



**CLASS IX
CHEMISTRY
CHAPTER 4
SYMBOLS, FORMULAE AND EQUATIONS**

SOLUTIONS

TEXTUAL QUESTIONS & ANSWERS

Textual Page No. 55

Let us answer these:

1. Write down the formula of

- (i) Aluminium nitrate (ii) Zinc Sulphide (iii) Calcium hydroxide (iv) Aluminium sulphate (v) Iron (II) carbonate

Ans:

- (i) Aluminium nitrate – $\text{Al}(\text{NO}_3)_3$
(ii) Zinc Sulphide – ZnS
(iii) Calcium hydroxide - $\text{Ca}(\text{OH})_2$
(iv) Aluminium sulphate - $\text{Al}_2(\text{SO}_4)_3$
(v) Iron (II) carbonate - FeCO_3

2. Name the following compounds:

Ans:

- (i) $\text{Ca}(\text{OH})_2$ - Calcium hydroxide
(ii) (ii) FeS – Iron Sulphide (Ferrous Sulphide)
(iii) $\text{Mg}_3(\text{PO}_4)_2$ – Magnesium Phosphate
(iv) AgNO_3 - Silver Nitrate
(v) PbCO_3 – Lead Carbonate
(vi) HgBr_2 – Mercuric Bromide

3. How many atoms are present in a $\text{Al}_2(\text{SO}_4)_3$ molecule and CO_3^{2-} ion?

Ans:

- (i) $\text{Al}_2(\text{SO}_4)_3$ molecule - **17 atoms**
(ii) CO_3^{2-} ion - **4 atoms**



Textual Page No. 58

Let us answer these:

1. Calculate the molecular masses of

(i) Cl_2 = molecular mass of Cl_2
= $2 \times$ atomic mass of Cl
= 2×35.5 u
= 71 u

(ii) CO_2 = molecular mass of CO_2
= atomic mass of C + $2 \times$ atomic mass of O
= $12 + 2 \times 16$
= $12 + 32$
= 44 u

(iii) CH_4 = atomic mass of C + $4 \times$ atomic mass of H
= $12 + 4 \times 1$
= 16 u

(iv) NH_3 = Molecular mass of NH_3
= Atomic mass of N + $3 \times$ Atomic mass of H
= $14 + 3 \times 1$
= 17 u

(v) C_2H_6 = Molecular mass of C_2H_6
= $2 \times$ Atomic mass of C + $6 \times$ Atomic mass of H
= $2 \times 12 + 6 \times 1$
= 30 u

2. Calculate the formula masses of

(i) CaO = Formula mass of CaO
= Atomic mass of Ca + Atomic mass of O
= $40 + 16$
= 56 u

(ii) K_2CO_3 = Formula mass of K_2CO_3
= $2 \times$ Atomic mass of K + Atomic mass of C + $3 \times$ Atomic mass of Oxygen
= $2 \times 39 + 12 + 3 \times 16$
= $78 + 12 + 48$
= 138 u

(iii) NaHCO_3 = Formula mass of NaHCO_3
= Atomic mass of Na + Atomic Mass of H + Atomic Mass of C + $3 \times$ Atomic Mass of O
= $23 + 1 + 12 + 3 \times 16$
= $23 + 1 + 12 + 48$
= 84 u



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(iv) H_2SO_4 = Formula mass of H_2SO_4
= $2 \times \text{Atomic Mass of H} + \text{Atomic Mass of S} + 4 \times \text{Atomic Mass of Oxygen}$
= $2 \times 1 + 32 + 4 \times 16$
= $2 + 32 + 64$
= 98 u

3. Calculate the gram molecular mass of $Al_2(SO_4)_3$ (atomic mass of Al = 27, S = 32)

Soln: The Gram molecular mass of $Al_2(SO_4)_3 = 2 \times \text{Atomic mass of Al} + 3 \times \text{Atomic mass of S} + 12 \times \text{Atomic Mass of O}$

$$\begin{aligned} &= 2 \times 27 + 3 \times 32 + 12 \times 16 \\ &= 54 + 96 + 192 \\ &= 342 \text{ g} \end{aligned}$$

Textual Page No. 61

Let us answer these:

1. What mass in grams is represented by

Soln:-

(a) 0.44 mole of CO_2

Gram molecular mass of $CO_2 = 12 + 32 = 44 \text{ g}$

1 mole of CO_2 contains 44g of it.

