SAFALTA CLASS™

An Initiative by अमर उजाला

Which of the following statements is not true about an atom?

(a) Atoms are not able to exist independently. ✓✓

(b) Atoms are the basic units from which molecules and ions are formed.

(c) Atoms are always neutral in nature.

(d) Atoms aggregate in large numbers to form the matter that we can see, feel or touch.

The molecular formula of potassium nitrate is _____.

(a) KNO_3

(b) KNO

(c) KNO_2

(d) KON

Which of the following represents a correct chemical formula?

(a) CaCl

(b) $BiPO_4$

(c) $NaSO_4$

(d) NaS

A strontium atom differs from a strontium ion in that the atom has a greater

1. number of electrons

2. mass number

3. number of protons

4. atomic number

With reference to ionic compounds, consider the following statement:

(a) Ionic compounds are insoluble in alcohol

(b) Ionic compounds in the solid state are good conductor of electricity

Which of these statements is/are correct?

(a) Only 1

(b) Only 2

(c) Both 1 and 2

(d) Neither 1 nor 2

Which of the following is a chemical formula of quicklime?

(a) Ca_2O

(b) Ca_2CO_3

(c) CaO_2

(d) CaO

What is formed when Magnesium is burnt?

(a) **Baking Soda**

(b) **Calcium Carbonate**

(c) **Ash**

(d) **Vinegar**

Which of the following chemicals is also known as "Vitriol of clay"?

[A] Aluminium sulphate

[B] Sodium silicate

[C] Zinc sulphate

[D] Copper(II) sulphate

Vitriol	Chemical	Comment	Formula
Black vitriol		a mixture[A]	$[Cu,Mg,Fe,Mn,Co,Ni]SO_4 \cdot 7H_2O$[B]
Vitriol of argile/Vitriol of clay	aluminium sulfate	alum	$Al_2(SO_4)_3$
Sweet oil of vitriol	diethyl ether	not a sulfate	$CH_3\text{-}CH_2\text{-}O\text{-}CH_2\text{-}CH_3$
Red vitriol	cobalt(II) sulfate	heptahydrate	$CoSO_4 \cdot 7H_2O$
Blue vitriol/Vitriol of Cyprus/Roman vitriol[2]	copper(II) sulfate	pentahydrate	$CuSO_4 \cdot 5H_2O$
Vitriol of Mars	iron(III) sulfate	Ferric sulfate	$Fe_2(SO_4)_3$
Green vitriol/Copperas	iron(II) sulfate	heptahydrate	$FeSO_4 \cdot 7H_2O$
Oil of vitriol/Spirit of vitriol	sulfuric acid	acid	H_2SO_4
White vitriol	zinc sulfate	heptahydrate	$ZnSO_4 \cdot 7H_2O$

4. Which compound, when dissolved in water, conducts electricity and forms a basic solution?

(a) HCl

(b) CH_3COOH

(c) CH_30H

(d) NaOH

13. Which one among the following chemicals is used in washing soda?

(a) Calcium carbonate

(b) Calcium bicarbonate

(c) Sodium carbonate

(d) Sodium bicarbonate

21. Brine is an aqueous solution of

(a) NaCl ✓

(b) NaOH

(c) $NaHCO_3$

(d) Na_2CO_3

22. Which one of the following is the chemical formula of Washing Soda?

(a) $NaHCO_3$

(b) $Na_2CO_3.10H_2O$

(c) $Na_2CO_3.5H_2O$

(d) NaOH

± नौसादर NH_4Cl

* $(NH_4)_3PO_4$

* NH_4NO_3

* PbS ⇒ Galena

Imp

MOLE CONCEPT

- Atomic Mass (**परमाणु द्रव्यमान**)
- Molecular Mass (**आणविक द्रव्यमान**)
- Molar mass (**मोलर द्रव्यमान**)
- Equivalent Weight (**तुल्यांकी भार**)
- Molarity (**मोलरता**)
- Molality (**मोललता**)
- Normality (**नॉर्मलता**)

ATOMIC MASS, MOLECULAR MASS & MOLAR MASS

* H (Atom) → 1 unit ⇒ 1u ⇒ Atomic mass of Hydrogen
(परमाणु द्रव्यमान)

$_1H^1$

$_8O^{16}$

H_2 (molecule) → 2 unit ⇒ 2u ⇒ molecular mass of Hydrogen
(अणु द्रव्यमान)

⇒ H_2O ⇒ 2H + 1O
(2u + 16) ⇒ 18u ⇒ molecular mass of H_2O
(अणु द्रव्यमान)

$_8O^{16}$

* CO_2 ⇒ 1C + 2O ⇒ 12u + 2×16u ⇒ 44 unit

⇒ अणु द्रव्यमान CO_2

* NH_3 ⇒ $_7N^{14}$ $_1H^1$

⇒ 1N + 3H

⇒ 14u + 3×1

⇒ 14u + 3u

⇒ 17 u

* CH_4 ⇒ 1C + 4H

⇒ 12u + 4×1

⇒ 16 u

22.5

35.5

* Oxygen:-

O → 16 unit ⇒ Atomic mass of oxygen

unit → u

⇓

O → 16 gm ⇒ Molar mass (मोलर द्रव्यमान) ↗ " "

