answers are correctly saved by the end of the test.
5. You are **allowed** to use:
  - a scientific calculator.
  - A blank piece of paper (no larger than A4 size) for rough work. The paper will not be accepted for submission at the end of the test.
6. You are **not allowed** to:
  - leave the test or leave your devices throughout the duration of the test.
  - use the washroom throughout the duration of the test.
  - communicate with any person, either face-to-face or through any communication device, other than the invigilator.
  - refer to any references, e.g. textbooks, resources from a laptop or smart devices etc.
  - share materials (e.g. electronic calculator) during the test.
  - use any communication devices such as mobile phones, tablets, smart watches, headsets during the test.
7. Enter the password provided by the invigilator to start Test paper.

**SECTION A (20 MARKS)**

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

- A1. Methanol boils at 65°C and water boils at 100°C. Given that methanol and water are completely miscible with each other, which is the **MOST SUITABLE** method to separate a mixture of these two liquids?
- Evaporation
  - Crystallisation
  - Fractional distillation
  - Paper chromatography ( )
- A2. A stopper was removed from a bottle containing perfume **A** and the time taken for the scent to reach the opposite side of the room was noted. The experiment was repeated using perfume **B**, which had a **LOWER** molecular mass than perfume **A**. Based on the information provided, predict the time taken for perfume **B** to reach the opposite side of the room compared to perfume **A**.
- Same as perfume **A**.
  - Shorter than perfume **A**.
  - Longer than perfume **A**.
  - Insufficient data to compare the time taken by perfume **A** and **B**. ( )
- A3. Two isotopes of carbon are  $^{12}_6\text{C}$  and  $^{13}_6\text{C}$ . Which statement about the isotopes is **TRUE**?
- They have the same number of electrons and neutrons.
  - They have the same number of electrons and protons.
  - They have the same number of neutrons and protons.
  - They have the same number of nucleons and electrons. ( )
- A4. A label is missing from a bottle of green solution **C**. In order to identify the solution, two chemical tests are carried out.
- Test 1: A few drops of aqueous sodium hydroxide are added to a sample of solution **C**. A green precipitate is formed.
- Test 2: Excess aqueous sodium hydroxide and aluminium are added to another sample of solution **C** and heated. A pungent gas, which turns damp red litmus paper blue, is produced.

What is **C**?

- a. Iron(II) nitrate  
 b. Iron(III) nitrate  
 c. Iron(II) sulfate  
 d. Iron(III) sulfate ( )

A5. Which statement describes the formation of a covalent bond?

- a. Electrons are shared between metallic atoms.  
 b. Electrons are shared between non-metallic atoms.  
 c. Electrons are transferred from a metallic atom to a non-metallic atom.  
 d. Electrons are transferred from a non-metallic atom to a metallic atom. ( )

A6. The electronic configuration of atom **D** is 2, 7. The electronic configuration of atom **E** is 2, 6. What is the formula of the compound formed between atoms **D** and **E**?

- a. **D<sub>2</sub>E**  
 b. **DE<sub>2</sub>**  
 c. **D<sub>6</sub>E**  
 d. **DE<sub>7</sub>** ( )

A7. Manganese(III) sulfate has the formula,  $Mn_2(SO_4)_3$ . What is the charge on the manganese ion?

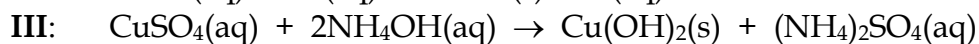
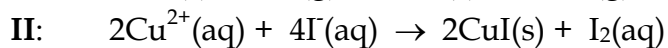
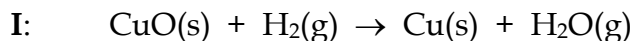
- a. 2+  
 b. 3+  
 c. 2-  
 d. 3- ( )

A8. Dissolving sodium carbonate in water is an exothermic process. Which row shows the change in temperature of solution and the direction of heat flow when sodium carbonate is dissolved in a beaker of water?

	Temperature of solution	Direction of heat flow
a.	Increase	To surrounding
b.	Decrease	To surrounding
c.	Increase	From surrounding
d.	Decrease	From surrounding

( )

A9. In which equation is copper reduced?



a. **I & II**

b. **I & III**

c. **II & III**

d. **I, II & III**

( )

A10. The following reactions are carried out.

Reaction	Result
Ammonium chloride is added to barium hydroxide.	Gas <b>F</b> is given off.
Sulfuric acid is added to ammonium carbonate.	Gas <b>G</b> is given off.
Hydrochloric acid is added to an aqueous solution of ammonia.	Compound <b>H</b> is formed

What are **F**, **G** and **H**?

	Gas <b>F</b>	Gas <b>G</b>	Compound <b>H</b>
a.	Chlorine	Ammonia	Ammonium sulfate
b.	Ammonia	Carbon dioxide	Ammonium sulfate
c.	Carbon dioxide	Ammonia	Ammonium chloride
d.	Ammonia	Carbon dioxide	Ammonium chloride

( )

----- End of Section A -----

**SECTION B (20 MARKS)**

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

- B1. (a) Table 1 describes the properties of compounds. Complete Table 1 by writing True **OR** False in the spaces provided. (2 marks)

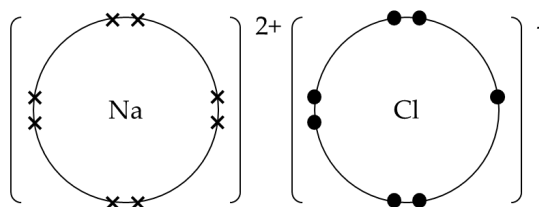
**Table 1**

Properties of compounds	True / False
A compound has a fixed composition.	True
A compound has a fixed melting/boiling point.	
A compound can only be decomposed by a chemical reaction.	

- (b) Sodium chloride and ethene are compounds with different physical and chemical properties. Figures 1 and 2 show the 'dot and cross' diagrams of the outer shell electrons in sodium chloride and ethene. Identify the **TWO** errors in **EACH** figure.

- (i) Sodium chloride (2 marks)

**Figure 1**



× electrons of Na  
● electrons of Cl

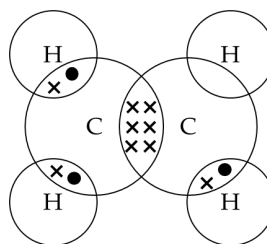
Error 1:

Error 2:

(ii) Ethene

(2 marks)

**Figure 2**



× electrons of C  
● electrons of H

Error 1:

Error 2:

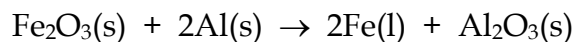
(c) Explain, in terms of structure and bonding, why:

(i) both solid sodium chloride and gaseous ethene do **NOT** conduct electricity. (3 marks)

(ii) molten sodium chloride will conduct electricity.

(1 mark)

- B2. In thermite welding, iron(III) oxide reacts with aluminium according to the following reaction.



- (a) Fine powders of both iron(III) oxide and aluminium are used in this reaction. State the advantage of using reactants in powder form. (1 mark)
- (b) If 9.00 g of iron(III) oxide is reacted with 2.80 g of aluminium, calculate the theoretical yield of molten iron in the reaction. (7 marks)
- (c) Determine the percentage yield if 5.23 g of molten iron is obtained from the reaction. (2 marks)

----- End of Paper -----