\therefore 0.44 mole of CO_2 contains $44 \times 0.44 \text{ g} = 19.36 \text{ g}$.

(b) 3 mole of NH_3

Gram Molecular Mass of $NH_3 = 17 \text{ g}$

So, 3 Mole of NH_3 represents $3 \times 17 = 51 \text{ g}$

2. The mass of a single atom M is $3.05 \times 10^{-22} \text{ g}$. What is its atomic mass?

Soln:

Atomic mass = 1 mole of its atom

Since 1 mole of atoms = 6.022×10^{23} atoms

Mass of one atom of M = $3.05 \times 10^{-22} \text{ g}$ (given)

Mass of 1 mole of atoms = $3.05 \times 10^{-22} \times 6.022 \times 10^{23} = 183.7 \text{ g}$

3. Which has more number of atoms, 50g of sodium or 50g of Ca? (Given atomic mass of Na = 23 u, Ca = 40 u) ?

Soln: 23 g of Na contains 6.022×10^{23} atoms

$$\begin{aligned} 50 \text{ g of Na will contain} &= 6.022 \times \frac{50}{23} \times 10^{23} \\ &= 1.3 \times 10^{24} \end{aligned}$$

40 g of Ca contains 6.022×10^{23} atoms

$$\begin{aligned} 50 \text{ g of Ca will contain} &= \frac{50}{40} \times 6.022 \times 10^{23} \\ &= 7.5 \times 10^{23} \end{aligned}$$

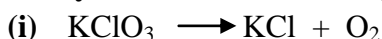
\therefore 50g of Na has more atoms.



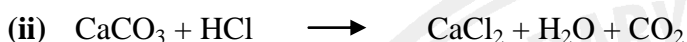
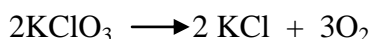
Textual Page No. 64

Let us answer these:

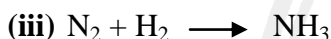
1. Verify whether the following equations are balanced or not? If not, balance it.



Ans: Not Balance: the balance equation is



Ans: Not Balance: the balance equation is



Ans: Not Balance: the balance equation is



2. Sodium reacts with water to produce sodium hydroxide and hydrogen gas. Write a chemical equation for the reaction.



TEXTUAL QUESTIONS AND ANSWERS

Textual Question (page 65)

Q1. What is meant by valency of an element?

Ans:- Valency of an element is the number of hydrogen atoms that can combine with or replace (either directly or indirectly) one atom of the element.

OR

Valency of an element is the combining capacity of an atom of an element to form a molecule.

Q2. What is meant by symbol of an element? Explain with examples.

Ans:- Symbol of an element is the short method of representation of chemical elements using one or two letters. For example, the symbol of iron is Fe, Hydrogen is represented by H, Oxygen by O and Carbon by C etc.



Q3. Give two symbols which have been derived from the Latin name of the elements.

Ans:-

- (i) The symbol of iron is Fe from its Latin name Ferrum.
- (ii) The symbol of Tin is Sn from its Latin name Stannum.

Q4. What is molecule? Explain with an example.

Ans:- A molecule is the smallest particle in a chemical element or compound that has the chemical properties of that element or compound.

Or

A molecule is a particle made up of two or more atoms that are chemically bonded together.

Example:- A molecule of oxygen consists of two oxygen atoms (O_2) and molecule of water consists of two hydrogen atom and one oxygen atom (H_2O).

Q5. What is meant by a chemical formula? Write the formula of the three elements and two compounds.

Ans:- A chemical formula is a symbolic representation of the composition of the molecule of a substance. Formulae of three elements are H_2 , O_2 , N_2 .

