

Chemistry Model Paper 2025

Time Allowed: 2 Hours

Total Marks: 75

You must bring a soft pencil (preferably type B or HB), a clean eraser, and a dark blue or black pen.

Before attempting the paper, write your name, candidate number, centre name, and centre number clearly in the designated spaces.

Instructions for Candidates

- **Section A** contains multiple choice questions. You are required to attempt all questions by selecting the most appropriate option and marking it on the separate MCQ answer sheet using a soft pencil.
- **Section B** comprises both theoretical questions and a practical component. All questions in this section are compulsory. Answers must be written in the space provided on the question paper using a dark blue or black pen. You may use an HB pencil for any diagrams or graphs.
- You may use a simple calculator if needed.
- You should show all your working and use appropriate units.
- Do not use an erasable pen or correction fluid.
- Avoid writing over any barcodes printed on the paper.

Information for Candidates

- This paper consists of a total of **75 marks**.
- **Section A** includes **20 multiple choice questions**, each carrying **1 mark**. There is no negative marking for incorrect answers.
- **Section B** carries a total of **55 marks**, divided as follows:
Theoretical Questions: 30 marks
Practical Component: 25 marks
- The number of marks for each question or part question is shown in brackets [].
- A copy of the periodic table will be provided with this paper.

Please read all questions carefully and follow the instructions exactly to ensure your responses are properly evaluated.

Section A: Multiple Choice Questions (20 questions)

Question 1

A bottle of perfume evaporates faster in summer than in winter. Why?

- A. Evaporation decreases with temperature.
- B. Evaporation increases with temperature.
- C. Evaporation is independent of temperature.
- D. Evaporation occurs only at boiling point.

Question 2

A block of solid iodine kept in an open container slowly disappears over time. Which statement best explains this?

- A. Iodine has a low melting point.
- B. Iodine sublimates at room temperature.
- C. Iodine dissolves in air.
- D. Iodine oxidises quickly.

Question 3

A student burns a piece of magnesium in open air and notices the mass of the product is greater than the mass of the original metal. Which explanation best fits the law of conservation of mass?

- A. Mass increased because new matter was created.
- B. Oxygen from the air combined with magnesium, increasing total mass.
- C. The magnesium lost mass as it reacted.
- D. Mass decreased because heat was released.

Question 4

A student accidentally stores potassium in a beaker that contains a thin film of water at the bottom. What is the MOST likely outcome?

- A. The potassium will slowly dissolve without danger.
- B. The potassium will absorb the water and expand.
- C. A violent reaction will occur, releasing hydrogen gas and heat.
- D. Nothing will happen until more water is added.

Question 5

Sodium and silicon are in the same period. Why does silicon behave less metallic than sodium?

- A. Silicon's valence electrons are more loosely held
- B. Silicon gains electrons more easily
- C. Sodium is farther to the left and loses electrons more easily
- D. Silicon has a larger atomic radius

Question 6

Which of the following shows the correct order of increasing non-metallic character across Period 3?

- A. $\text{Ar} < \text{Cl} < \text{S} < \text{P} < \text{Si}$
- B. $\text{Na} < \text{Mg} < \text{Al} < \text{Si} < \text{P} < \text{S} < \text{Cl}$
- C. $\text{Cl} < \text{S} < \text{P} < \text{Si} < \text{Al} < \text{Mg} < \text{Na}$
- D. $\text{Na} < \text{Al} < \text{Mg} < \text{Si} < \text{P} < \text{S} < \text{Cl}$

Question 7

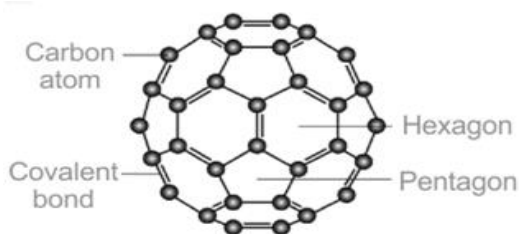
Which of the following bonds is formed when a molecule donates an electron pair to another molecule?

