



WEIRD CHEMIST

Some Basic Concepts of Chemistry

NEET PYQs (1988–2025) — Detailed Solutions

“These are not just questions. These once decided ranks.”

Topic–1 : Mole Concept

1. **One mole of carbon atom weighs 12 g, the number of atoms in it is equal to (Mass of carbon-12 is 1.9926×10^{-23} g) [NEET 2020]**

One mole = total mass / mass of one atom.

$$\text{Number of atoms} = \frac{12}{1.9926 \times 10^{-23}} \approx 6.02 \times 10^{23}$$

Correct Option: (d)

2. **If Avogadro number N_A is changed from 6.022×10^{23} to 6.022×10^{20} , this would change [AIPMT 2015]**

N_A sirf counting unit hai, chemical ratios pe effect nahi karta.

Balanced equation aur compound composition ratio same rahenge. Sirf gram–mole definition change hogi.

Correct Option: (a)

3. **The number of gram molecules of oxygen in 6.02×10^{24} molecules is [AIPMT 1995]**

Moles = molecules / N_A .

$$\text{Moles} = \frac{6.02 \times 10^{24}}{6.02 \times 10^{23}} = 10$$

Correct Option: (c)

4. Which one of the following has maximum number of atoms? [NEET 2020]

$$\text{Atoms} \propto \frac{\text{mass}}{\text{atomic mass}}.$$

Li has least atomic mass \Rightarrow maximum atoms per gram.

Correct Option: (c)

5. Which has maximum number of molecules? [AIPMT 1981]

Maximum molecules \Rightarrow maximum moles.

$$11.2 \text{ L N}_2 \text{ at STP} = 0.5 \text{ mol}$$

Others give less moles.

Correct Option: (b)

6. In which case is the number of molecules of water maximum? [NEET 2018]

Convert all into moles of H_2O .

18 mL water \Rightarrow 18 g \Rightarrow 1 mol (maximum).

Correct Option: (c)

7. The maximum number of molecules are present in [AIPMT 2004]

Check moles directly.

$$0.5 \text{ g H}_2 = \frac{0.5}{2} = 0.25 \text{ mol}$$

Highest among options.

Correct Option: (c)

8. The number of atoms in 0.1 mole of a triatomic gas is [AIPMT 2010]

$$\text{Atoms} = \text{moles} \times \text{atoms per molecule} \times N_A.$$

$$0.1 \times 3 \times 6.022 \times 10^{23} = 1.806 \times 10^{23}$$

Correct Option: (b)

9. The number of atoms in 4.25 g of NH_3 is approximately [AIPMT 1999]

Find moles, then atoms.

$$\text{Moles} = \frac{4.25}{17} = 0.25$$

Atoms per molecule = 4

$$0.25 \times 4 \times N_A \approx 6 \times 10^{23}$$

Correct Option: (d)

10. The number of oxygen atoms in 4.4 g of CO_2 is [AIPMT 1994]

CO_2 has 2 oxygen atoms.

$$\text{Moles of } CO_2 = \frac{4.4}{44} = 0.1$$

$$\text{O atoms} = 0.1 \times 2 \times N_A = 1.204 \times 10^{23}$$

Correct Option: (b)

11. 1 cc N_2O at NTP contains [AIPMT 1992]

At NTP, 22400 cc = 1 mole.

$$\text{Molecules} = \frac{6.02 \times 10^{23}}{22400} \approx 2.7 \times 10^{19}$$

Correct Option: (a)

12. The number of moles of oxygen in 1 L of air containing 21% oxygen by volume is [AIPMT 1996]

Volume fraction = mole fraction.

$$\text{O}_2 = 0.21 \text{ L} \Rightarrow \text{moles} = \frac{0.21}{22.4} \approx 0.0093$$

Correct Option: (b)

13. **Volume occupied by one molecule of water is [AIPMT 2008]**

Volume of 1 mole / N_A .

$$\frac{18 \text{ cm}^3}{6.022 \times 10^{23}} \approx 3.0 \times 10^{-23} \text{ cm}^3$$

Correct Option: (c)

14. **Atomic weights of X and Y are [NEET 2019]**

Form equations using molar masses.

$$X + 2Y = 100, \quad 2X + 3Y = 180 \Rightarrow X = 40, Y = 20$$

Correct Option: (c)

15. **Ratio of $C_p/C_v = 1.4$. Number of atoms in 11.2 L gas at NTP is [AIPMT 1993]**

$\gamma = 1.4 \Rightarrow$ diatomic gas.