⇒ H_2O ⇒ 18u ⇒ molecular mass of water

⇓

18 gm ⇒ molar mass of water molecule (मोलर द्रव्यमान) ↗

$_8O^{16}$ $_7N^{14}$

$_1H^1$

⇒ 2×1 + 16

= 2 + 16 = 18

* CO_2 ⇒ molecular mass = 44 u ✓

molar mass = 44 gm

⇒ (molecular Weight)
(आणविक भार)

* CH_4 ⇒ mole. weight

⇒ 16 gm

* $H_2SO_4 \Rightarrow 2H + S + 4O$

$\Rightarrow 2 \times 1u + 1 \times 32u + 4 \times 16u$

$\Rightarrow 2u + 32u + 64u$

$\Rightarrow 98\ u \Rightarrow$ molecular mass

$\Rightarrow 98\ g \Rightarrow$ molar mass (mol. weight)

* Urea (यूरिया):- NH_2CONH_2

$\Rightarrow 2N + 4H + C + O$

$\Rightarrow 2 \times 14u + 4 \times 1u + 12u + 16u$

$\Rightarrow 28u + 4u + 12u + 16u$

$\Rightarrow$ 60 unit $\Rightarrow$ mol. mass

60gm $\Rightarrow$ molar mass

$\Rightarrow N\% = \frac{28}{60} \times 100\% \Rightarrow \frac{280}{6} = 46.67\%$

* NH_3 ✓

$\Rightarrow N\% = \frac{14}{17} \times 100\%$

$\hookrightarrow = 82.3\%$ ✓

$H\% = \frac{3}{17} \times 100\%$

$= 17.7\%$

* H_2SO_4 → S %

98

$$S\% = \frac{32}{98} \times 100\%$$

$$= \frac{1600}{49} = 32.\overline{65}$$

⁂ Formula Unit Mass (सूत्र मात्रक / सांकेतिक द्रव्यमान)

⇒ ionic Compounds का द्रव्यमान !

⇒ NaCl ⇒ Na + Cl

⇒ 23 unit + 35.5 unit

⇒ 58.5 unit

58.5 gm ⇒ मोलर द्रव्यमान

$HNO_3 \Rightarrow H + N + 3O$

$1u + 14u + 3 \times 16$

$\Rightarrow 48 + 15 \Rightarrow$ 63 unit

$MgCl_2 \Rightarrow Mg + 2Cl$

HCl

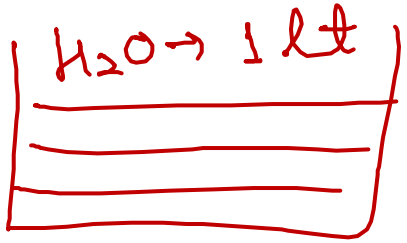
Mole Concept

(मोल उदाहरण)

⇒ 1 Dozon केले ⇒ 12 केले

$\frac{1}{2}$ Dozon Ball ⇒ 6 balls

⇒ Particle



⇒ H_2O

No. of molecules

Avogadro's No. =

N_A or $N_0 = 6.022 \times 10^{23}$

1 मोल $= 6.022 \times 10^{23}$ mol / Atom

1 Dozon केले = 12 केले

1 मोल केले = 6.022×10^{23} केले ✓

* 1 mole of a molecule = 6.022×10^{23} no. of molecules
  1 mole of an atom = 6.022×10^{23} no. of atoms
  1 mole of an ion ⇒ 6.022×10^{23} no. of ions

* ① $\left\{ n = \frac{m}{M} \right\}$

जहाँ, n ⇒ मोलों की संख्या (no. of moles)

m ⇒ Given mass (दिया गया द्रव्यमान)

⇒ M ⇒ Molar mass (मोलर द्रव्यमान)

② $\left\{ n = \frac{N}{N_A} \right\}$ ⇒ N = no. of Particles

N_A or N_0 ⇒ Avogadro Number

e.g:- H_2O ⇒ 18u ⇒ molecular mass

18gm ⇒ molar mass

In 1 mole water molecules = 18 gm ✓

1 mole = 18 gm. → $= 6.022 \times 10^{23}$ no. of water molecule

⇒ 36 gm ⇒ 2 mole ⇒ 12.044×10^{23} no.

9 gm ⇒ $\frac{1}{2}$ mole ⇒ 3.011×10^{23} no.

e.g.:- 2 gm → H ki no. of moles = ? (n) (N)

$$n = \frac{m}{M}$$ → molar mass

$$n = \frac{2gm}{1} = 2$$

no. of particle ⇒

$$n = \frac{N}{N_0}$$

$$N = n \times N_0 = 2 \times 6.022 \times 10^{23}$$

कणों की संख्या = 12.044×10^{23}

* 196 gm H_2SO_4 ⇒ मोलो की संख्या ?

$$n = \frac{m}{M} = \frac{196}{98}$$

$$n = 2$$

⇒ no. of particles

$$n = \frac{N}{N_A}$$

$$N = 2 \times 6.022 \times 10^{23}$$

$$= 12.044 \times 10^{23}$$

$H_2SO_4 \Rightarrow 2H + S + 4O$

$\Rightarrow 2 + 32 + 64 = 98$

* $HNO_3 \rightarrow 252gm$

$n = \frac{m}{M} = \frac{252}{63} = 4$ ✓

$M \Rightarrow 1H + 1N + 3O$

$\Rightarrow 1 + 14 + 48 \Rightarrow 48 + 15 \Rightarrow 63gm$ ✓

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