

Daily Tutorial Sheet-1

JEE Main (Archive)

1.(A) $\text{Fe (no. of moles)} = \frac{558.5}{55.85} = 10 \text{ moles}$

$\text{C (no. of moles)} = 60/12 = 5 \text{ moles.}$

(atomic weight of carbon = 12)

2.(A) 1 atomic mass unit on the scale of $1/6$ of C-12 = 2 amu on the scale of $1/12$ of C-12.

Now, atomic mass of an element = $\frac{\text{Mass of one atom of the element}}{1 \text{ amu (Here on the scale of } \frac{1}{6} \text{ of C-12)}}$

= $\frac{\text{Mass of one atom of the element}}{2 \text{ amu (Here on the scale of } \frac{1}{12} \text{ of C-12)}}$

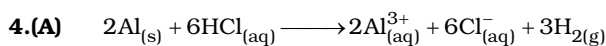
\therefore Numerically the mass of a substance will become half of the normal scale.

3.(B) 1 mole of $\text{Mg}_3(\text{PO}_4)_2$

\Rightarrow 3 moles of Mg atom + 2 moles of P atom + moles of O atom

8 moles of oxygen atoms are present in = 1 mole of $\text{Mg}_3(\text{PO}_4)_2$

0.25 mole of oxygen atoms are present in = $\frac{1 \times 0.25}{8} = 3.125 \times 10^{-2}$ moles of $\text{Mg}_3(\text{PO}_4)_2$



6 moles of HCl produced H_2 at STP = $3 \times 22.4 \text{ L}$

\therefore 1 mole of HCl will produce H_2 at STP = $\frac{3 \times 22.4}{6} = 11.2 \text{ L}$

5.(A) The data illustrates the law of conservation of mass.

6.(A) Since total moles of HCl is conserved

$$M_1 V_1 + M_2 V_2 = M_f V_f$$

$$0.5 \times 750 + 2 \times 250 = M_f (750 + 250)$$

$\therefore M_f = \frac{875}{1000} = 0.875 \text{ M}$

7.(C) Mass ratio of $\text{O}_2 : \text{N}_2$ is 1 : 4

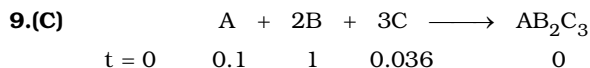
Mole ratio of $\text{O}_2 : \text{N}_2$ is $\frac{1}{32} : \frac{4}{28}$

Ratio of molecules of $\text{O}_2 : \text{N}_2$ is same as molar ratio i.e. 7 : 32.

8.(B) 52 gm BaCl_2 with 9 gm H_2O .

$\left(\frac{52}{208}\right)$ mole of BaCl_2 with $\left(\frac{9}{18}\right)$ moles of H_2O

\therefore 1 mole of BaCl_2 with 2 moles of H_2O



C is limiting reagent therefore moles of AB_2C_3 will be 0.012.

Mass of 0.012 mol AB_2C_3 is 4.8 gm

$$\text{Mass of 1 mol } AB_2C_3 \text{ is } \frac{4.8}{0.012} = 400$$

Molar mass of AB_2C_3 is 400 gm

$$A + 2B + 3C = 400 \text{ gm}$$

$$60 + 2B + 240 = 400 \Rightarrow B = 50$$

Atomic mass of B is 50u

10.(C) Moles of arsenic acid in 35.5 gm = 0.25 according to given reaction 2 moles of arsenic acid give 1 mole As_2S_5 therefore 0.25 moles of arsenic acid will give 0.125 mole.

11.(B) For minimum molecular weight compound has just one sulphur atom.

Mass of sulphur atom is 8% of mass of 8% = mass of one sulphur atom

$$8\% = 32$$

$$100\% = \frac{32}{8} \times 100 = 400$$

Mass of molecule = 400 gm / mole

12.(B) For neutralization

gm equivalent of acid = gm equivalent of base

$$0.1V = 0.04$$

$$v = 0.4 \text{ litre} = 400 \text{ ml}$$

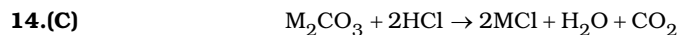
13.(C) Mass of acid in x mL of 45% acid solution is $\frac{45x}{100}$

Mass of acids in (800 - x) of 20% acid solution is $\frac{20(800 - x)}{100}$

And mass of acid in 800 mL of 29.875% acid

$$\Rightarrow 29.875 \times 8 = 239 \text{ gm}$$

$$\text{So, } \frac{45x}{100} + \frac{20(800 - x)}{100} = 239 \Rightarrow x = 316 \text{ mL}$$



Molar ratio 1 : 1

$$\frac{1g}{2M + 60} \text{ moles yield } \frac{1}{2M + 60} \text{ moles } CO_2 = 0.01186 \text{ (given)}$$

$$\Rightarrow M = 84.3$$

15.(D) O - 61.4%

C - 22.9%

H - 10.0%

N - 2.6%

Hence, gain in wt. is 7.5 kg

75 kg healthy human adult has 7.5 kg H atom(10%) which would be replaced by 15 kg 2H -atoms.