Formulae of two compounds are H_2O (water) and CO_2 (carbon-dioxide)

Q6. Explain the difference between 2N and N_2 .

Ans:- 2N denotes two atoms of nitrogen and N_2 denotes one molecule of nitrogen.

Q7. Define the molecular mass of a substance.

Ans:- Molecular mass of a substance is the sum of all the atomic masses of all the atoms in a molecule of the substance. **Or**

It may be defined as the relative mass of the molecule as compared with the mass of one atom of carbon (C-12) taken as 12 u.

Q8. Calculate the molecular masses of the following.

Ans:-

(a) Ethane, C_2H_6

Molecular mass of ethane, C_2H_6

$$C_2H_6 = (12 \times 2) + (1 \times 6)$$

$$= 24+6$$

$$= 30u$$



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(b) Calcium carbonate, CaCO₃

Molecular mass of CaCO₃

$$= 40 + 12 + (16 \times 3)$$

$$= 40 + 12 + 48$$

$$= 100\text{u}$$

(c) Copper sulphate, CuSO₄

Molecular mass of CuSO₄

$$= 63.5 + 32 + (16 \times 4)$$

$$= 63.5 + 32 + 64$$

$$= 159.5\text{u}$$

(d) Ethanol, C₂H₅OH

Molecular mass of C₂H₅OH

$$= (12 \times 2) + (1 \times 5) + 16 + 1$$

$$= 24 + 5 + 16 + 1$$

$$= 46\text{u}$$

(e) Acetic acid, CH₃COOH

Molecular mass of CH₃COOH

$$= 12 + (1 \times 3) + 12 + 16 + 16 + 1$$

$$= 12 + 3 + 12 + 16 + 16 + 1$$

$$= 60\text{u}$$

(f) Ferrous sulphate (hydrated) FeSO₄. 7H₂O

$$\text{FeSO}_4 \cdot 7\text{H}_2\text{O} = 56 + 32 + (16 \times 4) + 7(1 \times 2 + 16)$$

$$= 56 + 32 + 64 + 7(2 + 16)$$

$$= 56 + 32 + 64 + 7 \times 18$$

$$= 56 + 32 + 64 + 126$$

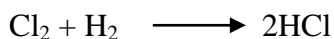
$$= 278\text{u}$$



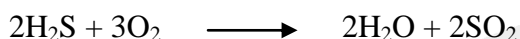
Q9. Translate the following statements into chemical equation and then balance the equations.

Ans:-

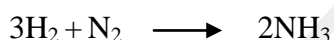
a) Chlorine gas burns in hydrogen gas to give hydrogen chloride.



b) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.



c) Hydrogen gas combines with nitrogen to give ammonia, NH_3



d) Sodium metal reacts with water to give sodium hydroxide and hydrogen gas



e) Aluminium metal replaces iron from ferric oxide Fe_2O_3 , giving aluminium oxide and iron.



Q10. What is the difference between a cation and an anion?

Ans:- Cations are positively charged ions whereas anions are negatively charged ions.

Example of cations are Ca^{2+} , Na^+ , H^+ , K^+ , NH_4^+ , Al^{3+} etc.

Example of anions are Cl^- , S^{2-} , O^{2-} , PO_4^{3-} , SO_4^{3-} , NO_3^- etc.

Q11. Name the following compounds, also write the symbols/formulas of the ions present in them.

Ans:

Symbol/ Formula	Compound name	Cation	Anion
CuSO_4	Copper sulphate	Cu^{2+} (copper ion)	SO_4^{2-} (Sulphate ion)
Na_2SO_4	Sodium sulphate	Na^+ (sodium ion)	SO_4^{2-} (Sulphate ion)
NH_4NO_3	Ammonium nitrate	NH_4^+ (ammonium ion)	NO_3^- (nitrate ion)
Na_2CO_3	Sodium carbonate	Na^+ (sodium ion)	CO_3^{2-} (carbonate ion)
CaCl_2	Calcium chloride	Ca^{2+} (calcium ion)	Cl^- (chloride ion)



