



### III. Short Answer Type Questions

Question 1. Give the unit to measure size of atom and give size of hydrogen atom.

Answer: The unit to measure size of atom, is nanometer, size of hydrogen atom is  $10^{-10}\text{m}$ .

Question 2. What is IUPAC, give its one function?

Answer: IUPAC is International Union for Pure and Applied Chemistry. It approves the names of elements.

Question 3. Give the Latin name for sodium, potassium, gold and mercury.

Answer:

- Sodium  $\rightarrow$  Natrium
- Gold  $\rightarrow$  Aurum
- Potassium  $\rightarrow$  Kalium
- Mercury  $\rightarrow$  Hydrargyrum

Question 4. What is the ratio by mass of combining elements in  $\text{H}_2\text{O}$ ,  $\text{CO}_2$  and  $\text{NH}_3$ ?

Answer:  $\text{H}_2\text{O}$  ratio by mass of combining elements  $2 : 16 \rightarrow 1 : 8$  (H : O)

$\text{CO}_2$  ratio by mass of combining elements  $12 : 32 \rightarrow 3 : 8$  (C : O)

$\text{NH}_3$  ratio by mass of combining elements  $14 : 3 \rightarrow 14 : 3$  (N : H)

Question 5. Define valency and give the valency for the following elements:

Magnesium, Aluminium, Chlorine and Copper.

Answer: Valency: The combining capacity of an element is called its valency. Valency of the following elements:

Magnesium - 2

Aluminium - 3

Chlorine - 1

Copper - 2

Question 6. What is polyatomic ion? Give one example.

Answer: A group of atoms carrying a charge is known as a polyatomic ion.

E.g., Ammonium -  $\text{NH}_4^+$

Nitrate -  $\text{NO}_3^-$

Question 7. Write down the formula for:

Copper nitrate, calcium sulphate and aluminium hydroxide.

Answer: Chemical formula:

Copper nitrate  $\rightarrow \text{Cu}(\text{NO}_3)_2$

Calcium sulphate  $\rightarrow \text{CaSO}_4$  Aluminium hydroxide  $\text{Al}(\text{OH})_3$

Question 8. What is formula unit mass? How is it different from molecular mass?

Answer: The formula unit mass of a substance is a sum of the atomic masses of all atoms in a formula unit of a compound. The constituent particles of formula unit mass are ions and the constituent particles of molecular mass are atoms.

Question 9. Find the number of moles in the following:

(i) 50 g of  $\text{H}_2\text{O}$

(ii) 7 g of Na

Answer: Number of moles in

(i) Molar mass of  $\text{H}_2\text{O}$  = 18 g

Given mass of  $\text{H}_2\text{O}$  = 50 g

$$\therefore \text{No. of moles in 50 g of } \text{H}_2\text{O} = \frac{50}{18} = 2.78 \text{ moles.}$$

(ii) Molar mass of Na = 23 g

Given mass of Na = 7 g

$$\therefore \text{No. of moles in 7 g of Na} = \frac{7}{23} = 0.304 \text{ moles.}$$

Question 10. Find the number of atoms in the following:

(i) 0.5 mole of C atom

(ii) 2 mole of N atom

Answer: (i) 0.5 mole of C atom:

Number of atoms in 1 mole of C atom =  $6.022 \times 10^{23}$  atoms

Number of atoms in 0.5 mole of C atom =  $6.022 \times 10^{23} \times 0.5$

=  $3.011 \times 10^{23}$  atoms

(ii) 2 mole of N atom:

Number of atoms in 1 mole of N atom =  $6.022 \times 10^{23}$  atoms

Number of atoms in 2 mole of N atom =  $6.022 \times 2 \times 10^{23}$

=  $1.2044 \times 10^{24}$  atoms

Question 11. Find the mass of the following:

(i)  $6.022 \times 10^{23}$  number of  $\text{O}_2$  molecules

(ii) 1.5 mole of  $\text{CO}_2$  molecule

Answer: (i)  $6.022 \times 10^{23}$  number of  $\text{O}_2$  molecules:

Mass of 1 mole of  $\text{O}_2$  molecule =  $6.022 \times 10^{23}$  molecules = 32 g

