O-I 16 - 25 S-I 19-27

(20) $\frac{(32 \times n)}{M} \times 100 = \% S = 8$

minimum molar mass $n = 1$

(24) $NO_2(g)$ $\rightarrow$ $NO_2(\ell)$

$n = \frac{PV}{RT}$

22.4 lit

$n = \frac{112\ ml}{22400\ ml}$

$= \frac{1}{200}$

density = 1.15 gm/ml

$V = \frac{w}{\text{density}}$

$W = \frac{1}{200} \times 46$

Nishant Jindal

(23)

$$PV = nRT$$

$$PV = \frac{W}{M}RT$$

$$2 \times 15 = \frac{80}{M} \times 0.0821 \times 300$$

(27)

O_2 gas

P, V, T

moles = moles

$n_{O_2} = n_{gas}$

$$\frac{1}{32} = \frac{1}{M_{O_2}} = \frac{2.375}{M_{gas}}$$

Nishant Jindal

(22)

$$C_5H_{12}O + 7.5\,O_2 \longrightarrow 5\,CO_2 + 6\,H_2O$$

$$1 \quad + 15 \qquad\qquad 10 \quad + 6$$

1 mol 7.5 mol

(23)

$$1\,Al_4C_3 + 12\,H_2O \longrightarrow 3\,CH_4 + 4\,Al(OH)_3$$

$\frac{1}{3} \times 0.5$ mol

(0.5)

$$= \frac{1}{3} \times 0.5 \times M_{Al_4C_3}$$

$$n_{CH_4} = \frac{\text{STP}}{22.7} = \frac{11.35 \text{ lit}}{22.7} = \frac{1}{2}$$