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Q18. Convert into mole:

a. 12g of nitrogen gas.

b. 15g of water.

c. 22g of carbon dioxide

a. $No. of moles = \frac{mass\ in\ gram}{molar\ mass} = \frac{12g}{28g\ mol^{-1}} = 0.428\ mol$

b. $No. of moles = \frac{mass\ in\ gram}{molar\ mass} = \frac{15g}{18g\ mol^{-1}} = 0.83\ mol$

c. $No. of moles = \frac{mass\ in\ gram}{molar\ mass} = \frac{22g}{44g\ mol^{-1}} = 0.5\ mol$

Q19. What is the mass of:

(a) 0.2 mole of chlorine (Cl₂)

(b) 0.5 mole of water molecule

Soln.

(a) 1 mole of chlorine (Cl₂) gas = 35.5 × 2 = 71g

Therefore 0.2 mole of Cl₂ = 71 × 0.2g = 14.2g

(b) 1 mole of water (H₂O) = (1 × 2) + 16 = 18g

Therefore 0.5 mole of water = 18 × 0.5 = 9g

Q20. Calculate the number of potassium ion present in 7.45g of potassium oxide. (at. mass of K = 39u)

Ans:- Formula of potassium oxide is K₂O.

Molar mass of K₂O = (39 × 2) + 16 = 78 + 16 = 94g mol⁻¹

No. of moles of K₂O = mass in gram/molar mass = 7.45g/94g mol⁻¹ = 0.079 mol

But 1 mole of K₂O contains 6.022 × 10²³ molecules

Therefore, 0.079 mole of K₂O contains = 6.022 × 10²³ × 0.079 molecules.

$$= 0.476 \times 10^{23} \text{ molecules.}$$

One formula unit of K₂O contains two potassium ions (K⁺),

Therefore, total number of potassium ion is given by 4.76 × 10²² × 2 = 9.52 × 10²² ions



EXTRA QUESTIONS AND ANSWERS

Q1. Give the name of the Scientist who use the symbols of element for the first time in a very specific sense?

Ans:- John Dalton.

Q2. List some element with symbol derived from their Latin name.

Ans:-

Name of the element	Latin name	Symbol
Antimony	Stibium	Sb
Copper	Cuprum	Cu
Gold	Aurium	Au

(For more, refer to Page 50, Table 4.3)

Q3. What are the significances of symbol of element? Explain with examples.

Ans:- The significances of symbol of element are

- Name of the element.
- One atom of the element
- Mass of an atom of the element

Example: The symbol 'N' represents:

- The name of the element is Nitrogen.
- An atom of Nitrogen.
- Mass of one atom of Nitrogen is 14u

Q4. What is a chemical formula? What are the significance of a chemical formula?

Ans:- A chemical formula is a symbolic representation of the composition of the molecule of a substance. Significance of a chemical formula (molecular formula)

- It signifies the total number of elements presence in the molecule (Chemical formula).
- It represents the total mass of the compound (Chemical formula).
- It represents the fixed ratio by mass of the compound.

Q5. What are the steps which are involved in writing the chemical formula? Explain with examples.

Ans:- Steps which are involved in writing the chemical formula are

- Write the symbols of the constituent elements.
- Put the valencies under each symbol.
- Take out the common factor if there is any.
- Cross over the valency of the combining atoms.
- In case of polyatomic ions, the ions must enclose in a bracket before writing the number.



Example:

i. Formula of Hydrogen Chloride

Symbol	H	→	Cl
Valency	1	→	1
Formula	HCl		

ii. Formula of Ammonium sulphate

Symbol	NH ₄	→	SO ₄
Charge	1 ⁺	→	2 ⁻
Formula	(NH ₄) ₂ SO ₄		

(Ref page 54 for more examples)

Q6. Write down the formula of the following compounds.