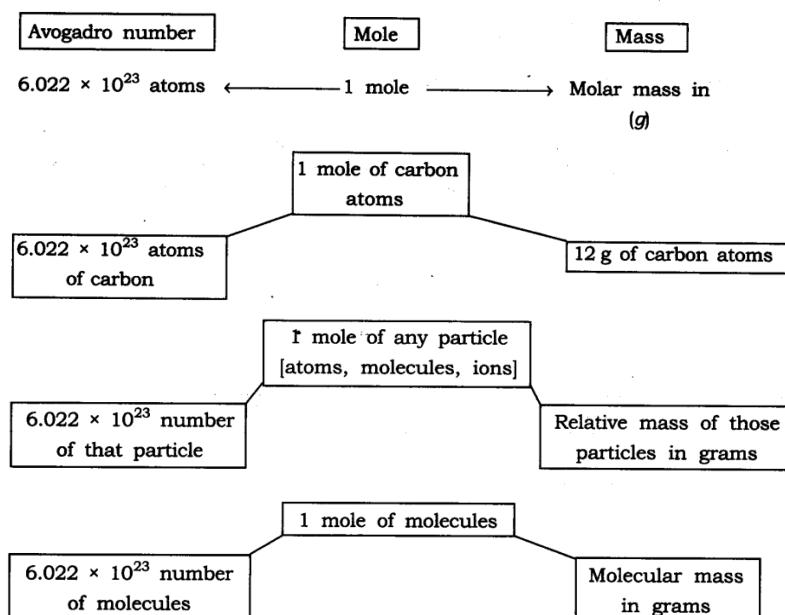
(ii) 1.5 mole of  $\text{CO}_2$  molecule:

Mass of 1 mole of  $\text{CO}_2$  molecule =  $6.022 \times 10^{23}$  molecules = 44 g

Mass of 1.5 mole  $\text{CO}_2$  molecule =  $44 \times 1.5 = 66$  g

Question 12. Show the relationship between mole, Avogadro number and mass.

Answer:



Question 13. What are the rules for writing the symbol of an element?

Answer: IUPAC → International Union of Pure and Applied

Chemistry approves name of elements.

Symbols are the first one or two letters of the element's name in English. The first letter of a symbol is always written as a capital letter (upper case) and the second letter as a small letter (lower case).

e.g., Hydrogen → H, Helium → He

Some symbols are taken from the names of elements in Latin, German or Greek.

e.g., Symbol of iron is Fe, its Latin name is Ferrum.

Symbol of sodium is Na, its Latin name is Natrium.

Question 14. Explain relative atomic mass and relative molecular mass.

Answer: Relative atomic mass: It can be defined as the number of times one atom of given element is heavier than  $\frac{1}{12}$  th of the mass of an atom of carbon-12. Relative Molecular Mass: It is defined as the number of times one molecule

of a substance or given element is heavier than  $\frac{1}{12}$  th of the mass of one atom of carbon-12.

Question 15. The formula of carbon-dioxide is  $\text{CO}_2$ . What information do you get from this formula?

Answer: (i)  $\text{CO}_2$  represents carbon-dioxide.

(ii)  $\text{CO}_2$  is one molecule of carbon-dioxide.

(iii)  $\text{CO}_2$  is one mole of carbon-dioxide i.e., it contains  $6.022 \times 10^{23}$  molecules of carbon dioxide.

(iv)  $\text{CO}_2$  contains 1 atom of carbon and two atoms of oxygen.

(v)  $\text{CO}_2$  represents 44 g of molar mass.

Question 16. State 3 points of difference between an atom and an ion.

Answer:

| Atom  | Ion  |
|---|--|
| 1. An atom has no charge.                   | An ion has either positive or negative charge. |
| 2. Number of electrons = number of protons. | Number of electrons $\neq$ number of protons.  |
| 3. Atom is reactive.                        | Ion is stable.                                 |

Question 17. Calculate the formula unit mass of NaCl and  $\text{CaCl}_2$ .

(Na = 23, Cl = 35.5, Ca = 40)

Answer:

Formula unit mass of NaCl =  $23 + 35.5 = 58.5 \text{ u}$

Formula unit mass of  $\text{CaCl}_2 = 40 + (2 \times 35.5)$

$= 40 + 71 = 111 \text{ u}$

Question 18. The ratio by mass for hydrogen and oxygen in water is given as 1 : 8 respectively. Calculate the ratio by number of atoms for a water molecule.