- A. Ionic bond
- B. Covalent bond
- C. Metallic bond
- D. Co-ordinate covalent bond

Question 8

What is the chemical formula of the fullerene known as buckminsterfullerene?

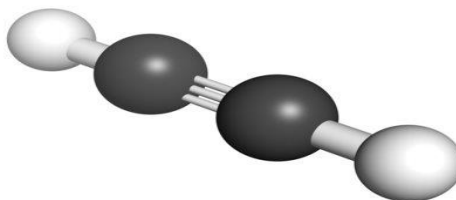
- A. C_{60}
- B. C_{70}
- C. C_{80}
- D. C_{90}



Question 9

In a molecule of ethyne, how many electron pairs are involved in the bonding between carbon- carbon atoms?

- A.2
- B.3
- C.4
- D.6



Question 10

A teacher asks a student to dissolve 2.5 g of sodium carbonate in 50 g of water. What will be the concentration of the prepared solution?

- A.4.76%
- B.5.00%
- C.47.6%
- D.95.2%

Question 11

A scientist prepares 0.125 M sodium chloride stock solution. What volume of the stock solution is required to prepare a 100 mL dilute solution of 0.05M?

- A.20mL
- B.40mL
- C.60mL
- D.100 mL

Question 12

Which of the following is a strong laboratory acid?

- A. Acetic acid (CH_3COOH)
- B. Carbonic acid (H_2CO_3)
- C. Hydrochloric acid (HCl)
- D. Ethanoic acid

Question 13

Soil with very low pH can cause:

- A. Better nutrient absorption
- B. Toxicity of certain metals
- C. Increased crop yield
- D. Excess oxygen in soil

Question14

Which setup is MOST suitable for measuring mass loss in the reaction between calcium carbonate and hydrochloric acid?

- A. Conical flask + balance + stopwatch
- B. Beaker + thermometer + ruler
- C. Gas syringe + pipette
- D. Measuring cylinder + funnel

Question15

In a photochemical reaction, light energy helps reactant molecules to:

- A. Slow down
- B. Reach excited state
- C. Become neutral
- D. Increase density

Question 16

Why does anhydrous copper sulphate change colour when water is added?

- A. Copper ions are reduced
- B. Water molecules chemically combine with CuSO_4
- C. The solid dissolves completely
- D. Copper sulphate decomposes

Question17

Which pair is correctly matched?

- A. Saturated hydrocarbon — decolourises bromine water
- B. Unsaturated hydrocarbon — contains only single bonds
- C. Saturated hydrocarbon — no reaction with bromine water
- D. Unsaturated hydrocarbon — substitution reaction with bromine

Question 18

Which general formula represents an ester?

- A. $R-OH$
- B. $R-COOH$
- C. $R-COO-R'$
- D. $R-CHO$

Question 19

The smelting of sulphide ores mainly releases:

- A. CO_2
- B. SO_2
- C. CH_4
- D. NO_x

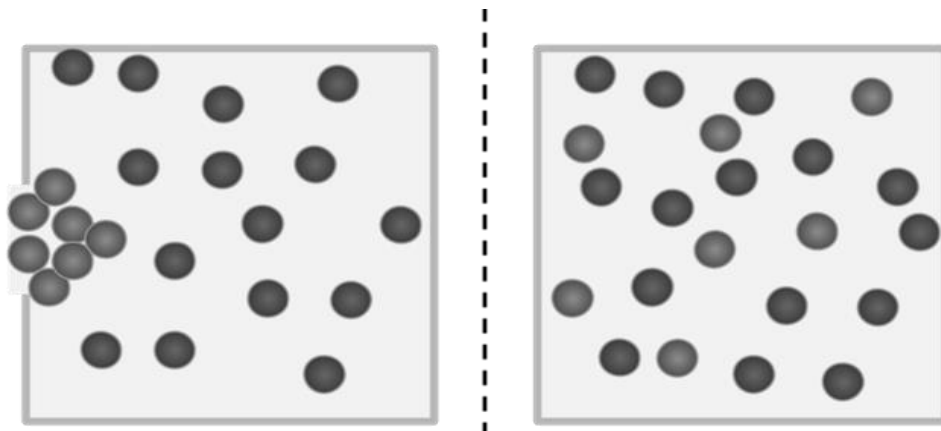
Question 20

Why does zinc protect iron in a galvanised coating?

