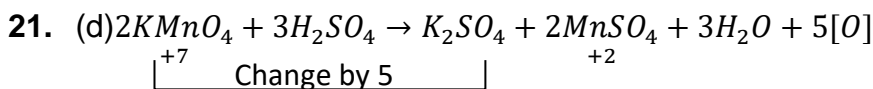


Chemical stoichiometry



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

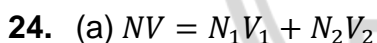


$$\frac{W}{E} \times 1000 = \frac{1}{10} \times 25; \frac{0.16}{E} \times 1000 = \frac{25}{10}$$

$$M = 2 \times E = 2 \times 64 = 128.$$



$$N_1V_1 = N_2V_2; 20 \times \frac{1}{10} = \frac{1}{20} \times V; V = 40\text{ml.}$$

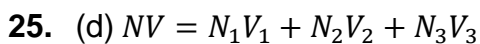


$$0.2 \times 2 = 0.5x + 0.1(2 - x)$$

$$0.4 = 0.5x + 0.2 - 0.1x$$

$$0.2 = 0.4x$$

$$x = \frac{1}{2}L = 0.5L$$

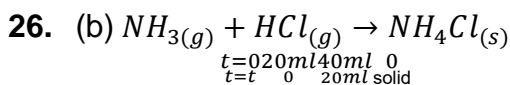


$$N \times 1000 = 1 \times 5 + \frac{1}{2} \times 20 + \frac{1}{3} \times 30 = 5 + 10 + 10 = 25$$

$$N = 0.025 = \frac{N}{40}.$$



CHEMICAL ARITHMETIC (MOLE CONCEPT)



Final volume = 20ml.

27. (b) $KMnO_4$ Oxalic acid

$$\frac{M_1 V_1}{n_1} = \frac{M_2 V_2}{n_2}, \frac{20 \times 0.1}{2} = \frac{M_2 V_2}{5}, M_2 V_2 = 5.$$

28. (b) Acidic medium $E = \frac{M}{5} = \frac{158}{5} = 31.6gm.$

29. (c) 0.1 M $AgNO_3$ will react with 0.1 M $NaCl$ to form 0.1 M $NaNO_3$. But as the volume is doubled, conc. of $NO_3^- = \frac{0.1}{2} = 0.05M$

30. (a) Acid base

$$N_1 V_1 = N_2 V_2; N_1 \times 30 = 0.2 \times 15; N_1 = 0.1N$$

31. (b) (I) Phenolphthalein indicate partial neutralisation of $Na_2CO_3 \rightarrow NaHCO_3$

Meq. of Na_2CO_3 + Meq. of $NaOH$ = Meq. of HCl

$$\frac{W}{E} \times 1000 + \frac{W}{E} \times 1000 = NV$$

(Suppose $Na_2CO_3 = a gm$, $NaOH = b gm$)

$$\frac{a}{106} \times 1000 + \frac{b}{40} \times 1000 = 300 \times 0.1 \dots (1)$$

(II) Methyl orange indicate complete neutralisation

$HCl \quad HCl$

$$N_1 V_1 = N_2 V_2, 25 \times 0.2 = 0.1 \times V_2 \text{ so } V_2 = 50ml \text{ excess}$$

$$\therefore \frac{a}{53} \times 1000 + \frac{b}{40} \times 1000 = 350 \times 0.1 \dots (2)$$

From (1) and (2) $b = 1gm$.



32. (c) From solution of (31)

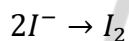
From equation (1)

$$a = Na_2CO_3 = 0.53gm.$$

33. (b)
- $(H_2SO_4) \frac{M_1V_1}{n_1} = \frac{M_2V_2}{n_2} (NaOH)$

$$\frac{1 \times V_1}{1} = \frac{1 \times 10}{2}; V_1 = 5ml.$$

34. (c) Atom in highest oxidation state can oxidize iodide to liberate
- I_2
- which is volumetrically measured by iodometric titration using hypo.


 $Pb^{+2} \rightarrow$ Lowest oxidation state can not oxidise iodide to I_2 .

35. (d)
- $KMnO_4$
- = Mohr salt

$$\frac{M_1V_1}{n_1} = \frac{M_2V_2}{n_2}; \frac{0.1 \times 10}{1} = \frac{M_2V_2}{5}; M_2V_2 = 5.$$

36. (d) The equivalent weight of
- $H_3PO_4 = \frac{\text{molecular weight}}{2}$

$$\therefore \text{mole wt of } H_3PO_4 = 3 + 31 + 64 = 98$$

$$\therefore \frac{98}{2} = 49$$

37. (b)
- $Ba(OH)_2 + CO_2 \rightarrow BaCO_3 + H_2O$

$$\text{Atomic wt. of } BaCO_3 = 137 + 12 + 16 \times 3 = 197$$

$$\text{No. of mole} = \frac{\text{wt. of substance}}{\text{mol wt.}}$$

 $\therefore 1 \text{ mole of } Ba(OH)_2 \text{ gives } 1 \text{ mole of } BaCO_3$
 $\therefore 205 \text{ mole of } Ba(OH)_2 \text{ will give } 205 \text{ mole of } BaCO_3$


CHEMICAL ARITHMETIC (MOLE CONCEPT)

∴ wt. of 0.205 mole of $BaCO_3$ will be

$$.205 \times 197 = 40.385gm \approx 40.5gm$$

38. (d) $N_1 = 0.5N \rightarrow 10mg$ per mL

$$N_2 = \frac{10 \times 10^{-3} gm}{40 \times 1} \times 1000 = 0.25N$$

$$V_1 = 500mL, \quad V_2 = ?$$

$$N_1 V_1 = N_2 V_2; 0.5 \times 500 = 0.25 \times V_2$$

$$V_2 = 1000mL \text{ final volume water added} = 1000 - 500 \\ = 500mL.$$

39. (a) eq. of $KMnO_4$ = eq. of $Fe(C_2O_4)$

$$x \times 5 = 1 \times 3$$

$$x = 0.6$$

40. (b)

Element	At.wt.	Mole	Ratio	Empirical formula
C = 86%	12	7.1	1	CH_2
H = 14%	1	14	2	Beleongs to alkene $C_n H_{2n}$

ESTD: 2005