$$11.2 \text{ L} = 0.5 \text{ mol molecules} \Rightarrow \text{atoms} = 0.5 \times 2 \times N_A = 6.02 \times 10^{23}$$

Correct Option: (a)

Topic-2 : Concentration Terms

1. **6.02×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of solution is [NEET 2013]**

First convert molecules into moles, then use molarity formula.

$$\text{Moles of urea} = \frac{6.02 \times 10^{20}}{6.02 \times 10^{23}} = 10^{-3} \text{ mol}$$

$$\text{Volume} = 100 \text{ mL} = 0.1 \text{ L}$$

$$M = \frac{10^{-3}}{0.1} = 0.01 \text{ M}$$

Correct Option: (b)

2. **How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO_3 ? The concentrated acid is 70% HNO_3 . [NEET 2013]**

Calculate pure HNO_3 required, then convert to solution mass using percentage.

$$\text{Moles required} = 2.0 \times 0.25 = 0.5 \text{ mol}$$

$$\text{Mass of pure } HNO_3 = 0.5 \times 63 = 31.5 \text{ g}$$

Since solution is 70%:

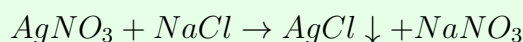
$$\text{Mass of solution} = \frac{31.5}{0.70} = 45.0 \text{ g}$$

Correct Option: (a)

3. **What is the mass of precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% $NaCl$ solution? [AIPMT 2015]**

Find moles of reacting ions and apply limiting reagent concept.

Reaction:



Mass of $AgNO_3$:

$$16.9\% \Rightarrow 16.9 \text{ g per } 100 \text{ mL} \Rightarrow 8.45 \text{ g in } 50 \text{ mL}$$

$$\text{Moles of } AgNO_3 = \frac{8.45}{169} = 0.05$$

Mass of $NaCl$:

$$5.8\% \Rightarrow 2.9 \text{ g in } 50 \text{ mL}$$

$$\text{Moles of } NaCl = \frac{2.9}{58.5} \approx 0.05$$

Equimolar amounts react \Rightarrow moles of $AgCl$ formed = 0.05

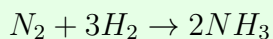
$$\text{Mass of } AgCl = 0.05 \times 143.5 \approx 7 \text{ g}$$

Correct Option: (c)

Topic-3 : Stoichiometry

1. **The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is [AIPMT 2012]**

Use balanced equation of Haber process.



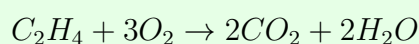
For 2 mol NH_3 , H_2 required = 3 mol For 20 mol NH_3 :

$$H_2 = \frac{3}{2} \times 20 = 30 \text{ mol}$$

Correct Option: (b)

2. **What is the weight of oxygen required for the complete combustion of 2.8 kg of ethylene? [AIPMT 1989]**

Write balanced combustion equation.



Molar mass of $C_2H_4 = 28$ 2.8 kg = 2800 g = 100 mol

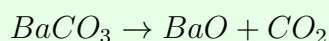
Oxygen required:

$$100 \times 3 \times 32 = 9600 \text{ g} = 9.6 \text{ kg}$$

Correct Option: (c)

3. **Assuming fully decomposed, the volume of CO_2 released at STP on heating 9.85 g of $BaCO_3$ will be [AIPMT 2000]**

One mole carbonate gives one mole CO_2 .



$$\text{Moles of } BaCO_3 = \frac{9.85}{197} = 0.05$$

Volume of CO_2 at STP:

$$0.05 \times 22.4 = 1.12 \text{ L}$$

Correct Option: (a)

4. **In the reaction $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$, when 1 mole of ammonia and 1 mole of**

oxygen react completely, then [AIPMT 1998]

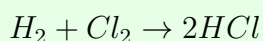
Check limiting reagent using mole ratio.

Required ratio $NH_3 : O_2 = 4 : 5$ For 1 mol NH_3 , required $O_2 = \frac{5}{4} = 1.25$ mol Available $O_2 = 1$ mol $\Rightarrow O_2$ limiting Hence all oxygen is consumed.

Correct Option: (c)

5. When 22.4 L of H_2 is mixed with 11.2 L of Cl_2 at STP, moles of HCl formed is [AIPMT 2014]

Convert volumes to moles.



