



INDIAN SCHOOL MUSCAT
CLASS: XI
CHEMISTRY



SOME BASIC CONCEPTS IN CHEMISTRY

I. Multiple Choice Question:

- Which of the following is dependent of temperature?
(a) Molarity (b) Molality (c) Mole fraction (d) Mass percentage.
- The number of oxygen atoms in 4.4g of CO_2 is approximately-
(a) 1.2×10^{23} (b) 6×10^{22} (c) 6×10^{23} (d) 12×10^{23}
- What will be the molarity of a solution, which contains 5.85g of NaCl(s) per 500ml.
(a) 4 mole/Lit (b) 20 mole/Lit (c) 0.2 mole/L (d) 2mol/Lit
- The empirical formula and molecular mass of a compound are CH_2O and 180g respectively.
What will be the molecular formula of the compound?
(a) $\text{C}_9\text{H}_{18}\text{O}_9$ (b) CH_2O (c) $\text{C}_6\text{H}_{12}\text{O}_6$ (d) $\text{C}_2\text{H}_4\text{O}_2$
- A gaseous hydrocarbon gives upon combustion, 0.72 g of water and 3.08 g of CO_2 . The empirical formula of the hydrocarbon is:
(a) C_6H_5 (b) C_7H_8 (c) C_2H_4 (d) C_3H_4

II. Fill in the Blanks:

- The number of Li atoms in _____ g. is 6.022×10^{24} atoms.
- Number of atoms of oxygen in 24 g of O_3 is _____.
- A mixture having 2 g of H_2 and 32 g of oxygen occupies a volume of _____ at NTP.
- The mass of one molecule of carbon dioxide is _____.
- Number of carbon atoms present in 18 g of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) is _____.

III. ASSERTION AND REASONING QUESTIONS:

Directions for Q. No.1-5

A If both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C If Assertion is true statement but Reason is false.

D If both Assertion and Reason are false statements.

1. Assertion: A solution of table salt in a glass of water is homogeneous

Reason: A solution having same composition throughout is heterogeneous

2. Assertion: The molecular weight of oxygen is 32 amu.

Reason: The atomic weight of oxygen is 16 amu

3. Assertion: No. of moles of H₂ in 0.224 L of hydrogen is 0.01 mole.

Reason: 22.4 L of H₂ at STP contain 6.023×10^{23} moles.

4. Assertion: Atomic mass of Na is 23.

Reason: An atom of sodium is 23 times heavier than 1/12th mass of C-12 isotope.

5. Assertion: Number of atoms of He in 60 u of He is 15.

Reason: Atomic weight of He is 4 u.

IV. Descriptive Questions:

1. State the following laws:

- i) Avogadro's law
- ii) Law of constant proportion
- iii) Gay Lussac's law

2. If the density of methanol is 0.793 kg l^{-1} What is its volume needed for making 2.5l of its 0.25 M solution?

3. Why do atomic masses of most of the elements in atomic mass unit involve fraction?

4. 200ml of 0.05M magnesium chloride is mixed with 75ml of 0.1M silver nitrate solution. Find the number of moles and mass in grams of AgCl formed. What is the limiting reagent?

5. 24g of NaOH is dissolved in 300ml water. Calculate the molarity of the solution.

6. 4.8g of O₂ was used to burn 0.15moles of Fe to Fe₂O₃. What mass of Fe₂O₃ was formed?

7. (i) What do you understand by the term limiting reagent?
(ii) 6.5g of Zn was reacted with excess of dil. HCl. Calculate the amount and volume of hydrogen produced at STP.
8. A compound contains 2.68% Mg. How many atoms of magnesium are present in 15g of the compound?
9. Calculate the percentage of (i) copper (ii) Sulphur (iii) Oxygen and (iv) water of hydration in crystalline copper sulphate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
10. 1.8g of an organic compound on combustion gave 2.64g of CO_2 and 1.08g of water. Find the empirical formula of the compound.
11. In three moles of ethane C_2H_6 , calculate the following
 - i) Number of moles of C atoms
 - ii) Number of moles of Hydrogen atoms
 - iii) Number of molecules of ethane.
12. Calculate the number of atoms and molecules in 224ml of Nitrogen gas at STP.
13. Carbon and oxygen combine to give two compounds. The carbon content in one is 42.9% and in the other it is 27.3%. How does this illustrate the law of multiple proportions?
14. Commercially available H_2SO_4 contains 98% acid by mass. Find the molarity if density of the sample is 1.84g/cc. What volume of this acid is required to make 2 L of 0.1 M solution?
15. Find the number of atoms of each type in 3.42g of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$).
16. How many atoms are there in a) 72 amu of Carbon b) 72 g of carbon?
17. How many atoms of hydrogen are there in 51g of ammonia?
18. 400 mL each of H_2 and O_2 are mixed and ignited, find volume of water vapour formed?
19. What mass C^{12} will contain the same number of atoms as in 3.6g of O^{16} ?
20. Calculate mass of CO_2 containing same number of oxygen atoms as in 3g of NO.
21. From 0.2g of CO_2 , 10^{21} molecules are removed. How many of moles of CO_2 remain?
22. (i) Define the terms empirical formula and molecular formula.
(ii) A hydrocarbon on burning gave 3.38g of CO_2 and 0.69g of H_2O . 10 L of the gas at STP weighs 11.6g. Find empirical and molecular formula.
23. Aqueous magnesium chloride solution is marketed as 20% by mass. Its density is 1.18 g/ml. Calculate
 - (i) The mole fraction of each component
 - (ii) Molarity.
 - (iii) Molality
 - (iv) The concentration in ppm.
24. Define (i) ppm, (ii) molarity, (iii) molality and (iv) mole fraction

25. Calculate the mole fraction of ethanol in 0.5 m aqueous solution of ethanol.
26. The mole fraction of glucose in water is 0.35. What is the molality of the solution?
27. What is the effect of temperature on molarity and molality?
28. The density of a 3M solution of NaCl is 1.25g/ml. Calculate the molality of the solution.