- A. Zinc is less reactive than iron
- B. Zinc is more reactive than iron and corrodes first
- C. Zinc forms an impermeable layer
- D. Zinc reacts with water to produce oxygen

Section B: Theoretical Questions (Total marks: 30)

Q1. The process below shows the movement of gas molecules. Identify the given phenomenon.



a. Define the above given process.

..... [1]

b. [1]

In an experiment with hydrogen chloride and ammonia, the white ring of ammonium chloride forms closer to the hydrogen chloride end. Explain why.

.....

c. Name one factor, other than molecular mass, that affects the rate of diffusion. [1]

.....

d. Explain why gases diffuse faster than liquids. [1]

.....

Q2. Naturally occurring carbon consists of the isotopes ^{12}C , ^{13}C and ^{14}C . Its relative atomic mass is 12.0107.



a. Define the term isotopes. [1]

.....

b. Draw **TWO** isotopes of oxygen. [2]

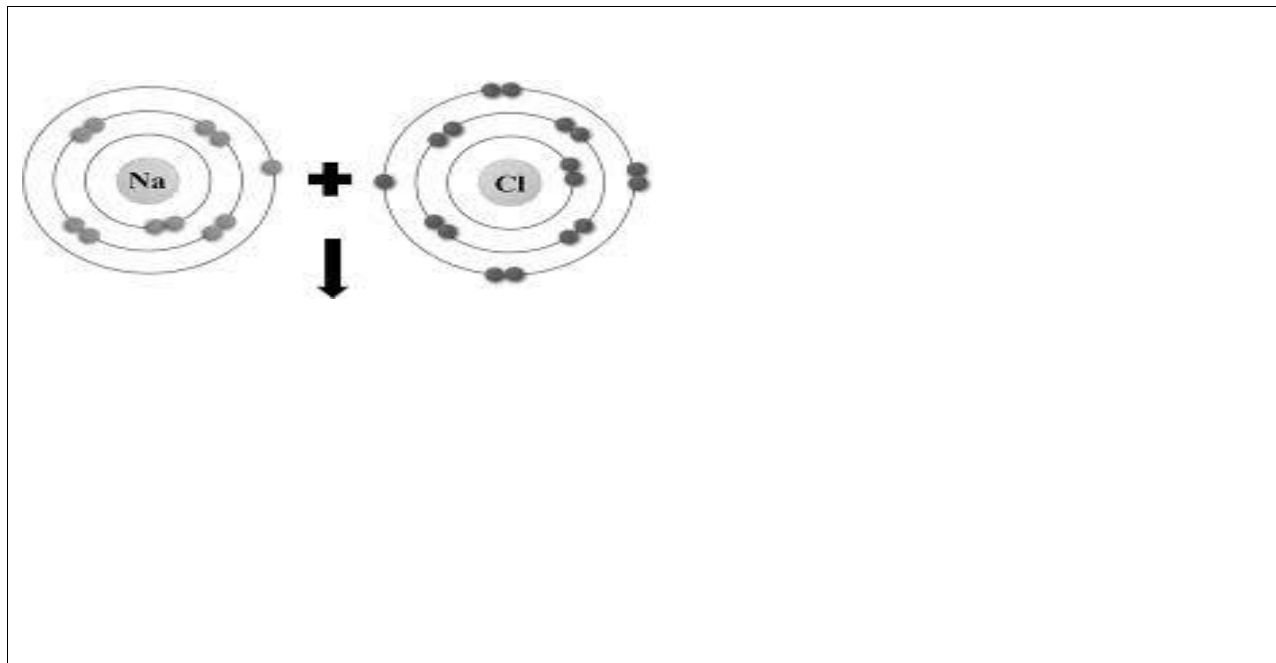
c. Give medical use of the isotope of iodine-131. [1]

.....