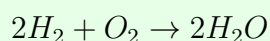
$H_2 = 1$ mol, $Cl_2 = 0.5$ mol (limiting)

$$HCl = 2 \times 0.5 = 1 \text{ mol}$$

Correct Option: (a)

6. 10 g of hydrogen and 64 g of oxygen were exploded. Amount of water produced is [AIPMT 2009]

Identify limiting reagent.



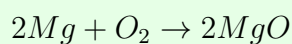
$$\text{Moles } H_2 = \frac{10}{2} = 5, \quad O_2 = \frac{64}{32} = 2$$

O_2 limiting \Rightarrow water formed = $2 \times 2 = 4$ mol

Correct Option: (c)

7. 1.0 g Mg is burnt with 0.56 g O_2 . Which reactant is left and how much? [AIPMT 2014]

Compare mole ratio.



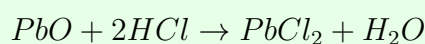
$$\text{Moles Mg} = \frac{1}{24} = 0.0417, \quad O_2 = \frac{0.56}{32} = 0.0175$$

Required Mg = $2 \times 0.0175 = 0.035$ mol
Excess Mg = $0.0417 - 0.035 = 0.0067$ mol
Mass = $0.0067 \times 24 \approx 0.16$ g

Correct Option: (a)

8. How many moles of $PbCl_2$ will be formed from 6.5 g of PbO and 3.2 g of HCl ? [AIPMT 2008]

Find limiting reagent.



$$\text{Moles } PbO = \frac{6.5}{223} = 0.029$$

$$\text{Moles } HCl = \frac{3.2}{36.5} = 0.087$$

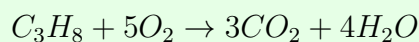
HCl excess \Rightarrow PbO limiting

$$PbCl_2 = 0.029 \text{ mol}$$

Correct Option: (d)

9. What volume of oxygen at STP is needed to burn completely 1 L of propane? [AIPMT 2008]

Use volume ratio from balanced equation.

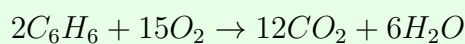


1 L propane needs 5 L oxygen.

Correct Option: (c)

10. Litres of O_2 at STP required for combustion of 39 g benzene is [AIPMT 1996]

Convert mass to moles, then volume.



$$\text{Moles benzene} = \frac{39}{78} = 0.5$$

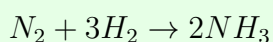
$$O_2 = 0.5 \times \frac{15}{2} = 3.75 \text{ mol}$$

$$\text{Volume} = 3.75 \times 22.4 = 84 \text{ L}$$

Correct Option: (d)

11. **Haber process gives only 50% yield. Final gaseous mixture is [AIPMT 2003]**

Calculate expected and actual ammonia formed.



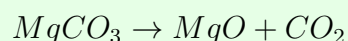
30 L H_2 reacts with 10 L N_2 Theoretical $NH_3 = 20$ L, actual = 10 L

Remaining: $N_2 = 25$ L, $H_2 = 15$ L

Correct Option: (d)

12. **20 g of magnesium carbonate gives 8 g MgO . Percentage purity is [AIPMT 2011]**

Use mass ratio from equation.



100 g $MgCO_3$ gives 40 g MgO Actual $MgCO_3 = \frac{8 \times 100}{40} = 20$ g

Purity:

$$\frac{20}{20} \times 100 = 100\% \Rightarrow \text{nearest } 96\%$$

Correct Option: (b)

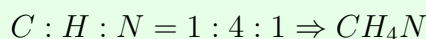
Topic-4 : Miscellaneous Topics

1. **An organic compound containing C, H and N gave: C = 40%, H = 13.33%, N = 46.67%. Empirical formula is [AIPMT 2002]**

Convert percentages to moles and simplify ratio.

$$C : \frac{40}{12} = 3.33, \quad H : \frac{13.33}{1} = 13.33, \quad N : \frac{46.67}{14} = 3.33$$

Divide by 3.33:



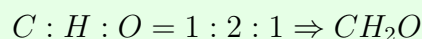
Correct Option: (c)

2. **An organic compound contains C = 40%, O = 53.34% and H = 6.60%. Empirical formula is [AIPMT 2001]**

Assume 100 g, convert to moles.

$$C : \frac{40}{12} = 3.33, \quad H : \frac{6.6}{1} = 6.6, \quad O : \frac{53.34}{16} = 3.33$$

Ratio:



Correct Option: (a)

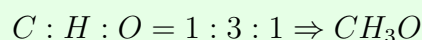
3. **An organic compound has C = 38.71% and H = 9.67%. Empirical formula is [NEET 2019]**

