

Chemistry - 11th Class Chemistry Short Questions Chapter 1 Preparation

Q1. 180 grams of glucose and 342 grams of sucrose have same number of molecules, but different number of atoms present in them. Justify it.

Ans 1: 180 grams of glucose ($C_6H_{12}O_6$) and 342 grams of sucrose ($C_{12}H_{22}O_{11}$) are one mole of each. One mole of various substances contain equal number of molecules i.e., 6.02×10^{23} . One molecule of $C_6H_{12}O_6$ has 24 atoms. The total number of atoms of glucose in one mole is $24 \times 6.02 \times 10^{23}$. One molecule of $C_{12}H_{22}O_{11}$ has 45 atoms and the number of atom in 1 mole is $45 \times 6.022 \times 10^{23}$. It means that one mole of both glucose and sucrose will have different number of atoms.

Q2.

Molecular formula is multiple of empirical formula. Give an example.

Ans 1: The empirical formula is the simplest whole number ratio of atoms of different elements present in a compound. Molecular formula tells the actual number of atoms of each element in a molecule. Hence the empirical formula has to be multiplied with a suitable digit to get the molecular formula.

Q3. Prove that one mole of each $14g$, CO_2 and H_2 contain equal number of molecules.

Ans 1: This is according to Avogadro's law that one mole of a substance has 6.02×10^{23} molecules in it. So, 28 g of N_2 , 44g of CO_2 and 2 g of H_2 have 6.02×10^{23} molecules in each.

Q4.

Ans 1:

Q5. Define Avogadro's number. How does it relate to the masses of chemical substances?

Ans 1: It is the number of atoms, molecules or ions in one gram mole of an element, compound and ion. One gram mole of the substance is the atomic mass, molar mass or ionic mass taken in grams. It means that the number of the species is related with the masses of the species.

Q6.

Calculate the mass in grams of 10^{-2} moles of water.

Ans 1:

Q7. Distinguish between actual and theoretical yield.

Ans 1:

Q8. What is atomic mass unit? Give its values in grams.

Ans 1: It is a unit of mass used for atoms and molecules and is equal to the $1/12$ of the mass of an atom of carbon— 12 . It is obtained by dividing the unity by Avogadro's number (6.02×10^{23}).

Q9. 2 grams of H_2 , 16g of CH_4 and 44g of CO_2 , occupy separately the volumes of 22.414 dm^3 at STP although the sizes and masses of molecules of three gases are very different from each other.

Ans 1: One mole of an ideal gas at S.T.P. occupies a volume of 22.414 dm^3 . Sizes and masses of molecules of different gases do not affect the volume. Normally it is known that in the gaseous state, the distance between the molecules is 300 times greater than their diameter. Therefore two grams of H_2 , 16g of CH_4 and 44g of CO_2 (1 mole of each gas) separately occupy a volume of 22.4 dm^3 . This is called molar volume (V_m).

Q10. Why positively charged ions of isotopes are passed through magnetic field in the mass spectrometer?

Ans 1:

The positively charged ions bend perpendicular to the joining lines of the two poles, when passed through the magnetic field. In this way, magnetic field gives these ions semicircular path, scatters them on the basis of m/e values and compels them to fall on the electrometer. Electrometer develops the electric current. The strength of the torrent gives the relative of ions of definite m/v value.