Nishant Jindal

27

$$KClO_3(s) \xrightarrow{\Delta} KCl(s) + \frac{3}{2} O_2(g) \uparrow$$

$\frac{48}{122.5} \times 100$

1 mol

O

$1 \times (39 + 35.5 + 48)$

122.5

$\frac{3}{2}$ mol

$\frac{3}{2} \times 32$

$= 48$ gm

Nishant Jindal

Type-2 problems :→ Rxn involving more than one reactant

Case-I If amount of only one reactant is given

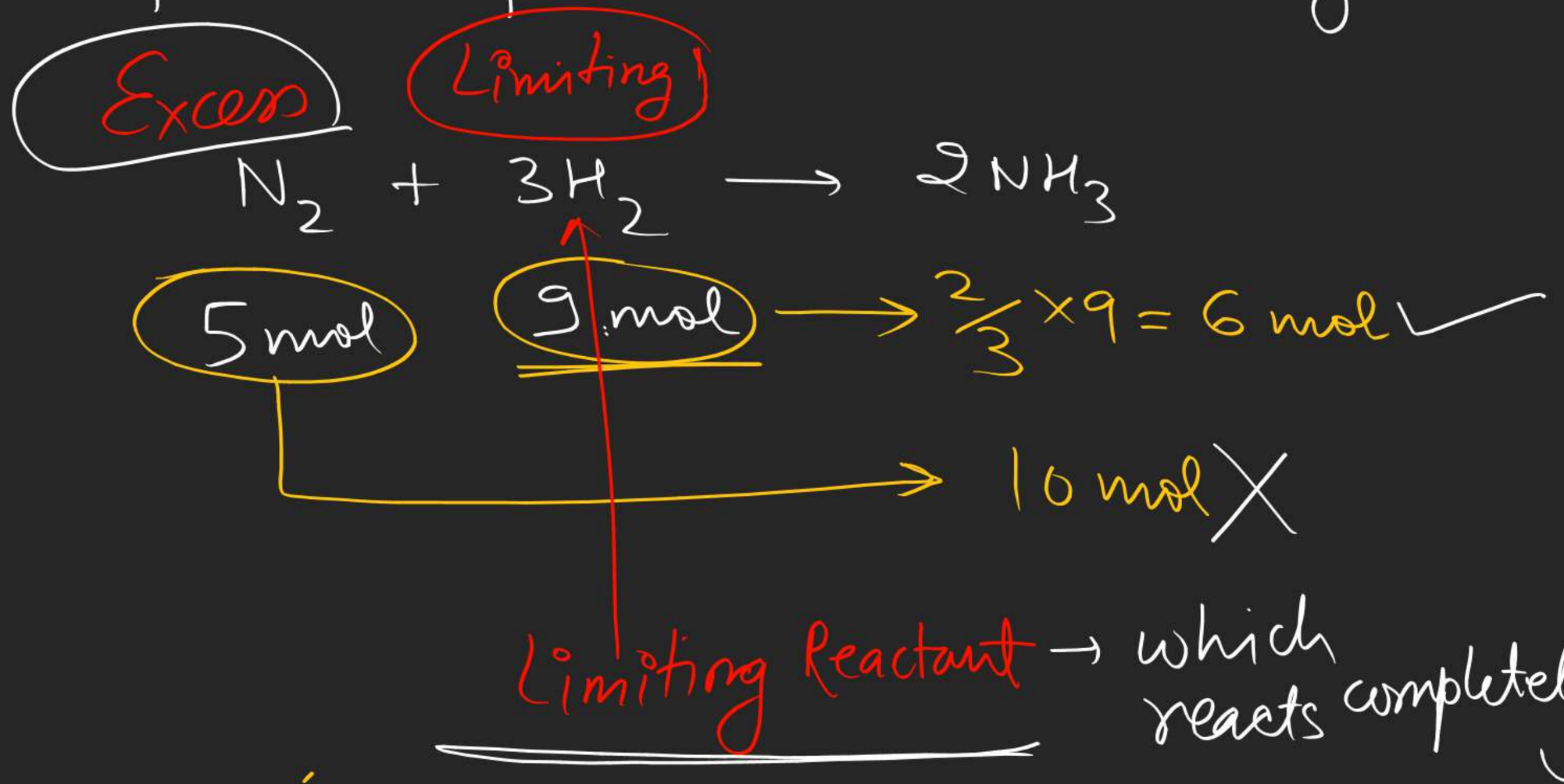
$$N_2 + 3H_2 \longrightarrow 2NH_3$$

5 mol — 0 — 0

10 mol

Note Assume that other reactant is present in sufficient amount

Case-II If amount of all the reactants are given



Nishant Jindal

LR

$$N_2 + 3H_2 \longrightarrow 2NH_3$$

5 9

5 − Reacted 0

$\frac{2}{3} \times 9 = 6$ mol

$= 5 - \frac{1}{3} \times 9$

$= 5 - 3$

$= 2$

$$\text{Stoichiometric amount} = \frac{\text{no. of moles of substance}}{\text{Stoichiometric coeff.}}$$

Note: Substance having minimum Stoichiometric amount will be L.R.

$5/1$ $9/3 = 3$

$$N_2 + 3H_2 \longrightarrow 2NH_3$$

5 mol 9 mol $\longrightarrow$ $2/3 \times 9 = 6$

Excess LR

$= 5 -$ Reacted

$= 5 - 1/3 \times 9$

$= 5 - 3 = 2$

0 6

$$T + 6C \longrightarrow D$$

30 150

Excess LR

$= 30 - \frac{1}{6} \times 150$

$= 30 - 25$

$= 5$

0

$\frac{1}{6} \times 150$

$= 25$

Nishant Jindal

$\frac{3}{2} = 1.5$ $\frac{4}{3} = 1.33$

Q. $2A + 3B \longrightarrow C$

3 mol	4 mol	$\frac{1}{3} \times 4$
Excess	LR	

finally

$= 3 - \text{Reacted}$	0	$4/3$
$= 3 - \frac{2}{3} \times 4$		
$= 3 - \frac{8}{3} = 1/3$		

Nishant Jindal

In the reaction $4\,A + 2\,B + 3C \longrightarrow A_4\,B_2C_3$ what will be the number of moles of product formed, starting from 2 moles of A, 1.2 moles of B & 1.44 moles of C :

(A) 0.5

(B) 0.6

(C) 0.48

(D) 4.64

$\frac{2}{4} = 0.5$ $\quad \frac{1.2}{2} = 0.6$ $\quad \frac{1.44}{3} = 0.48$

$4A + 2B + 3C \longrightarrow A_4B_2C_3$

$4A$	$2B$	$3C$	$A_4B_2C_3$
2	1.2	1.44	
$2 - \frac{4}{3} \times 1.44$	$1.2 - \frac{2}{3} \times 1.44$	LR	$\frac{1}{3} \times 1.44$
$= 2 - 1.92$	$= 0.24$	0	$= 0.48$
$= 0.08$			

Nishant Jindal

Q. 20 mol mixture Li & O_2 are allowed to produce Li_2O. find maximum moles of Li_2O produced = (8)

$$4Li + O_2 \longrightarrow 2Li_2O$$

4 : 1

16 mol	4 mol	0
0	0	8 mol

$4x + x = 20$

$x = 4$

Nishant Jindal

Type-3 problems : Problems related with mixture

$$A + C \longrightarrow P$$

Mixture
$$\begin{cases} A + C \longrightarrow P_1 \\ B + C \longrightarrow P_2 \end{cases}$$

Nishant Jindal

Q. W gm mixture of Al & Mg react with Excess HCl to produce W_1 gm H_2. find moles of each in original mixture.

let the no. of moles of Al = x

let the moles of Mg = y

$$Al + 3HCl \longrightarrow AlCl_3 + \frac{3}{2}H_2$$

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

$$Mg + 2HCl \longrightarrow MgCl_2 + H_2$$

y 2y y y

$$27x + 24y = W \quad \text{— (1)}$$

$$\left(\frac{3}{2}x + y\right) \times 2 = W_1 \quad \text{— (2)}$$

X $\underline{Al} + \underline{Mg} + HCl \longrightarrow AlCl_3 + MgCl_2 + H_2$

$Al + HCl$

$Mg + HCl$

$\underline{A + B}$

Nishant Jindal

30 30

150gm mixture of C_2H_6 and HCHO reacts completely with 320gm O_2. Find mass of C_2H_6 in original mixture.

60gm

$$30x + 30y = 150$$

$$x + y = 5 \quad -(1)$$

$$3.5x + y = \frac{320}{32}$$

$$3.5x + y = 10 \quad -(2)$$

$$x = 2, \; y = 3.$$

$$C_2H_6 + 3.5\,O_2 \longrightarrow 2\,CO_2 + 3\,H_2O$$

$$x \qquad 3.5x \qquad 2x \qquad 3x$$

$$HCHO + O_2 \longrightarrow CO_2 + H_2O$$

$$y \qquad y \qquad y \qquad y$$

Nishant Jindal

O-L 26 — 37

S-I 28 — 34