Answer: The ratio by number of atoms for a water molecule are:

| Element | Ratio by mass | Atomic mass | Mass ratio<br>Atomic mass    | Simplest ratio |
|---------|---------------|-------------|------------------------------|----------------|
| H       | 1             | 1           | $\frac{1}{1} = 1$            | 2              |
| O       | 8             | 16          | $\frac{8}{16} = \frac{1}{2}$ | 1              |

Thus, the ratio by number of atoms for water is H : O = 2 : 1.

Question 19. Write down the chemical formula for the following compounds:

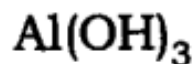
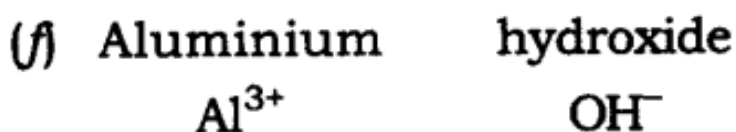
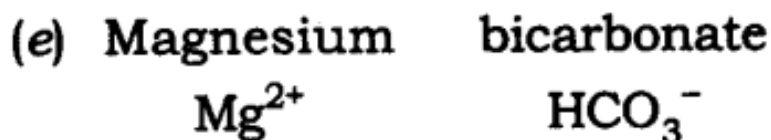
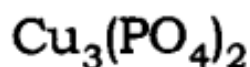
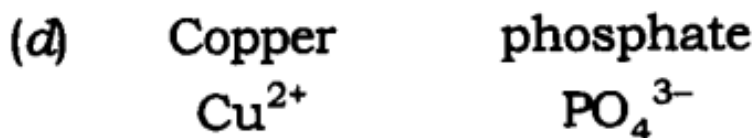
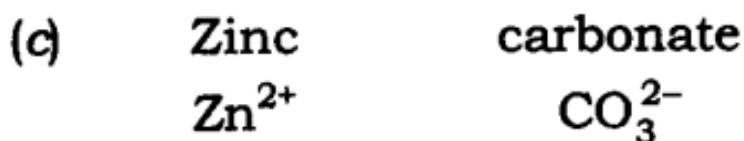
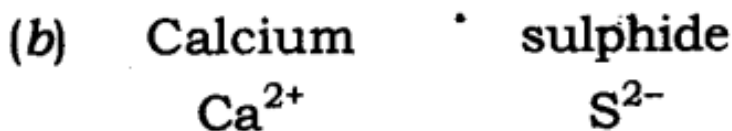
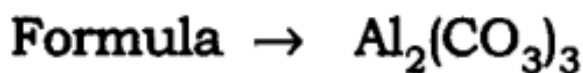
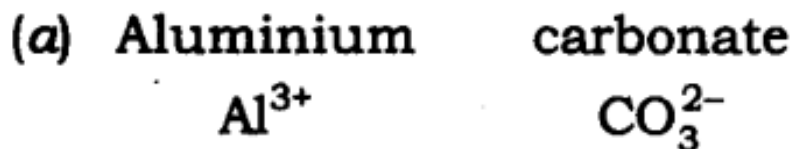
(a) Aluminium carbonate

(b) Calcium sulphide

(c) Zinc carbonate

(d) Copper phosphate

(e) Magnesium bicarbonate  
 (f) Aluminium hydroxide.  
 Answer: The chemical formula are:



Question 20. Give the atomicity of the following compounds:

(a)  $\text{Ca}(\text{OH})_2$  (d)  $\text{H}_2\text{SO}_4$

(b)  $\text{Mg}(\text{HCO}_3)_2$  (e)  $\text{Al}_2(\text{SO}_4)_3$

(c)  $\text{Cu}_2\text{O}$  (f)  $\text{MgCl}_2$

Answer: The atomicity of the molecules are:



Question 21. Explain the difference between 2O, O<sub>2</sub> and O<sub>3</sub>.

Answer: 2O → It represents 2 atoms of oxygen (cannot exist independently).

O<sub>2</sub> → It represents one molecule of oxygen (made up of 2 atom) can exist freely.

O<sub>3</sub> → It represents one molecule of ozone (made up of 3 atoms) it can exist independently.

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