Q3.The given figure shows the formation of Sodium Chloride.

a.Draw the formation of Sodium and Chloride ions in the space provided.

[2]



b. Identify the following as ionic, covalent and Coordinate covalent.

[3]

	COMPOUND	TYPE OF CHEMICAL BOND
i	LiF Lithium Fluoride	
ii	H ₃ O ⁺ Hydronium ion	
iii	CO ₂ Carbon di oxide	

Q4.

a. Write balanced chemical equations for the following reactions.

i) Barium Chloride + Sodium Sulphate \longrightarrow Barium Sulphate + Sodium Chloride

Balanced equation: [1]

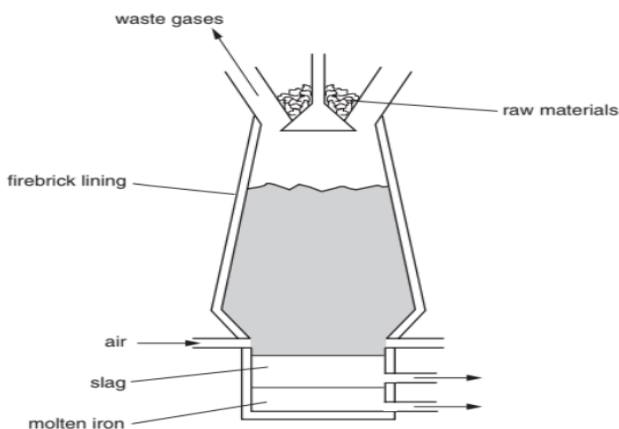
ii) Aluminum + Ferric Oxide \longrightarrow Iron + Aluminum Oxide

Balanced equation: [1]

b) Complete the following table by specifying the formula and valency of the given radical. [1]

Name of radical	Formula and valency
Bi Carbonate ion	

Q5. The given figure represents the extraction of iron from its ore.



a. Write the equations of the following reactions.

i. Reduction of Iron Ore (Hematite) [1]

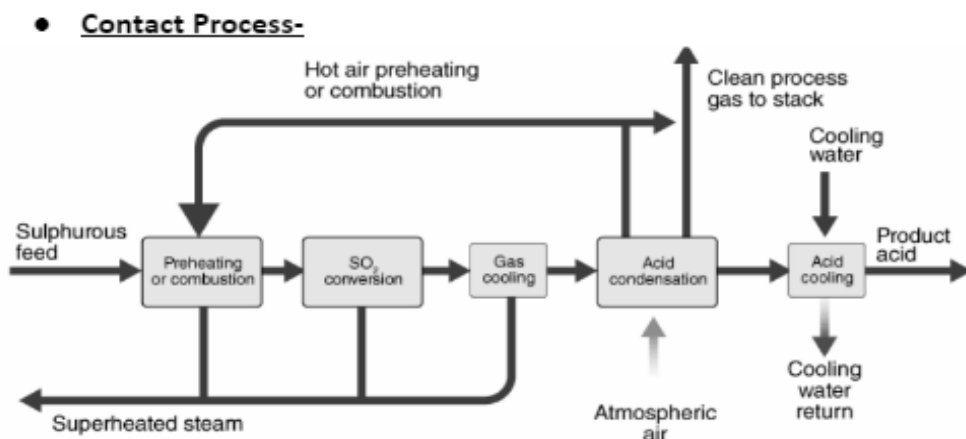
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ii. Formation of Slag (Impurity Removal): [2]

.....

.....

Q6.The following diagram represents the Contact prorocess of the formation of Sulphuric acid.



a.Name the catalyst used in the above given process.

[1]

.....

b. What are the ideal conditions for SO₃ formation?

[1]

.....

