DPP # 11

M.M. : 35 **MAX. TIME : 20 Min.**

ONLY ONE OPTION CORRECT TYPE

1. **(B)**

Sol. $\text{Moles} = \dfrac{\text{wt.}}{\text{Molecular Mass}}$

$\text{Molecular Mass} = \dfrac{1}{0.00318} = 314\ \text{gm}$

	C	H	O
Atoms ratio	$15 \times \dfrac{70}{100}$	15	1
$\Rightarrow$	10.5	15	1
$\Rightarrow$	21	30	2

Empirical formula = $C_{21}H_{30}O_2$
Empirical formula mass = 314
Our compound is $C_{21}H_{30}O_2$

2. **(C)**

Sol.

$$\begin{array}{lcccccccc} & & & (LR) & & & & & \\ & A & + & 2Z & \longrightarrow & B & & & \\ n_i & 5 & & 6 & & & & & \\ n_f & 2 & & - & & 3 & & & \\ & B & + & C & \longrightarrow & Z & + & F & \\ n_i & 3 & & & & & & & \\ n_f & - & & & & 3 & & \boxed{3} & \\ & & & (LR) & & & & & \\ & A & + & 2Z & \longrightarrow & B & & & \\ n_i & 2 & & 3 & & & & & \\ n_f & 0.5 & & - & & 1.5 & & & \\ & B & + & C & \longrightarrow & Z & + & F & \\ n_i & 1.5 & & & & & & & \\ n_f & - & & & & 1.5 & & \boxed{1.5} & \\ & (LR) & & & & & & & \\ & A & + & 2Z & \longrightarrow & B & & & \\ n_i & 0.5 & & 1.5 & & & & & \\ n_f & - & & 0.5 & & 0.5 & & & \\ & B & + & C & \longrightarrow & Z & + & F & \\ n_i & 0.5 & & & & & & & \\ n_f & - & & & & 0.5 & & \boxed{0.5} & \end{array}$$

Since A has finished, so more reaction total moles of $F = 3 + 1.5 + 0.5 = 5$

3. **(C)**

Sol. $Ti + \underset{\text{(excess)}}{O_2} \longrightarrow Ti_{1.44}O$

1.44 gram x gram

Applying POAC on Ti

$$\frac{1.44}{48} \times 1 = \frac{x}{1.44(48)+16} \times 1.44$$

$$x = 1.44 + \frac{16}{48}$$

$x = 1.77$ gm

4. **(D)**

Sol.

	$2SO_3$	$\longrightarrow$	$2SO_2$	+	O_2
n_i	$\frac{160}{80} = 2$				
n_f	–		4		2 moles

	$4FeO$	+	O_2	$\longrightarrow$	$2Fe_2O_3$
n_i	$\frac{144}{72} = 2$		2		
n_f	–		1		1

Moles of Fe_2O_3 formed = 1

Mass of Fe_2O_3 = 1 × 160

= 160 gm

5. **(C)**

Sol. Molecular mass of MAGGI = 169

$(C_5O_4NH_8Na)$

$$\% \text{ mass of Na} = \frac{23}{169} \times 100$$

= 13.6 %

6. **(B,D)**

Sol. 1 gm molecule of Oxygen = 1 mole of O_2

= 32 gm

(A) 12 gram

(B) 1 gm molecule of O_3 = 1 mole O_3

= 48 gm

(C) 4 gm-atom of Hydrogen = 4 mole atom of H

= 4 × 1 gm

= 4 gm

(D) 1.12 lit of water = 1120 ml

= 1120 gram

7. (a) 9 moles, (b) 2, (c) 5, (d) 50

Sol. (A) $2NH_3 \rightleftharpoons 3H_2 + N_2$

	$2NH_3$	$3H_2$	N_2
n_i	6		
n_f	–	9	3

$\therefore$ a = 9

(B) Vapour Density $= \dfrac{\text{Molar Mass}}{2}$

$$\frac{D_{SO_2}}{D_{O_2}} = \frac{(64/2)}{(32/2)} = 2$$

(C) $M_{avg} = \dfrac{n_1M_1 + n_2M_2}{n_1 + n_2}$

$$33.15 = \frac{n_1(17) + n_2(34)}{n_1 + n_2}$$

$16.15\ n_1 = 0.85\ n_2$

$$\frac{n_2}{n_1} = \frac{16.15}{0.85}$$

$$\frac{n_1}{n_1 + n_2} = \frac{0.85}{17}$$

% moles of $NH_3 = \dfrac{n_1}{n_1 + n_2} \times 100$

$= \dfrac{0.85}{17} \times 100$

$= 5\%$

(D) $KClO_3 \xrightarrow{x\%} O_2 + \text{products}$

122.5 gram $\quad \dfrac{16.8}{22.4}$

Applying POAC on 0

$$\frac{122.5}{122.5} \times 3 \times \frac{x}{100} = \frac{16.8}{22.4} \times 2$$

$$\frac{3x}{100} = \frac{3}{2}$$

x = 50

8. (15.84)

Sol. $\underset{\frac{202}{101}\text{moles}}{KNO_{3(s)}} \longrightarrow KNO_{2(s)} + \frac{1}{2}O_{2(g)}$

Moles of $O_2 = \dfrac{202}{101} \times \dfrac{1}{2}$

$= 1$ mole

Mass of O_2 $= 32$ gram

% wt. loss $= \frac{32}{202} \times 100$

$= 15.84\%$

9. **(163 gm)**

Sol.

	ZnS	+	O_2	$\longrightarrow$	ZnO	+	SO_2
n_i	$\frac{195}{97.5}$		$\frac{89.6}{22.4}$				
n_f	$= 2$ (LR)		$= 4$				
n_f	0		2		2		2

Moles of ZnO $= 2$

Mass of ZnO $= 2 \times 81.5$

$= 163$

10. **(4)**

Sol.

$$\boxed{CaCO_3 + S:O_2}$$

62.5 gram sample

$\Downarrow$ x gm $\Downarrow$ (62.5 – x) gm

SiO_2 is acidic in nature & $CaCO_3$ is basic in nature.

$$\underset{x\,gm}{CaCO_3} + HCl \longrightarrow CaCl_2 + H_2O + \underset{1.1\,gm}{CO_2}$$

Moles of $CaCO_3$ = Moles of CO_2

$$\frac{x}{100} = \frac{1.1}{44}$$

$$x = \frac{1}{40} \times 100 = 2.5$$

% mass of $CaCO_3$ $= \frac{x}{62.5} \times 100$

$= \frac{2.5}{62.5} \times 100 = 4\%$