Ans:- Compound

Formula

- (i) Aluminium Chloride
- (ii) Zinc sulphide
- (iii) Calcium hydroxide
- (iv) Aluminium sulphate
- (v) Iron (ii) Carbonate

- AlCl₃
- ZnS
- Ca(OH)₂
- Al₂(SO₄)₃
- FeCO₃

Q7. Define valency. How does it differ from variable valency?

Ans:- The combining capacity of an atom of an element to form a molecule is called valency.

E.g valency of aluminium is 3, calcium is 2. *(Ref, page 52 for more examples)*

Variable valency

If an element possesses more than one valency then, it is said to possess variable valency.

E.g. copper has valency of 1 and 2, iron has a valency of 2 and 3 etc.

Q8. What do you understand by Ferrous chloride (FeCl₂) and Ferric chloride (FeCl₃)?

Ans:- Ferrous Chloride(FeCl₂) and (Ferric chloride)FeCl₃ are the compounds formed when iron combines with chlorine. In FeCl₂, valency of iron is 2 and in FeCl₃ the valency of iron is 3. When metallic element form two compound with another element, the name of the metal in its lower valency state ends with a suffix “ous” like ferrous chloride and that element in the compound and that element in the compound of its higher valency state ends with a suffix “ic” like ferric chloride.

Q9. Define the following terms. Give examples.

Ans:-

- (i) **Ions:-** An atom or a group of atoms carrying either positive or negative charges are called ions.

E.g. Na⁺, Ca²⁺, K⁺, S²⁻, H⁺ etc.



(ii) **Cations:-** The positively charged ions are called Cations.

E.g. K^+ , Cu^+ etc.

(iii) **Anions:-** The negatively charged ions are called Anions.

E.g. Br^- , O^{2-} , NO_3^- etc.

(iv) **Ionic compounds:-** The compounds which are made up of ions are called ionic compounds.

E.g. NaCl (Sodium Chloride) consist of positively charged sodium ion (Na^+) and negatively charged Chloride ion (Cl^-).

(v) **Polyatomic ions:-** A group of atom carrying a charged is called polyatomic ions.

E.g. NH_4^+ , NO_3^- etc.

Q10. Define is molecular mass? What is its S.I. unit?

Ans:- Molecular mass of a substance is the total sum of all the atomic masses of all the atoms in a molecule of the substance. Its S.I. unit is unified mass (u).

Q11. Calculate

(i) **Molecular mass of CO_2**

(ii) **Percentage (%) of Carbon (C) in CO_2**

(iii) **Percentage (%) of Oxygen (O) in CO_2**

Ans:-

(i) Molecular mass of CO_2 is $12+(2 \times 16)$
 $= 12+32 = 44u$

(ii) Percentage (%) of Carbon (C) in $CO_2 = \frac{\text{parts of carbon (C) by mass}}{\text{Molecular mass of } CO_2} \times 100$
 $= \frac{12}{44} \times 100$
 $= 27.3\%$

(iii) Percentage (%) of Oxygen (O) in $CO_2 = \frac{\text{parts of oxygen (O) by mass}}{\text{Molecular mass of } CO_2} \times 100$
 $= \frac{32}{44} \times 100$
 $= 72.7\%$

Q12. Calculate the mass of Carbon present in 24g of CO_2 .

Ans:- Molecular mass of $CO_2 = (1 \times 12) + (2 \times 16)$
 $= 12 + 32 = 44u$

Mass of C in 24g of $CO_2 = \frac{\text{parts of carbon (C) by mass}}{\text{Molecular mass of } CO_2} \times 24$
 $= \frac{12}{44} \times 24$
 $= 6.5g$



Q13. Define gram molecular mass? Give an example.

Ans:- The molecular mass of a substances (element or compound) expressed in grams is called gram molecular mass of a substances. For example, molecular mass of CO₂ is 44u. Hence, the gram molecular mass of CO₂ is 44g.

$$\begin{aligned}\text{Molecular mass of H}_2\text{O} &= 2 \times 1 + 1 \times 16 \\ &= 2 + 16 \\ &= 18 \text{ (u)}\end{aligned}$$

∴ gram molecular mass of H₂O = 18 g.