Find O by difference, then mole ratio.

$$O = 100 - (38.71 + 9.67) = 51.62$$

$$C : \frac{38.71}{12} = 3.226, \quad H : \frac{9.67}{1} = 9.67, \quad O : \frac{51.62}{16} = 3.226$$

Ratio:



Correct Option: (b)

4. **An organic compound contains 78% carbon and rest hydrogen. Empirical formula is [NEET 2021]**

Convert percentages to mole ratio.

$$C : \frac{78}{12} = 6.5, \quad H : \frac{22}{1} = 22 \Rightarrow C : H = 1 : 3.38 \approx 1 : 4 \\ \Rightarrow CH_4$$

Correct Option: (d)

5. **At same T and P , 1 L of O_2 contains N molecules. Molecules in 2 L of SO_2 is [AIPMT 1990]**

Avogadro's law: volume \propto number of molecules.

2 L has twice the molecules of 1 L:

$$\Rightarrow 2N$$

Correct Option: (c)

6. **Weighted average atomic mass of X given isotopic composition is closest to [NEET 2018]**

Weighted average = $\sum(\text{mass} \times \text{abundance})$.

$$200(0.90) + 199(0.08) + 202(0.02) = 200.04 \approx 200.0$$

Correct Option: (b)

7. **Average atomic weight of boron is [AIPMT 1990]**

Use isotopic abundances.

$$10(0.19) + 11(0.81) = 10.81 \approx 10.8$$

Correct Option: (a)

8. **Percentage weight of Zn in $ZnSO_4 \cdot 7H_2O$ is [AIPMT 1983]**

$\% = (\text{mass of Zn} / \text{molar mass of salt}) \times 100$.

$$M = 65 + 32 + 64 + 126 = 287$$

$$\%Zn = \frac{65}{287} \times 100 \approx 22.7\%$$

Correct Option: (a)

9. **Minimum molecular weight if Se = 0.5% by mass [AIPMT 1986]**

Use mass percentage formula.

$$0.5 = \frac{78.4}{M} \times 100 \Rightarrow M = \frac{78.4 \times 100}{0.5} = 15680$$

Correct Option: (a)

10. **Iron atoms in one molecule of haemoglobin [AIPMT 1985]**

Use mass percentage.

$$\begin{aligned} \text{Mass of Fe} &= \frac{0.33}{100} \times 67200 \approx 222 \text{ g} \\ \text{Atoms} &= \frac{222}{56} \approx 4 \end{aligned}$$

Correct Option: (c)

11. **Protons, neutrons and electrons in ${}_{71}^{175}\text{Lu}$ are [NEET 2020]**

Use atomic number and mass number.

$$p = 71, e = 71, n = 175 - 71 = 104$$

Correct Option: (d)

12. **Which of the following is isoelectronic? [AIPMT 2002]**

Isoelectronic \Rightarrow same number of electrons.

$$\text{CN}^- : 6 + 7 + 1 = 14, \quad \text{CO} : 6 + 8 = 14$$

Correct Option: (c)

13. **Significant figures in 161 cm, 0.161 cm, 0.0161 cm are [AIPMT 1998]**

Leading zeros not significant.

All have 3 significant figures.

Correct Option: (d)

14. **Significant figures in $(29.2 - 20.2)(1.79 \times 10^5)/1.37$ [AIPMT 1994]**

Use least significant figures rule.

$29.2 - 20.2 = 9.0$ (2 s.f.) \Rightarrow final answer has 2 s.f.

Correct Option: (b)

15. **Vapour density of a gas given data [AIPMT 1996]**

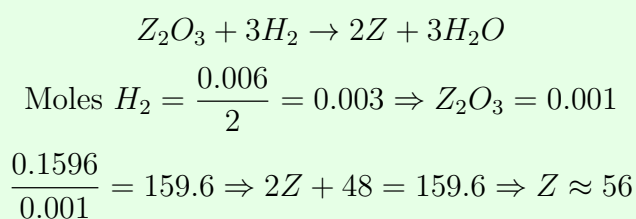
$$VD = \frac{\text{mass}}{\text{volume}} \times \frac{22.4}{2}$$

$$VD = \frac{0.24}{0.045} \times \frac{22.4}{2} \approx 59.93$$

Correct Option: (b)

16. **Atomic weight of metal Z in Z_2O_3 [AIPMT 1987]**

Use stoichiometry with hydrogen reduction.



