

Sainik School Tilaiya

Class-XI

Subject-Chemistry

Chapter Name- Some Basic Concepts Of Chemistry

Q1. Short answer type questions.

- a. What is the SI unit of mass and volume?
- b. Relate Kelvin scale and °C scale.
- c. What is the SI unit of luminous intensity?
- d. How many basic units are there in SI system?
- e. What is the unit of amount of substance?
- f. Matter can be created or destroyed.(T/F)
- g. What is the value of Avogadro number?
- h. What is the atomic ratio of hydrogen and oxygen in Water?
- i. What are the sub atomic particles present in atom?
- j. Find the values of STP?
- k. What is the volume of 1 mole of gas in STP?
- l. Find the molar mass of CH₄ and H₂O.
- m. Chlorine contains how many isotopes in nature?
- n. What is the formulae mass of NaCl?
- o. How many no of molecules present in one mole of a substance?
- p. What is one atomic mass unit?

Q2. Long answer type questions.

- a. What are the three different states of matter?
- b. Distinguish between three states of matter.
- c. Define mass and density with unit.
- d. Distinguish between mass and weight.
- e. Distinguish between physical and chemical properties?
- f. Write down three characteristics of gas, solid and liquid.
- g. Why density has no unit?
- i. How many significant figures present in the following?
 - i. 0.0025
 - ii. 208

- iii. 5005
- iv. 126,000
- v. 500.0
- vi. 2.0034

- j.** Round up the following upto three significant figures;
 - i. 34.2016
 - ii. 10.4107
 - iii. 0.04597
 - iv. 2808
- k.** Explain law of conservation of mass with suitable chemical reaction.
- l.** Give an example where you can show evidence that law of definite proportion is valid in every case.
- m.** How can you prove that law of multiple proportions exist?
- n.** Write down the basic postulates of Dalton's atomic theory.
- o.** What is limiting reagent ? Explain it with suitable example.
- p.** Distinguish between molecular mass and formulae mass.
- q.** Explain the term molality and molarity.
- r.** Between molarity and molality which one is more perfect?
- s.** What do you mean by one mole of a substance?
- t.** Why average atomic mass is important to us?

Q3. Mathematical Problems.

1. A welding fuel gas contains carbon and hydrogen only. Burning a small sample of it in oxygen gives 3.38 g carbon dioxide, 0.690 g of water and no other products. A volume of 10.0 L (measured at STP) of this welding gas is found to weigh 11.6 g. Calculate (i) empirical formula, (ii) molar mass of the gas, and (iii) molecular formula.
2. Calcium carbonate reacts with aqueous HCl to give CaCl₂ and CO₂ according to the reaction,

$$\text{CaCO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}).$$
 What mass of CaCO₃ is required to react completely with 25 mL of 0.75 M HCl?
3. Chlorine is prepared in the laboratory by treating manganese dioxide (MnO₂) with aqueous hydrochloric acid according to the reaction.

$$4\text{HCl}(\text{aq}) + \text{MnO}_2(\text{s}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{MnCl}_2(\text{aq}) + \text{Cl}_2(\text{g})$$
 How many grams of HCl react with 5.0 g of manganese dioxide?
4. A sample of drinking water was found to be severely contaminated with chloroform,

CHCl_3 , supposed to be carcinogenic in nature. The level of contamination was 15 ppm (by mass).

- i. Express this in percent by mass.
 - ii. Determine the molality of chloroform in the water sample.
5. What is the concentration of sugar ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) in mol L^{-1} if its 20 g are dissolved in enough water to make a final volume up to 2L?
 6. If the density of methanol is 0.793 kg L^{-1} , what is its volume needed for making 2.5 L of its 0.25 M solution?
 7. Calculate the mass of sodium acetate (CH_3COONa) required to make 500 mL of 0.375 molar aqueous solution. Molar mass of sodium acetate is $82.0245 \text{ g mol}^{-1}$.
 8. Calculate the concentration of nitric acid in moles per litre in a sample which has a density, 1.41 g mL^{-1} and the mass per cent of nitric acid in it being 69%.
 9. Determine the molecular formula of an oxide of iron in which the mass per cent of iron and oxygen are 69.9 and 30.1 respectively.