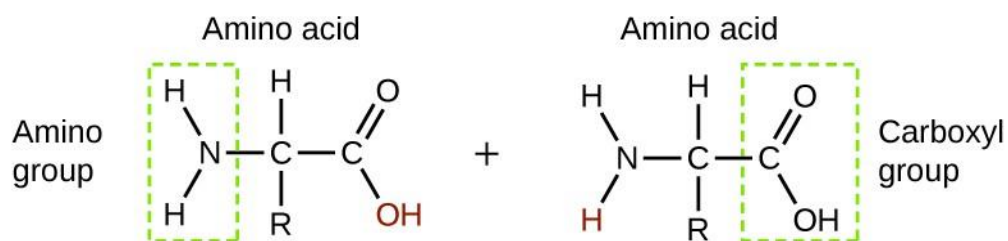
c.Why is SO₃ absorbed in H₂SO₄, not water?

[1]

.....

Q7.a Complete the given chemical reaction in the provided space

[2]



Q7b. Name the chemical reaction which is taking place in the above reaction.

[1]

.....

Q7.c. Give ONE example of a monomer

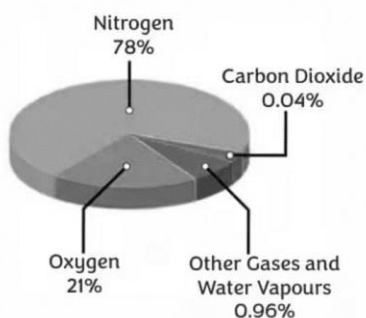
[1]

.....

Q7.d. Draw the structure of the above-mentioned monomer.

[1]

Q8.The given diagram shows the composition of air.



Q8.a Why is air considered a mixture and not a compound? Explain with reference to its composition. [1]

.....

Q8.b.During festivals, air pollution levels rise sharply. Explain the reasons and suggest one preventive measure. [1]

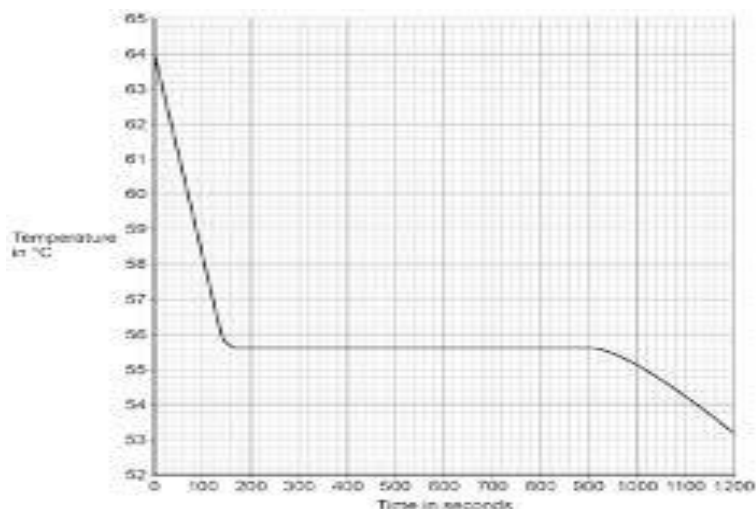
.....

Q8.c [1]

How does the presence of smoke and dust in air affect human health and the environment?

.....

Section B: PRACTICAL COMPONENT (Total : 25 marks)



Q1.a. How do intermolecular forces in stearic acid influence the shape and features of its heating and cooling curves? [1]

.....

Q1.b. Why does the temperature of stearic acid remain constant during phase changes despite continuous energy transfer, and how is this reflected differently in the heating and cooling curves? [1]

.....

Q1.c. Explain how latent heat is involved during the plateau region of the curve and why no temperature change is observed. [1]

.....

Q1.d. What evidence from the graph suggests that the substance is pure rather than a mixture? [1]

.....

Q1.e. If the substance were impure, how would the shape of the plateau region likely differ from the one shown? [1]

.....

Q2.a. A student dissolves 12 g of NaOH in 0.5 dm³ of water. Explain how the concentration in mol/dm³ would change if the volume of water was doubled but the mass of NaOH stayed the same. [2]

.....
.....

Q2.b. 24 dm³ of hydrogen gas is collected at room temperature. Predict what happens to the number of moles if the gas is compressed to 12 dm³ without changing temperature. Explain your reasoning. [2]

.....
.....

Q2.c. [1]

Calculate the number of moles in 12 dm³ of carbon dioxide gas (CO₂) at room temperature.

