CHEMISTRY ANSWER KEY

SSLC Exam 2025

1. **Which of the given compounds is a mineral of Aluminium?**
   Answer: Cryolite
2. **Which polymer is formed from isoprene?**
   Answer: Natural rubber (or Polyisoprene)
3. **Find the total number of atoms in 2 GMM water (H_2O).**
   Answer:
   - 1 molecule of H_2O contains 3 atoms (2 Hydrogen + 1 Oxygen)
   - 2 GMM = $2 \times 6.022 \times 10^{23}$ molecules = 1.2044×10^{24} molecules
   - Total atoms = $1.2044 \times 10^{24} \times 3$ = **3.6132×10^{24} atoms**
4. **Which is the product obtained when SO_3 gas is dissolved in concentrated sulphuric acid?**
   Answer: Oleum
5. **Many of the metals in _____ block are used as catalysts in petroleum industry.**
   Answer: d-block
6. **Classify the following compounds into alkanes, alkenes and alkynes:**
   Compounds: C_2H_4, C_5H_{12}, C_3H_8, C_7H_{12}
   Answer:
   - **Alkanes:** C_5H_{12} (Pentane), C_3H_8 (Propane)
   - **Alkenes:** C_2H_4 (Ethene)
   - **Alkynes:** C_7H_{12} (Heptyne)
7. **Two gases Oxygen and Nitrogen at STP are given:**
   (a) Calculate the number of molecules in 64 g of Oxygen.
   - Molecular mass of O_2 = 32
   - Number of moles = 64 / 32 = 2 moles
   - Molecules = $2 \times 6.022 \times 10^{23}$ = **1.2044×10^{24} molecules**

(b) Calculate the mass of Nitrogen having the same volume as that of 64 g of Oxygen.

- 64 g of O_2 = 2 moles = 2 × 22.4 L = 44.8 L (at STP)
- 44.8 L of N_2 = 2 moles (since 1 mole = 22.4 L)
- Mass of N_2 = 2 × 28 = **56 g**

8. **8. Two reactions related to extraction of metals are given. Identify calcination and roasting.**

   (a) **Cu_2S ore is converted to Cu_2O by heating.**
   This is **Roasting** (as it involves heating of sulphide ore in presence of oxygen).

   (b) **Carbonates and hydroxides of metals decompose to form their oxides.**
   This is **Calcination** (as it involves heating in absence of air).

9. **9. Identify A and B.**
   (a) **$CH_3OH + CO \rightarrow$(catalyst)$\rightarrow$ (A)**
   This forms **CH_3COOH (Acetic acid)**
   A = CH_3COOH

   (b) **$CHCl_3 + Cl_2 \rightarrow$ (B) + HCl**
   This forms **CCl_4 (Carbon tetrachloride)**
   B = CCl_4

10. **10. The chemical formula of a compound is C_2H_6O.**
    (a) **Write the structural formula of any one of the functional isomers.**
    Two functional isomers:
    Ethanol: $CH_3–CH_2–OH$
    Dimethyl ether: $CH_3–O–CH_3$

    (b) **Write the IUPAC name of this functional isomer.**
    If ethanol: **Ethanol**
    If dimethyl ether: **Methoxymethane**

11. **Copper is electroplated on an iron bangle.**

(a) **Which electrolyte is used here?**
Copper sulphate ($CuSO_4$) solution

(b) **Write any one of the advantages of electroplating.**
Improves appearance / Prevents corrosion / Increases durability

(c) **Does the intensity of colour of electrolyte change during this process? Why?**
Yes, the intensity decreases because **Cu^{2+} ions are deposited on the iron** and their concentration in the solution reduces.

12. **Subshell electronic configuration of element 'A' is given.**
(i) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^2$
(ii) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$

(a) **Which is the correct subshell electronic configuration? Why?**
(ii) is correct
Because **4s orbital is filled before 3d orbital**.

(b) **Identify the block in the periodic table to which this element belongs.**
Ends in $4s^2$ → **s-block**

13. **Two reversible reactions are given:**
(I) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g) + Heat$
(II) $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) + Heat$

(a) **Identify the reaction in which pressure has no effect.**
Reaction I (equal number of moles of gas on both sides → pressure has no effect)

(b) **How do the following factors influence the amount of product in Reaction II?**
(i) **Increase the temperature**
Decreases the amount of SO_3 (forward reaction is exothermic, heat opposes forward direction)

(ii) **Increase the pressure**

Increases the amount of SO_3 (forward reaction has fewer gas molecules)

14. (a) Which types of reactions are these?

