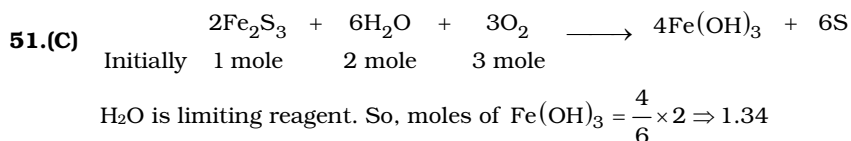
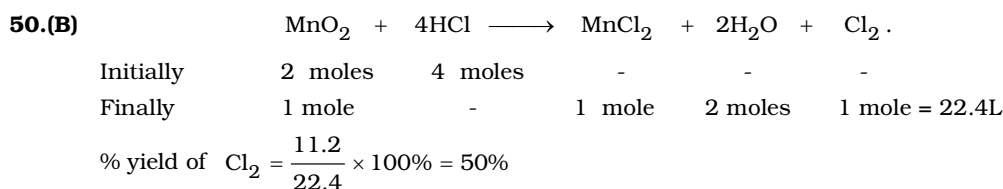
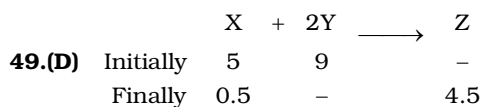


46.(D) Apply $m = \left(\frac{1000 \times M}{1000 d - Mm_0} \right)$

47.(C) Number of g atoms = $\frac{2 \times 10^{23}}{6 \times 10^{23}} = 0.33$

Weight = $0.33 \times 32 = 10.6 \text{ g}$

48.(A) Meq. of metal = Meq of $H_2 \Rightarrow 1000 \times \frac{0.05}{E} = \frac{24.62}{24620} \times 1000 \times 2 \Rightarrow E = 25$

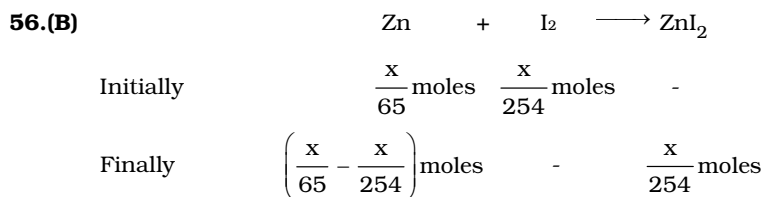
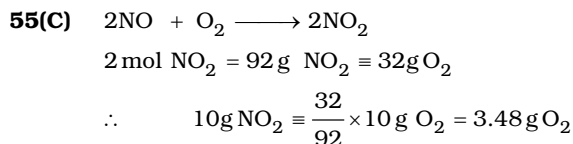
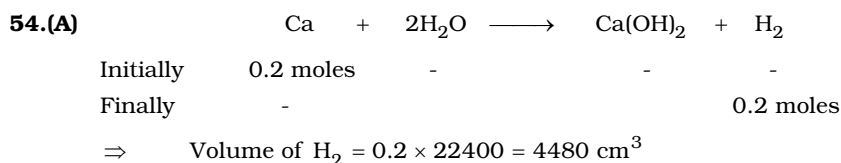


52.(D) Let 100 g mass of the compound

Moles of atoms of element $X = \frac{75.8}{75} \approx 1$; Moles of atoms of element $Y = \frac{24.2}{16} = 1.5$

So, formula of compound is $XY_{1.5}$ or X_2Y_3

53.(C) Atomic mass $1.8 \times 10^{-22} \times N_A = 108.36u$



$$\text{Fraction by weight of original Zn that remains unreacted} = \frac{\left(\frac{x}{65} - \frac{x}{254}\right) \times 65}{\left(\frac{x}{65}\right) \times 65} = 0.74$$

57.(D) Volume of $O_2 = \frac{21}{100} \times 1L = \frac{21}{100} L$

$$\text{Moles of } O_2 = \frac{21}{100 \times 22.4} = 0.0093 \text{ moles}$$

58.(B) (A) $0.1 \text{ mole of } NH_3 = 0.1 \times 17g = 1.7g$

(B) $1120 \text{ cc of } CO_2 \text{ at STP} \Rightarrow \frac{1120}{22400} \times 44g = 2.2g$

(C) $0.1 \text{ g atom of C} \Rightarrow 0.1 \times 12g = 1.2g$

(D) $6 \times 10^{22} \text{ molecules of } H_2 \text{ gas} \Rightarrow 1 \text{ mole of } H_2 \Rightarrow 2g$

59.(A) Let meq of $NaOH = x$ and meq of $Na_2CO_3 = y$

$$\text{Meq } NaOH + \frac{1}{2} \text{ Meq } Na_2CO_3 = \text{Meq } HCl \quad \Rightarrow \quad x + \frac{y}{2} = 0.5 \times 21 = 10.5 \quad \dots (i)$$

$$\text{and } \frac{\text{Meq } Na_2CO_3}{2} (\text{= left}) = \text{Meq } HCl \quad \Rightarrow \quad \frac{y}{2} = 0.5 \times 7 \Rightarrow y = 7 \quad \dots (ii)$$

$$\text{Now, } \frac{g_{Na_2CO_3}}{106/2} \times 1000 = y \Rightarrow g_{Na_2CO_3} = 0.371 \Rightarrow \% Na_2CO_3 = \frac{0.371}{0.75} \times 100 = 49.5$$

60.(ACD)

$$\left. \begin{aligned} \text{Meq } NaOH &= \frac{40}{40/1} \times 1000 = 1000 \\ \text{Meq } Na_2CO_3 &= \frac{106}{106/2} \times 1000 = 2000 \\ \text{Meq } NaHCO_3 &= \frac{84}{84/1} \times 1000 = 1000 \end{aligned} \right\} \left(\text{meq} = \frac{g}{E} \times 1000 \right) \text{ in } 1.0L$$

In 20 ml solution, we have :

$$\text{Meq } NaOH = 1000 \times \frac{20}{1000} = 20 \quad \text{Meq } Na_2CO_3 = 2000 \times \frac{20}{1000} = 40$$

$$\text{Meq } NaHCO_3 = 1000 \times \frac{20}{1000} = 20$$

(A) $\text{Meq } NaOH + \frac{1}{2} \text{ Meq } Na_2CO_3 = \text{Meq } HCl$

$$\Rightarrow \frac{40}{2} + 20 = 1 \times V_{HCl} \Rightarrow V_{HCl} = 40 \text{ ml}$$

(C) $\text{Meq } Na_2CO_3 \text{ Left} \left[= \frac{1}{2} (\text{Meq } Na_2CO_3 \text{ initial}) \right] + \text{Meq } NaHCO_3 = \text{Meq } HCl$

$$\Rightarrow \frac{40}{2} + 20 = 1 \times V_{HCl} \Rightarrow V_{HCl} = 40 \text{ ml}$$

(D) $\text{Meq } NaOH + \text{Meq } Na_2CO_3 + \text{Meq } NaHCO_3 = \text{Meq } HCl$

$$\Rightarrow 20 + 40 + 20 = 1 \times V_{HCl} \Rightarrow V_{HCl} = 80 \text{ ml}$$