

Kerala Class 10 Chemistry Answer key
Summative Assessment – Term II 2025-26
Class : X Score : 40

1-mark questions ($4 \times 1 = 4$)

1. Azimuthal
2. A. (a)-(ii) (b)-(i) (c)-(iii)
3. Zinc
4. B. Both are correct but II is not the explanation of I (Maximum 2 electrons due to spin quantum number; only n, l, m define the orbital)

2-mark questions ($7 \times 2 = 14$)

5. a) Chlorine (Cl) b) p-block
6. a) $1s^2 2s^2 2p^6 3s^2 3s^2$ (or $1s^2 2s^2 2p^6 3s^2$)
b) 2 unpaired electrons (in $3s^2$ both electrons are paired)
7. Molar volume at STP = 22.4 L $44.8 \text{ L} = 2 \text{ moles}$ Mass = 88 g $\rightarrow$ Molar mass = $88/2 = 44 \text{ g/mol}$ Gas = Carbon dioxide (CO_2)

OR

Boyle's law ($P_1V_1 = P_2V_2$) $760 \times 400 = 1520 \times V_2$ $V_2 = 200 \text{ mL}$

8.

Electrolyte	Product at cathode	Product at anode
Molten NaCl	Na (sodium)	Cl_2 (chlorine)
Aqueous NaCl (concentrated)	H_2 (hydrogen)	Cl_2 (chlorine)

9. a) $2\text{H}_2\text{O} \rightarrow \text{O}_2 + 4\text{H}^+ + 4\text{e}^-$ (or $4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$)
b) To increase conductivity / to provide excess H^+ ions so that H_2 is liberated at cathode instead of Na

10. A $\rightarrow$ Roasting B $\rightarrow$ Carbon reduction / Smelting C $\rightarrow$ Electrolytic refining

OR a) Bauxite ($\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$) or Cryolite (Na_3AlF_6) also accepted

b) Any two: Bauxite $\rightarrow$ purification $\rightarrow$ electrolysis in cryolite $\rightarrow$ alumina dissolved $\rightarrow$ electrolytic reduction

11. Any two:

- More corrosion resistant
- Harder / stronger
- More lustrous / better appearance
- Does not rust easily

3-mark questions ($6 \times 3 = 18$)

12. a) M shell b) 4 subshells – 3s, 3p, 3d c) 18 electrons ($2n^2 = 2 \times 9 = 18$)

OR a) 4p subshell b) Zinc (Zn) c) d-block

13. $11.2 \text{ L O}_2 = 0.5 \text{ mole O}_2 \rightarrow 1 \text{ mole metal oxide}$ Mass of metal = 16 g $\rightarrow$ molar mass of metal = 32 g/mol Equation: $\text{M} + \text{O}_2 \rightarrow \text{MO}_2$ (or $2\text{M} + \text{O}_2 \rightarrow 2\text{MO}$ if adjusted) Metal = Sulphur (S) is not metal; correct metal for 16 g is Magnesium (Mg) Balanced: $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ Equivalent mass = $32/2 = 12$ Metal = Magnesium

OR a) $5.6 \text{ L} = 0.25 \text{ mole} \rightarrow \text{mass } 11 \text{ g} \rightarrow \text{M} = 44 \text{ g/mol}$ b) CO_2 c) $\text{O}=\text{C}=\text{O}$ (or $:\text{O}::\text{C}::\text{O}:$)

14. a) Sodium (Na) or Potassium (K)

b) Zinc (Zn) – it is more reactive than iron, forms protective layer

c) Zinc displaces copper; blue colour fades $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$

15. a) Gradual eating away of metal due to reaction with moist air/water/acids b) Any two: Painting, oiling, galvanising, electroplating, alloying c) Coating iron with zinc; zinc being more reactive corrodes first, protecting iron (sacrificial protection). Example: iron pipes, buckets

16. a) Haematite (Fe_2O_3), Coke (C), Limestone (CaCO_3)

b) Lower region: $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$, $\text{CO}_2 + \text{C} \rightarrow 2\text{CO}$ (reduction) Upper region: $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ c) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$

17. a) Anode – Impure copper; Cathode – Pure copper

b) Anode: $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$ Cathode: $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$

c) Acts as electrolyte / supplies Cu^{2+} ions / maintains concentration

4-mark question ($1 \times 4 = 4$)

18. (A) Any FOUR

a) Cr: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$ – half-filled d-subshell is more stable

b) $2.8 \text{ L} = 0.125 \text{ mole} \rightarrow \text{M} = 4/0.125 = 32 \text{ g/mol}$

c) Aluminium has very high affinity for oxygen / Al_2O_3 is very stable / carbon cannot reduce it

d) Calcination – heating carbonate ore in absence of air Roasting – heating sulphide ore in excess air

e) Alloy – homogeneous mixture of metals. Examples: Steel (Fe+C) – stronger; Brass (Cu+Zn) – corrosion resistant

f) Sodium reacts violently with oxygen and moisture in air

OR

(B) a) $5.6 \text{ L} = 0.25 \text{ mole}$

b) $T_2 = 546 \text{ K}$, $P_2 = P/2 \rightarrow V_2 = (P_1 V_1 / T_1) \times (T_2 / P_2) = 5.6 \times (546/273) \times 2 = 22.4 \text{ L}$

c) (i) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O(g)}$

(ii) Gas = Methane (CH_4); Gay-Lussac's law of gaseous volumes