(i) **Addition reaction**

(ii) **Polymerisation reaction**

(b) Identify the product in the reaction (ii) and write any one use of it.

Product: **Polyvinyl chloride (PVC)**

Use: **Used in making pipes, wires, cables, synthetic leather, etc.**

15. Volume and number of molecules of gases at 27°C and 2 atm:

Gas	**Volume (L)**	**Number of molecules**
Nitrogen	10	x
Carbon dioxide	(i) 20	2x
Oxygen	5	(ii) 0.5x

(a) Complete the table.

Use Avogadro's Law: Equal volumes of gases at same temp & pressure have equal number of molecules.

If 10 L = x molecules,

Then:

CO_2 = 20 L → 2x molecules

O_2 = 5 L → 0.5x molecules

(b) What will be the volume of carbon dioxide gas if pressure is increased to 4 atm?

At constant T and n, $P_1V_1 = P_2V_2$

P_1 = 2 atm, V_1 = 20 L

P_2 = 4 atm

$V_2 = (P_1 \times V_1) / P_2 = (2 \times 20) / 4 =$ **10 L**

16. **Manganese (Mn) is an element that belongs to d block in the periodic table.**

(a) Outer subshell electronic configuration of Mn is 3d54s23*d*54*s*2. Find the atomic number of Manganese.
Answer: Atomic number = 25

(b) Find the oxidation state of Mn in Mn_2O_7.
Answer: +7

(c) Write period number and group number of Manganese.
Answer: Period = 4, Group = 7

(d) Write the subshell electronic configuration of Mn^{4+} ion.
Answer:
$1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$

17. **A few drops of the solution 'X' is added to Magnesium sulphate solution taken in a test tube. A white precipitate is formed.**

(a) What is 'X'?
Answer: Sodium hydroxide (NaOH)

(b) What is the chemical name of white precipitate formed here?
Answer: Magnesium hydroxide ($Mg(OH)_2$)

(c) What happens to the white precipitate when dilute hydrochloric acid is added?
Answer: It dissolves to form a clear solution.

(d) Which type of salt is identified by this experiment?
Answer: Magnesium sulphate ($MgSO_4$)

18. **Three metals Ag, Mg, Cu and their salt solutions are given.**

(a) How many galvanic cells can be constructed using these metals?
From 3 metals, possible pairs = 3C2 = **3 galvanic cells**

(b) If we construct a galvanic cell using the most reactive metal and the least reactive metal from the given metals, identify the cathode and anode.

Reactivity order: **Mg > Cu > Ag**
Anode = Mg (most reactive → oxidized)
Cathode = Ag (least reactive → reduced)

(c) Write the chemical equation of the reaction which takes place at anode and cathode in the above cell.

At Anode (Mg):
$Mg \rightarrow Mg^{2+} + 2e^-$

At Cathode (Ag):
$Ag^+ + e^- \rightarrow Ag$

(But since two electrons come from Mg, it would be: $2Ag^+ + 2e^- \rightarrow 2Ag$)

Overall cell reaction:
$Mg + 2Ag^+ \rightarrow Mg^{2+} + 2Ag$

19. **(a) Write the name and chemical formula of ore of iron used in industrial production.**

Name: **Haematite**
Formula: **Fe_2O_3**

(b) Write the chemical equation of slag formation in the industrial production of iron.

$CaO + SiO_2 \rightarrow CaSiO_3$ (slag)

(c) Which mineral of iron is known as fool's gold?

Iron pyrite or **FeS_2**

(d) Write the names of two alloy steels which contain the same constituent elements.

Stainless steel and **Tungsten steel** (both contain Fe, C, and other metals like Cr, W, etc.)

20.

A (Structure)	B (Molecular Formula)	C (Name)
1. $CH_3–CH–CH–CH_3$ (CH_3 on both C2 and C3)	C_6H_{14}	2,3-Dimethylbutane
2. $CH_3–CH=CH–CH_3$	C_4H_8	But-2-ene
3. $CH_3–CH(OH)–CH_3$	C_3H_8O	Propan-2-ol
4. $CH_3–CH_2–CH_2–CH_2–COOH$	$C_5H_{10}O_2$	Pentanoic acid