.....
.....

Q3.a. A student titrates 25.0 cm³ of a weak acid, ethanoic acid (CH₃COOH), with 0.100 mol/dm³ NaOH. Another student titrates 25.0 cm³ of hydrochloric acid (HCl) with the same NaOH solution.

Predict and explain which titration would show a sharper pH change near the equivalence point. [2]

.....
.....

Q3.b. Describe THREE properties of acidic substances. [3]

i.....

ii.....

iii.....

Q4a.State the uses of:

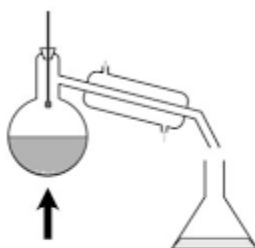
[5]

S.No	Name of the Substance	Use
i	Lime	
ii	Slaked lime	
iii	Calcium carbonate.	
iv	Sulphur	
v	Sulphur dioxide.	

Q5.a.Explain why different fractions of petroleum condense at different heights in the fractionating column.

[2]

.....
.....



Q5.b. Identify the above given separation technique.

[1]

.....

Q5.c.Explain the working principle of the above identified technique.

[1]

.....

Q5.d.Name any ONE compound which can be separated by this method.

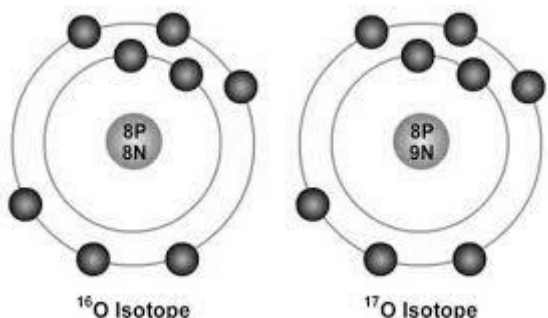
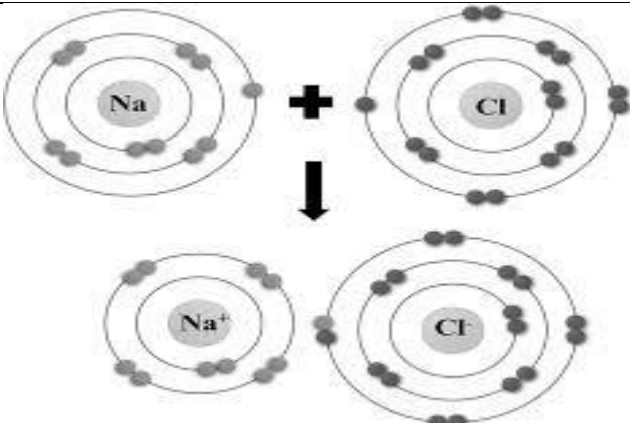
[1]

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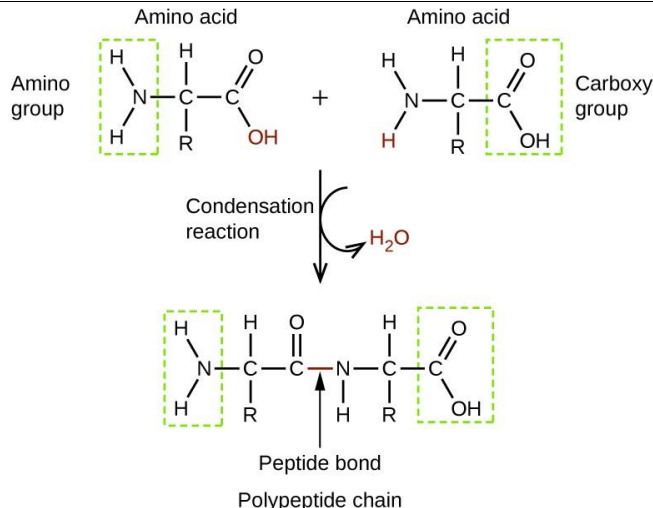
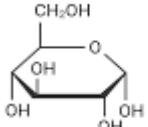
Chemistry Model Paper -Answer Key

