Reaction based Numericals

Law of Conservation of Mass — (Given by Lavoisier)

In a chemical reaction Mass of Reactant is always equal to Mass of product (Mass neither be created nor be destroyed)

Ex-① In a reaction 5.3 gm of Sodium Carbonate reacted with 6 gm of Ethanoic acid. The product were 2.2 g of CO_2, 0.9 g water and [redacted] g of Sodium Ethanoate. find the Value of K.

Soln 2 Sodium Carbonate + Ethanoic Acid

5.3 g 6 g

$\rightarrow CO_2 + H_2O +$ Sodium Ethanoate

2.2 0.9 x

Mass of Reactant = Mass of Product

$5.3 + 6 = 2.2 + 0.9 + x$ so $x = 8.2$ gm

Law of Constant Proportion - Given by Proust. According to this law A chemical Compound always Consist of the same elements Combined together in the same ratio. Ex $H_2O \rightarrow 1:8$

Ex-1 Hydrogen And Oxygen Combine in the ratio of 1:8 by mass to form water. What mass of Oxygen gas would be required to react Completely with 3 gm of H_2 gas

Soln - $\frac{1}{8} = \frac{3}{x}$ (x gm O_2)

$x = 24$ gm

Or 1 gm $H_2 \rightarrow 8$ gm O_2

3 gm $H_2 \rightarrow 3 \times 8 = 24$ gm O_2

2015/2019

Ex-3 → find out wt of Magnesium Oxide formed when 3 gm of Magnesium are burned in Oxygen.

Soln →

$$2Mg + O_2 \rightarrow 2MgO$$

$2 \times 24 = 48$ $\qquad$ $2 \times (24+16) = 80$

$48\ gm\ Mg \rightarrow 80\ gm\ MgO$

$1\ ,\ ,\ \rightarrow \frac{80}{48}5 = 5/3$

$3\ gm\ Mg \rightarrow 3 \times \frac{5}{3} = 5\ gm$

2020

Ex-4 → 10 gm of H_2 is burnt in presence of Oxygen. Calculate how much of water formed:

Soln →

$$2H_2 + O_2 \rightarrow 2H_2O$$

$2 \times 2 \times 1 = 4$ $\qquad$ $2 \times (2 \times 1 + 16) = 36$

$4\ gm\ H_2 \rightarrow 36\ gm\ H_2O$

$1\ ,\ ,\ \rightarrow 36/4 = 9\ gm$

$10\ ,\ ,\ \rightarrow 10 \times 9 = 90\ gm$

③ How much of Copper Oxide will be obtained by heating 12.35 gm of Copper Carbonate.

Soln -

$$CuCO_3 \xrightarrow{Heat} CuO + CO_2$$

12.35 ?

At wt

$= 63.5 + 12 + 48$ $63.5 + 16$

$= 123.5$ $= 79.5$

123.5 gm $CuCO_3$ on heat → 79.5 CuO

1 : : → $\frac{79.5}{123.5}$

12.35 gm : $= \frac{79.5 \times 12.35}{123.5}$

10

$= 7.95$ gm

④