

Chemical stoichiometry

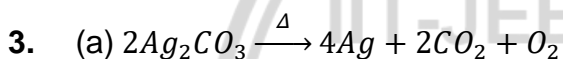
1. (c) $N = \frac{W(\text{gm}) \times 1000}{V \times \text{Eq.wt.}}$

$$1500 \text{ ml of } 0.1 \text{ N HCl} = 150 \text{ ml (N)}$$

$$1 = \frac{W(\text{gm}) \times 1000}{150 \times 40}, W(\text{gm}) = \frac{150 \times 40}{1000} = 6 \text{ gm.}$$

2. (c) $N_1 V_1 = N_2 V_2; \frac{1}{2} \times 200 = \frac{1}{10} \times V_2; V_2 = 1000 \text{ ml}$

$$\text{Volume of water added} = 1000 - 200 = 800 \text{ ml.}$$



$$2 \times 276 \text{ gm} \quad 4 \times 108 \text{ gm}$$

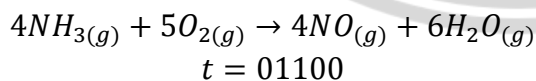
$$\therefore 2 \times 276 \text{ gm of } \text{Ag}_2\text{CO}_3 \text{ gives } 4 \times 108 \text{ gm}$$

$$\therefore 1 \text{ gm of } \text{Ag}_2\text{CO}_3 \text{ gives } = \frac{4 \times 108}{2 \times 276}$$

$$\therefore 2.76 \text{ gm of } \text{Ag}_2\text{CO}_3 \text{ gives}$$

$$\frac{4 \times 108 \times 2.76}{2 \times 276} = 2.16 \text{ gm}$$

4. (c)



$$t = 01100$$

$$t = t1 - 4x1 - 5x4x6x$$

Oxygen is limiting reagent

$$\text{So, } X = \frac{1}{5} = 0.2 \text{ all oxygen consumed}$$

$$\text{Left } \text{NH}_3 = 1 - 4 \times 0.2 = 0.2.$$



CHEMICAL ARITHMETIC (MOLE CONCEPT)

5. (c) $\therefore 100\text{gm Hb contain} = 0.33\text{gm Fe}$

$$\therefore 67200\text{gm Hb} = \frac{67200 \times 0.33}{100} \text{gm Fe}$$

$$\text{gm atom of Fe} = \frac{672 \times 0.33}{56} = 4.$$

6. (c) $(\text{NH}_4)_2\text{SO}_4 \equiv 2\text{NH}_3 \equiv \frac{2\text{HCl}}{2(36.5)=73\text{gm}}$

$$73\text{gHCl} \equiv 132\text{g}(\text{NH}_4)_2\text{SO}_4$$

$$292\text{gHCl} = 528\text{g}(\text{NH}_4)_2\text{SO}_4$$

7. (c) $2(\text{NH}_4)_2\text{HPO}_4 \equiv \frac{\text{P}_2\text{O}_5}{2(36+1+31+64)=264 \quad 62+80=142}$

$$\begin{aligned} \% \text{ of } \text{P}_2\text{O}_5 &= \frac{\text{wt. of } \text{P}_2\text{O}_5}{\text{wt of salt}} \times 100 \\ &= \frac{142}{264} \times 100 = 53.78\%. \end{aligned}$$

8. (b) $2\text{Al} + \frac{3}{2}\text{O}_2 \rightarrow \text{Al}_2\text{O}_3$

According to equation $\frac{3}{2}$ mole of O_2 combines with 2 mole Al.

$$2 \text{ mole Al} = 54\text{gm}$$

9. (a) $0.5\text{gm Se} \rightarrow 100\text{gm peroxidase anhydrous enzyme}$

$$78.4\text{gm Se} \rightarrow \frac{100 \times 78.4}{0.5} = 1.568 \times 10^4$$

Minimum m.w. \rightarrow molecule at least contain one selenium.

10. (d) $\text{H}_2\text{O} + \frac{\text{Al}}{27\text{gm}} + \text{NaOH} \rightarrow \text{NaAlO}_2 + \frac{3}{2}\text{H}_2$
 $\frac{3}{2} \times 22.4 = 33.6\text{L}$



11. (c) In $Fe(CNS)_3 \cdot 3H_2O$

$$\% \text{ of } H_2O = \frac{3 \times 18}{284} \times 100 = 19\%.$$

12. (d) $5S + 5O_2 \rightarrow 5SO_2$; $5 O_2 \equiv 5 SO_2$; $5 \times 64 = 320 gm.$

13. (d) H_3PO_4 is tribasic so $N = 3M = 3 \times 1 = 3.$

14. (b) H_2SO_4 is dibasic $N = 2M = 2 \times 2 = 4.$

15. (a) For Dibasic acid $E = \frac{M}{2} = \frac{200}{2} = 100$

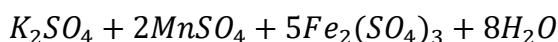
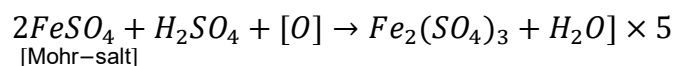
$$N = \frac{W \times 1000}{E \times V(\text{in ml})}$$

$$\frac{1}{10} = \frac{W \times 1000}{100 \times 100} = W = 1gm.$$

16. (b) $N = \frac{10 \times \text{sp. gr. of the solution} \times \text{wt. \% of solute} \times \text{Mol. wt.}}{\text{Molecular wt. of solute} \times \text{Eq. wt.}}$

$$N = \frac{10 \times 1.71 \times 80 \times 98}{98 \times 49} = 27.9$$

18. (c) $2KMnO_4 + 3H_2SO_4 \rightarrow$



Mohr-salt reducing agent $KMnO_4/H^+ \rightarrow$ oxidising agent

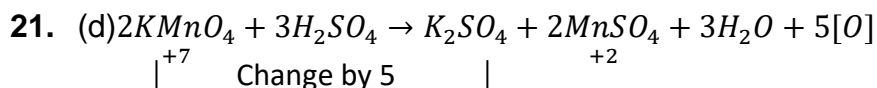
19. (d) Atomic weight = Equivalent weight \times Valency



CHEMICAL ARITHMETIC (MOLE CONCEPT)

$$= 8.9 \times 3 = 26.7 \left(\text{Valency} = \frac{26.89}{8.9} \approx 3 \right).$$

20. (c) $MW = 2 \times V.D. = 2 \times 22 = 44.$



$$\text{Eq. wt.} = \frac{\text{Mol. wt.}}{5}$$