Question Number	Answer Key
1	B
2	B
3	B
4	C
5	C
6	B
7	D
8	A
9	D
10	A
11	B
12	C
13	B
14	A
15	B
16	B
17	C
18	C
19	B
20	B

Section B: (55 marks) Theoretical (30 marks)

Q1a.	Diffusion is the process in which gas molecules move from a region of higher concentration to a region of lower concentration until they are evenly spread	1
Q1b.	Ammonia is lighter and diffuses faster, so it travels further.	1
Q1c	Temperature / concentration gradient / pressure	1
Q1.d	Gas particles have more kinetic energy and more space to move freely.	1
Q2.a	Atoms of the same elements having the same atomic number but different mass number	1
Q2.b	 <p>¹⁶O Isotope ¹⁷O Isotope</p>	2
Q2.c	Used for the treatment of thyroid	1
Q3.a		1+1

Q3b.i	Ionic bond	1
Q3 b.ii	Coordinate Covalent Bond	1
Q3 b.iii	Covalent Bond	1
Q4.a.i	$\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$	1
Q4.a.ii	$2\text{Al} + \text{Fe}_2\text{O}_3 \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$	1
Q4.b	HCO_3^{1-}	1
Q5.a.i	$\text{Fe}_2\text{O}_3(\text{s}) + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{l}) + 3\text{CO}_2(\text{g})$ (Primary reaction to form molten iron)	1
Q5a.ii.	$\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ (Limestone decomposes) $\text{CaO}(\text{s}) + \text{SiO}_2(\text{s}) \rightarrow \text{CaSiO}_3(\text{l})$ (Calcium oxide reacts with silica impurity to form liquid slag)	1 + 1
Q6.a	Vanadium(V) oxide V_2O_5	1
Q6.b	A compromise temperature of about 450°C is used for a good rate, even though lower temps favor equilibrium.	1
Q6.c	The reaction of SO_3 with water is extremely exothermic, creating a dangerous, fine mist of sulfuric acid that's hard to collect.	1

Q7.a	 <p>1 mark for completion of chemical reaction</p> <p>1 mark for elimination of water molecule</p>	2
Q7.b	Condensation reaction	1
Q7.c	Glucose	1
Q7.d	 <p>Glucose</p>	1
Q8 a	because its gases are present in variable proportions and retain their individual properties.	1

Q8.b.	due to burning of firecrackers and increased vehicular emissions	1
Q8.c	Smoke and dust cause respiratory problems in humans and reduce visibility, damage plants, and disturb ecosystems.	1

Section B: Practical Component (Total:25 marks)

Q1a.	Strong intermolecular forces in stearic acid require more energy to overcome, resulting in a distinct flat plateau at the melting/freezing point on the heating and cooling curves.	1
Q1b.	The energy supplied or removed is used to break or form intermolecular forces rather than change temperature	1
Q1c.	Latent heat is absorbed or released to change the state of stearic acid, so the energy alters particle arrangement instead of kinetic energy, causing no temperature change.	1
Q1d.	The graph shows a sharp, constant temperature plateau during the phase change, indicating a single, well-defined melting/freezing point characteristic of a pure substance.	1
Q1e.	the plateau region would not be flat or at a single temperature ; instead, it would be sloped or spread over a range of temperatures	1
Q2.a	If the volume is doubled , the same number of moles is spread over twice the volume, so the concentration is halved. This demonstrates the inverse relationship between concentration and solution volume.	1 + 1
Q2.b	According to the ideal gas law, volume change at constant temperature does not affect moles. Number of moles will remain the same	1+1
Q2.c	Moles (mol)=Molar gas volume (dm ³ /mol)Volume (dm ³) Answer: 0.5 mol	1
Q3.a	The HCl titration will show a sharper pH jump because HCl is a strong acid and fully dissociates; the pH changes rapidly once neutralisation occurs. Ethanoic acid is a weak acid , partially dissociated, so the pH change is more	1 + 1