Q14. Calculate gram molecular mass of NH₃.

$$\begin{aligned}\text{Ans:- Molecular mass of NH}_3 &= 14+(3 \times 1) \\ &= 14+3 = 17\text{u}\end{aligned}$$

Therefore gram molecular mass of NH₃ is 17g

Q15. What is meant by mole of a substance?

Ans:- Mole is the specific number in which the number of particles present in atoms, molecules, ions or electrons remains the same. The specific number is 6.022×10^{23} .

E.g. 1 mole of atom = 6.022×10^{23} atom

1 mole of molecule = 6.022×10^{23} molecules

1 mole of ions = 6.022×10^{23} ions etc.

Q16. Why mole is so significant?

Ans:- Besides being related to a number, a mole has one more advantage over other number like dozen or gross.

The advantage is that mass of 1 mole of a particular substance is also fixed.

The mass of 1 mole of a substance is equal to its relative atomic or molecular mass in grams (gram` atomic or molecular mass).

Q17. Convert into mole. A) 12 g of Nitrogen gas

Ans:-

$$\text{Molecular mass of N}_2 = 2 \times 14 = 28\text{u}$$

So, gram molecular mass = 28g

Hence 28g of N₂ molecule contains 1mole of N₂ molecules.

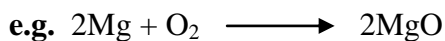
So, 1g of N₂ molecule contains 1/28 moles of molecules.

$$\begin{aligned}\text{Therefore 12g of N}_2 \text{ molecule contain} &= \frac{1}{28} \times 12 \text{ mole of N}_2 \text{ molecule} \\ &= \frac{3}{7} \text{ mole of N}_2 \text{ molecule} \\ &= 0.43 \text{ mole of N}_2 \text{ molecule}\end{aligned}$$



Q18. What is chemical equation? Give example.

Ans:- A chemical equation is the symbolic representation of an actual chemical reaction with the help of symbol and formulas of reactants and products.



This chemical equation shows that Magnesium react with Oxygen to form magnesium oxide as products.

Q19. What are the rules to be followed while writing chemical equations?

Ans:- Rules to be followed while writing chemical equation are

- (i) The reactants are placed on the left hand side separated by plus(+) sign which means “reacts with”.
- (ii) The products are placed on the right hand side separated by (+) sign which means “along with”
- (iii) The reactants and products are separated by an arrow pointing towards the product (\longrightarrow) or the sign of equality (=) which means ‘to produce’
- (iv) Above the arrow, the reaction conditions such as catalyst, temperature, pressure etc. may be indicated.
- (v) If the product is a gas, it indicated by an upward arrow (\uparrow) and if the product is a precipitate, it is indicated by a downward arrow (\downarrow).
- (vi) Sometimes the physical state of reactants and products are also indicated in a chemical reaction.



Q20. What are the qualitative and quantitative significance of chemical equation.

Ans:- The qualitative and quantitative significance of chemical equation are

Qualitatively, it represents

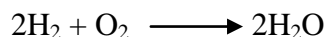
- (i) What are the reactants and what are the products,
- (ii) The composition of reactants and products

Quantitatively, it represents

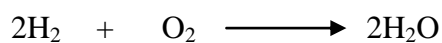
- (i) The relative of each kind of the molecules and atoms
- (ii) The relative masses of the reactants and products
- (iii) The number of moles of the reactants and products
- (iv) The volumes of gaseous substance involved.



Q21. Interpret the following equation



Ans:-



2 mole or 4g 1mole or 32g 2mole or 36 g

This chemical equation can be interpreted as

- i. Hydrogen and Oxygen combined to form water
- ii. 2 molecules of Hydrogen react with 1 molecule of Oxygen to produced 2 molecules of water.
- iii. 32 parts by mass of oxygen reacts with 4 parts by mass of Hydrogen to produce 36 parts by mass of water
- iv. 2 moles of Hydrogen molecule react with 1 mole of Oxygen molecule to produce 2 mole of water.

