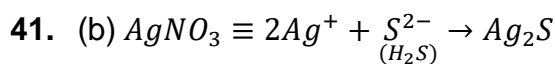
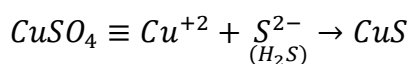


Chemical stoichiometry



$\therefore 2 \text{ mole} \rightarrow 1 \text{ mole}$ [100×1 = 100 millimole]

$\therefore 100 \text{ millimole} \rightarrow 50 \text{ millimole } H_2S \text{ required}$



$\therefore 1 \text{ mole} \rightarrow 1 \text{ mole}$ [100×1 = 100 millimole]

$\therefore 100 \text{ millimole} \rightarrow 100 \text{ millimole } H_2S \text{ required}$

Ratio $\frac{50}{100} = \frac{1}{2}$.



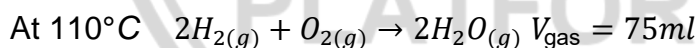
$t=0 \quad 50ml \quad 50ml \quad 0$

$t=t \quad 50 - 2x \quad 50 - x \quad 2x$

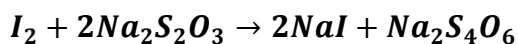
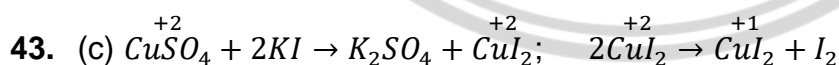
$=0 \quad 25 \text{ gases } (50) \text{ liquid}$

In this case H_2 is limiting reagent

$x = 25ml$



$t=t \quad 0 \quad 25ml \quad 50ml$



Eq. wt. of $CuSO_4 \cdot 5H_2O$ = Mol. wt. = 250

100 ml of 0.1 N hypo \equiv 100 ml of 0.1 N $CuSO_4 \cdot 5H_2O$

$= \frac{250 \times 0.1 \times 100}{100} = 2.5gm$



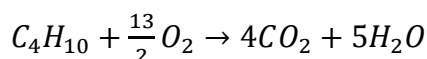
CHEMICAL ARITHMETIC (MOLE CONCEPT)

$$\frac{12.6}{63} = 0.2 \text{ mole}; \text{HNO}_3 \equiv \text{KOH}$$

$$0.2 \text{ mole} \equiv 0.2 \text{ mole}$$

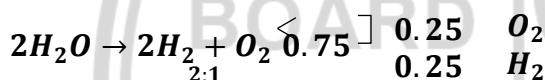
$$0.2 \times 56 = 11.2 \text{ gm.}$$

45. (a) Isobutane and *n*-butane [C_4H_{10}] have same molecular formula;



$$\begin{aligned} \text{For } 58 \text{ gm of } \text{C}_4\text{H}_{10} \text{ } 208 \text{ gm } \text{O}_2 \text{ is required then for } 5 \text{ kg of } \text{C}_4\text{H}_{10} \text{ } \text{O}_2 &= \frac{5 \times 208}{58} \\ &= 17.9 \text{ kg} \end{aligned}$$

46. (b) $n = \frac{16.8}{22.4} = 0.75 \text{ mole of } \text{H}_2 \text{ and } \text{O}_2$



$$2 \text{ mole } \text{H}_2 - 2 \text{ mole } \text{H}_2\text{O}$$

$$0.5 \text{ mole } \text{H}_2 - 0.5 \text{ mole } \text{H}_2\text{O} = 9 \text{ gm.}$$

47. (a) $\therefore 3 \text{ ml } (\text{O}) \rightarrow 1 \text{ ml } \text{O}_3$

$$30 \text{ ml } (\text{O}) \rightarrow 10 \text{ ml } \text{O}_3$$

$$x = \frac{150 \times 10}{100} = 15 \text{ ml}$$

$$V \text{ of } \text{O}_2 + V \text{ of } \text{O}_3 = 135 + 10 = 145 \text{ ml}$$

Turpentine oil absorb ozone.

48. (a) 50% *HCl* itself means 50 gm *HCl* react with 100 gm sample

$$\% \text{ Purity} = \frac{50}{100} \times 100 = 50\%.$$

49. (a) $\text{AgNO}_3 + \text{HCl} \rightarrow \text{AgCl} + \text{HNO}_3$



$$\frac{30}{170} \quad \frac{500 \times 0.2}{1000}$$

$$t=0 \quad 0.176 \text{ mole} \quad 0.1 \text{ mole limiting} \quad =14.345 \text{ gm}$$

$$t=t \quad 0.076 \text{ mole} \quad 0 \quad 0.1 \text{ mole}$$

50. (d) $KMnO_4$ $FeSO_4$

$$\frac{M_1 V_1}{n_1} = \frac{M_2 V_2}{n_2}, \quad M_1 V_1 = \frac{n_1}{n_2} M_2 V_2$$

$$= \frac{2}{10} \times 10 \times \frac{1}{10} = \frac{1}{5} = 0.2$$

$$\text{For (d), } M_1 V_1 = 0.02 \times 10 = \frac{1}{5}$$

51. (c) $ROH + CH_3MgI \rightarrow CH_4 + MgI$ OR
1 mol. 1 mol = 22400 cc

1.12 mL is obtained from 4.12 mg

\therefore 22400 mL will be obtained from

$$\frac{4.12}{1.12} \times 22400 \text{ mg} = 84.2 \text{ g}$$

52. (b)

Element	%(a)	At.wt.(b)	a/b	Ratio
X	50	10	5	2
Y	50	20	2.5	1

Simplest formula = X_2Y

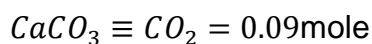
53. (a) $A_3(BC_4)_2 = 3 \times 2 + [5 + (-2 \times 4)]_2 = 0.$

54. (b) $CaCO_3 \rightarrow CaO + CO_2$
10 gm

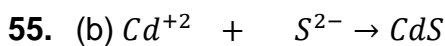
$$90\% \text{ pure } 9 \text{ gm} = \frac{9}{100} \text{ mole}$$



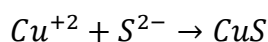
CHEMICAL ARITHMETIC (MOLE CONCEPT)



$$\text{At NTP Vol. } CO_2 = 0.09 \times 22.4 = 2.016 \text{ L.}$$

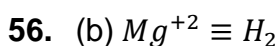


$$20 \times 1 = 20$$

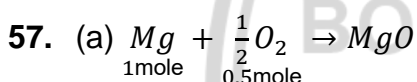


$$20 \times 0.5 = 10$$

$$\text{Ratio} = 2:1$$



$$n = \frac{12 \text{ gm}}{24 \text{ gm}} = \frac{1}{2} \text{ mole of } H_2$$



0.5 mole of oxygen react with 1 mole of Mg

1.5 mole of oxygen react with $\frac{1.5}{0.5} = 3 \text{ mole}$

$$24 \times 3 = 72 \text{ gm.}$$



100 g $CaCO_3$ with 2 N HCl gives 44 g CO_2

100 g $CaCO_3$ with 1 N HCl gives 22 g CO_2