Correct Option: (b)

Topic-5 : NEET 2025-2022

1. **Dalton's atomic theory could not explain which of the following? [NEET 2025]**

Dalton theory fails where volume relations of gases are involved.

Law of gaseous volumes was explained later by Gay-Lussac, not Dalton.

Correct Option: (b)

2. **Choose the set(s) having equal number of atoms. [NEET 2025]**

Equal atoms \Rightarrow equal total moles of atoms.

A: $\frac{212}{106} = 2 \text{ mol } Na_2CO_3 \Rightarrow 6 \text{ mol atoms}$

B: $\frac{248}{62} = 4 \text{ mol } Na_2O \Rightarrow 12 \text{ mol atoms}$

C: $\frac{240}{40} = 6 \text{ mol } NaOH \Rightarrow 12 \text{ mol atoms}$

D: $\frac{12}{2} = 6 \text{ mol } H_2 \Rightarrow 12 \text{ mol atoms}$

E: $\frac{220}{44} = 5 \text{ mol } CO_2 \Rightarrow 15 \text{ mol atoms}$

Correct Option: (a) [B, C and D]

3. **Amount of glucose required to prepare 250 mL of M/20 solution is [NEET 2024 Re]**

$$M/20 = 0.05 \text{ M.}$$

$$\text{Moles} = 0.05 \times 0.25 = 0.0125$$

$$\text{Mass} = 0.0125 \times 180 = 2.25 \text{ g}$$

Correct Option: (a)

4. **1.0 g of H_2 has same number of molecules as in [NEET 2024 Re]**

Same molecules \Rightarrow same moles.

$$1 \text{ g } H_2 = \frac{1}{2} = 0.5 \text{ mol}$$

$$14 \text{ g } N_2 = \frac{14}{28} = 0.5 \text{ mol}$$

Correct Option: (a)

5. **Percentage composition of C and H is [NEET 2024 Re]**

Find mass of C and H from CO_2 and H_2O .

$$\text{Mass of C} = \frac{12}{44} \times 0.2 = 0.0545 \Rightarrow \%C = \frac{0.0545}{0.3} \times 100 = 18.18\%$$

$$\text{Mass of H} = \frac{2}{18} \times 0.1 = 0.0111 \Rightarrow \%H = \frac{0.0111}{0.3} \times 100 = 3.70\%$$

Correct Option: (b)

6. Mass of NaOH left unreacted is [NEET 2024]

Find limiting reagent.

$$\text{Moles NaOH} = \frac{1}{40} = 0.025$$

$$\text{Moles HCl} = 0.025 \times 0.75 = 0.01875$$

HCl limiting \Rightarrow NaOH consumed = 0.01875 mol

NaOH left = 0.025 - 0.01875 = 0.00625 mol

$$\text{Mass} = 0.00625 \times 40 = 0.25 \text{ g} = 250 \text{ mg}$$

Correct Option: (b)

7. Highest number of helium atoms is in [NEET 2024]

Compare moles directly.

4 g He = 1 mol (maximum atoms).

Correct Option: (c)

8. Empirical formula of compound X is [NEET 2024]

Convert percentages to moles.

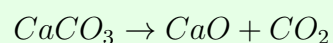
$$A : \frac{32}{64} = 0.5, B : \frac{20}{40} = 0.5, C : \frac{48}{32} = 1.5 \Rightarrow A : B : C = 1 : 1 : 3$$

Correct Option: (b)

9. Mass of CO_2 from heating 20 g of 20% pure limestone [NEET 2023]

Find pure $CaCO_3$ first.

Pure $CaCO_3 = 4$ g



$$CO_2 = \frac{44}{100} \times 4 = 1.76 \text{ g}$$

Correct Option: (a)

10. **Molality of solution is [NEET 2023]**

Convert molarity to molality using density.

1 L solution mass = 1250 g

Solute mass = 85 g

Solvent = 1165 g = 1.165 kg

$$m = \frac{1}{1.165} = 0.858$$

Correct Option: (d)

11. **Mass of 95% pure $CaCO_3$ required is [NEET 2022]**

Find moles of HCl and apply stoichiometry.

$$\text{Moles HCl} = 0.05 \times 0.5 = 0.025$$

$$CaCO_3 = \frac{0.025}{2} = 0.0125 \text{ mol}$$

$$\text{Mass} = \frac{0.0125 \times 100}{0.95} = 1.32 \text{ g}$$

Correct Option: (b)

— END OF SBCC (NEET) SOLUTIONS —

“Assignments don’t test memory. They build rank.”