PROBABLE QUESTIONS FROM TEXTBOOK

Q1. Give the name of the Scientist who use symbol of elements for the first time in a very specific sense.

Ans: John Dalton

Q2. Define symbol of an element. What are the significances of symbols?

Ans: Symbol of an element is the accepted abbreviation of the name of the element.

A symbol signifies

- (a) Name of the element.
- (b) An atom of the element.
- (c) The mass of an atom of the element.
- (d) Atomic number of the element.

Q3. Write the rules associated for writing the modern symbols of elements by giving suitable examples.

Ans:

(i) Using of first letter of the name of the element in capital letter. (Berzerllius)

e.g. Hydrogen — H Oxygen — O Carbon — C

(ii) Using of two letter Combination: The first letter of the symbol should be capital and the second letter should be in small.

e.g. Calcium — Ca Chlorine — Cl Palladium — Pd



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(iii) Using of Latin language, name of Scientist or country.

e.g. Gold — Aurum — Au , Silver — Argentum — Ag, Tungsten — W — Wolfram (Name of scientist).

Q4. Write the Latin names and symbols of the following elements.

- (a) Iron (b) Copper (c) Gold (d) Silver (e) lead (f) Sodium
(g) Potassium (h) Mercury (i) Tin (j) Antimony (k) Tungsten

Ans:

Name of Element	Symbol	Latin Name
(a) Iron	Fe	Ferrum.
(b) Copper	Cu	Cuprum
(c) Silver	Ag	Argentum
(d) Sodium	Na	Natrium
(e) Potassium	K	Kalium
(f) Mercury	Hg	Hydrargyrum
(g) Tin	Sn	Stannum
(h) Tungsten	W	Wolfram

Q5. What are the rules associated for writing chemical formula of a compound?

Ans:

- (i) When a compound consists of a metal and non-metal, the name or symbol of the metal should be written first and following by the ion formed by the non-metal.
e.g. NaCl → Sodium Chloride.
- (ii) When the compound consist of non-metals only, the name of the non-metal which has less electronegativity
- (iii) Should be written first and followed by the name of the ion formed by the non-metal which has less electronegativity.
e.g. CO₂ → Carbon dioxide ; PN → Phosphorous nitride.
- (iv) When writing the chemical formula ,the valencies of the elements should be written with the symbols and they must be cross wise and if there is equal fractions (common factors), they should be cancelled .
- (v) In compounds formed with polyatomic ions, the ion is enclosed in a bracket before writing the number to indicate the ratio.

Q6. What is formula unit mass?

Ans:- It is the total sum of the atomic masses of the atoms present in the different ions in a compound (molecules) having opposite ions .



Q7. Differentiate between molecular mass and formula (unit) mass. Give example.

Ans: molecular mass is the total sum of the atomic masses of all the atom in a molecule of a substance.

Formula (unit) mass is the total sum of the atomic masses of the atoms presence in the opposite ions (constituent ions) in a compound.

e.g. **Molecular mass of CO₂**

CO₂ (C=12 ; O=16)

$$= 1XC + 2XO = 1 \times 12 + 2 \times 16 = 12 + 32 = 44u.$$

Formula mass of NaCl



$$23u \quad 35.5u$$

$$= 23 + 35.5 = 58.5u$$

Q8. What is molar mass? What is its unit?

Ans:- It is define as the mass of 1 mole of any substance. It is always expressed in gram. It is also known as gram atomic mass or gram molecular mass.

Q9. What is the information conveyed by a chemical formula?

Ans:- A chemical formula conveys the following information:

(a) Qualitatively it represents-

- (i) The name of the compound.
- (ii) The elements presents in the compound.

(b) Quantitatively it represents-

- (i) One molecule of the substance.
- (ii) The number of atoms of various elements which constitute one molecule of the substance.
- (iii) The molecular mass of the one molecule of the substance.
- (iv) The number of parts by mass of the elements present in the molecule.
- (v) One mole of the substance.

