
DELHI PUBLIC SCHOOL JAMMU

Subject: Chemistry

Topic: 1. Some Basic Concepts of Chemistry

Month: May

Assignment

Q.1 Multiple Choice Questions (5 Marks)

1. A student calculates the number of moles of water in 36 g of H_2O . What is the correct number of moles? (a) 1 (b) 2 (c) 3 (d) 0.5
2. During a chemical reaction, 22.4 L of a gas at STP weighs 44 g. What is the molar mass of the gas? (a) 22.4 g/mol (b) 44 g/mol (c) 28 g/mol (d) 88 g/mol
3. A sample of a compound contains 40% carbon, 6.7% hydrogen, and 53.3% oxygen by mass. What is the empirical formula of the compound? (a) CH_2O (b) $\text{C}_2\text{H}_4\text{O}$ (c) $\text{C}_3\text{H}_6\text{O}_3$ (d) CH_4O
4. If 3 moles of a substance contain 'X' atoms, how many atoms will be present in 1 mole? (a) $\text{X}/3$ (b) X (c) 3X (d) 6.022×10^{23}
5. Which of the following is not a SI unit of mass? (a) Kilogram (b) Gram (c) Mole (d) Milligram

Q.2 Assertion-Reasoning Questions: (2 Marks each)

1. Assertion: 1 mole of oxygen gas weighs 32 g. Reason: The molar mass of oxygen gas (O_2) is 32 g/mol.
2. Assertion: The empirical formula represents the simplest whole number ratio of atoms in a compound. Reason: The molecular formula is always the same as the empirical formula.

Q.3 Short Answer Questions: (2 Marks each)

1. A student determines the molar mass of CO_2 to be 44 g/mol. Explain how this value is calculated.
2. Define Avogadro's constant and explain its significance in mole concept.

Q.4 Short Answer Questions: (3 Marks each)

1. A compound is found to contain 85.7% carbon and 14.3% hydrogen by mass. Determine its empirical formula.
2. Differentiate between empirical formula and molecular formula with a suitable example.

Q.5 Long Answer Questions: (5 Marks each)

1. Calculate the percentage composition of elements in C_2H_6 .

2. During an experiment, a student reacts 4 g of hydrogen with 32 g of oxygen to form water. Calculate the amount of water formed and identify the limiting reagent.

Q.6 Case-Based Study: (5 Marks)

A laboratory technician prepares a solution by dissolving 58.5 g of sodium chloride in 1 L of water. Based on this information, answer the following questions:

- (a) Calculate the molarity of the solution.
- (b) How many moles of sodium chloride are present in 0.5 L of the solution?
- (c) How would the concentration of the solution change if 100 mL of water is added to it?