SSLC MODEL EXAM 2025
CHEMISTRY ANSWER KEY

SECTION A

Answer any 4 questions from 1 to 5. Each carries 1 score.

1. **Drying agent**
   Quick lime (CaO) absorbs moisture during ammonia preparation, ensuring dry gas.
2. **8 electrons**
   Noble gases (except helium) have a complete octet (8 electrons) in their outermost shell.
3. **224 liters**
   - Molecular mass of O_2 = 32 g/mol → 320 g = 10 moles.
   - At STP, 1 mole occupies 22.4 L → 10 moles = **224 L**.
4. **Glycerol**
   By-product of saponification, where triglycerides react with a base to form soap and glycerol.
5. **Sn and Pb**
   Liquation refines low-melting-point metals like tin (Sn) and lead (Pb).

Answer any 4 questions from 6 to 10. Each carries 2 score.

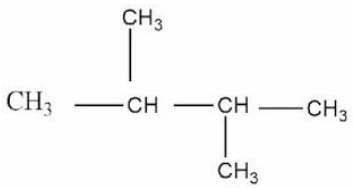
6. **(a) 88 g**

- $2 \times 6.022 \times 10^{23}$ molecules = 2 moles.
- Mass = $2 \times 44\,\text{g/mol} = 88\,\text{g}$.

(b) 168 g

- 264 g CO_2 = $264/44 = 6$ moles.
- 6 moles N_2 = $6 \times 28\,\text{g/mol} = 168\,\text{g}$.

7. **(a) Structural formula of 2,3-Dimethylbutane**



(b) 2,2-Dimethylbutane

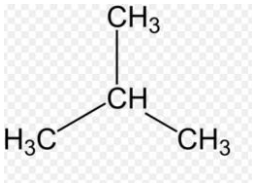
- Four-carbon chain with two methyl groups on C-2.

8. **Concentration methods**

Properties	Method
Magnetic vs. Non-magnetic	Magnetic separation
Low vs. High density	Froth floatation
High vs. Low density	Levigation
Non-magnetic vs. Magnetic	Magnetic separation

9. **(a) Chain isomer of butane**

   2-Methylpropane (Isobutane):



(b) Functional isomers: (ii) and (iv)

- Ether ($CH_3CH_2OCH_3$) and alcohol ($CH_3CH_2CH_2OH$).

10. **(a) A = Ethene ($CH_2 = CH_2$)**

- Thermal cracking of propane produces ethene and methane.

  (b) Polythene

- Polymerization of ethene forms polythene.

SECTION C

Answer any 4 questions from 11 to 15. Each carries 3 score.

11. **(a) Boyle's Law**

- Pressure decreases as bubbles rise → volume increases.

(b) $P \propto 1/V$ **(constant T)**

(c) 5 liters

- $P_1V_1 = P_2V_2 \Rightarrow 2 \times 20 = 8 \times V_2 \Rightarrow V_2 = 5\,\text{L}.$

12. **(a) Mg-Fe**
    - Mg (anode) oxidizes; Fe (cathode) reduces.

    (b) Redox reaction: $\text{Mg} + \text{Fe}^{2+} \rightarrow \text{Mg}^{2+} + \text{Fe}$

    (c) At Ag cathode: $\text{Ag}^{+} + e^{-} \rightarrow \text{Ag}$

13. **(a) X = Concentrated** H_2SO_4

    (b) Dehydration
    - H_2SO_4 removes water from sugar ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$), leaving carbon.

    (c) $\text{KNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{KHSO}_4 + \text{HNO}_3$

14. **(a)** $1s^2 2s^2 2p^6 3s^2$
    - Element A (Mg) in period 3, group 2.

    (b) $1s^2 2s^2 2p^6$
    - Noble gas in period 2 (Neon).

    (c) MgO
    - Mg^{2+} and O^{2-} combine ionically.

15. **(a) Matching columns**

A	B	C
Rectified spirit	95.6% Ethanol	-OH
Vinegar	5-8% Ethanoic acid	-COOH

(b) $\text{CH}_3\text{COOCH}_2\text{CH}_3$ **(Ethyl ethanoate)**

- Esterification of acetic acid and ethanol.

SECTION D

Answer any 4 questions from 16 to 20. Each carries 4 score.

16. **(a) Most stable configuration:** $3d^5 4s^1$

(b) Half-filled d-subshell

- Achieves symmetry and exchange energy stabilization.

(c) Copper: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

(d) Period 4, Group 11

17. **(a) NaOH formation**
    - Electrolysis produces OH^- ions → basic solution (pink with phenolphthalein).

    (b) Cathode: $2H_2O + 2e^- \rightarrow H_2 + 2OH^-$

    (c) Molten NaCl reactions:
    - Anode: $2Cl^- \rightarrow Cl_2 + 2e^-$
    - Cathode: $Na^+ + e^- \rightarrow Na$

18. **(a) Forward reaction decreases**
    - Exothermic reaction; increased T shifts equilibrium backward.

    (b) Product increases
    - Higher pressure favors fewer moles (2 moles NH_3 vs. 4 moles reactants).

    (c) Forward reaction increases
    - Removing NH_3 (product) shifts equilibrium forward (Le Chatelier's principle).

    (d) Le Chatelier's principle

19. **(a) Froth flotation**
    - Separates zinc blende (ZnS) from gangue.

    (b) Conversion to ZnO:
    - **Calamine:** $ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$ (Calcination).
    - **Zinc blende:** $2ZnS + 3O_2 \xrightarrow{\Delta} 2ZnO + 2SO_2$ (Roasting).

    (c) Distillation
    - Zinc's low boiling point allows separation via distillation.

20. **(a)** C_4H_8
    - Alkene (butene) with a double bond undergoes addition.

    (b) Addition reactions:
    - With Cl_2: $C_4H_8 + Cl_2 \rightarrow C_4H_8Cl_2$.
    - With H_2: $C_4H_8 + H_2 \rightarrow C_4H_{10}$.

    (c) 2-Chlorobutane
    - HCl adds to $CH_3CH = CHCH_3$ via Markovnikov's rule.