	gradual due to buffering by undissociated acid.	
Q3.b	<p>i. Acids have a sour taste (e.g., lemon juice, vinegar).</p> <p>ii. pH – Acids have a pH less than 7; strong acids have lower pH than weak acids.</p> <p>iii. Hydrogen ion (H⁺) presence – Acids release H⁺ ions in aqueous solution.</p>	1 + 1+1
Q4a.i	used in construction and chemical industry.	1
Q4a.ii	water treatment, and agriculture to neutralise acidity.	1
Q4a.iii	used in construction and antacids.	1
Q4a.iv	used in fertilizers, matches, and vulcanization of rubber.	1
Q4a.v	used in bleaching, preservatives, and as a disinfectant.	1
Q5.a.	<p>• Short-chain hydrocarbons (e.g., gasoline) have lower boiling points and condense near the top of the column.</p> <p>• Long-chain hydrocarbons (e.g., bitumen) have higher boiling points and condense near the bottom.</p>	1 + 1
Q5.b.	Distillation	1
Q5.c.	Depends on boiling points of substances	1
Q5.d.	Organic solvents/alcohol	1

Table of Specification P2							
No.	Chapter Title	MCQs (1 mark)	AO	Theoretical Questions	AO	Practical Component	AO
1.	States of matter and methods of separation	3	AO1 (1) AO2 (1) AO3 (1)	4	AO1 (1) AO2 (2) AO3 (1) -	5	AO1 (2) AO2 (2) AO3 (1)
2.	Atoms and the Periodic Table	3	AO1 (1) AO2 (1) AO3 (1)	4	AO1 (1) AO2 (2) AO3 (1)	-----	
3.	Chemical Bonding	3	AO1 (1) AO2 (1) AO3 (1)	5	AO1 (2) AO2 (2) AO3 (1)	-----	
4.	Qualitative Chemistry	2	AO2 (1) AO3 (1)	3	AO1 (1) AO2 (2)	5	AO1 (1) AO2 (2) AO3 (2)
5.	Chemical Changes	2	AO1 (1) AO2 (1)	3	AO1 (1) AO3 (2)	5	AO1 (2) AO2 (2) AO3 (1)
	Reversible Reactions and	3	AO1 (1) AO2 (1)	3	AO1 (1)	5	AO1 (1) AO2 (2)

Table of specifications –Chemistry SSC – A

6.	Rate of Reactions		AO3 (1)		AO3 (2)		AO3 (2)
7.	Organic Chemistry	2	AO1 (1) AO2 (1)	5	AO1 (1) AO2 (2) AO3 (2)	5	AO1 (2) AO2 (2) AO3 (1)
8.	Air and Water Chemistry	2	AO2 (1) AO3 (1)	3	AO1 (1) AO2 (2)	-----	
		Total =20	AO1= 6 AO2 =8 AO3 = 6	Total = 30	AO1= 9 AO2 =12 AO3 = 9	Total = 25	AO1= 8 AO2 =10 AO3 = 7

Table of specifications –Chemistry SSC – A

Question- wise Breakdown			
Section	Question	Related Chapter	AO
MCQs	1	1	1
	2	1	2
	3	1	3
	4	2	1
	5	2	2
	6	2	3
	7	3	1
	8	3	2
	9	3	3
	10	4	2
	11	4	3
	12	5	1
	13	5	2
	14	6	1
	15	6	2
	16	6	3
	17	7	1
	18	7	2
	19	8	2
	20	8	3
Theoretical Questions	1	1,2	1,2,3
	2	3,4	1,2
	3	5,	1,2
	4	6,7	1,2
	5	8	1,2,3

Table of specifications –Chemistry SSC – A

Practical Component	1	1	1, 2,3
	2	4	1, 2,3
	3	5	1, 2,3
	4	6	1, 2,3
	5	7	1, 2,3

Marks for AO1		Percentage
MCQS	6	30%
Theory	9	
Practical	8	
Total	23	

Marks for AO2		Percentage
MCQS	8	40%
Theory	12	
Practical	10	
Total	30	

Marks for AO3		Percentage
MCQS	6	30%
Theory	9	
Practical	7	
Total	22	

Table of specifications –Chemistry SSC – A