NX is produced by the following step of reactions

$$M + X_2 \longrightarrow MX_2$$

$$3MX_2 + X_2 \longrightarrow M_3X_8$$

$$M_3X_8 + N_2CO_3 \longrightarrow NX + CO_2 + M_3O_4$$

(4) (8) (4)

How much M (metal) is consumed to produce 206 g of NX.

(Take atomic weight of M = 56, N = 23, X = 80)

(A) 42 g

(B) 56 g

(C) 52 g

(D) 64 g

$\frac{3}{4} \times 56$

$= 42$ gm

moles of Metal $= x$

moles of $NX = x \times \frac{1}{1} \times \frac{1}{3} \times \frac{8}{1} = \frac{206}{103} = 2$

$x = 3/4$

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find moles of M_3O_4 formed by 30 moles of 'M'.

Given

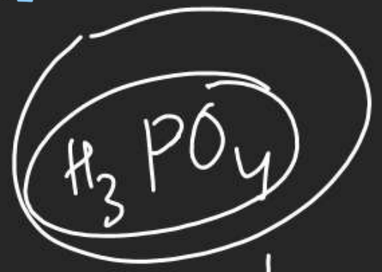
$$M + X_2 \longrightarrow MX_2$$
30

$$3MX_2 + X_2 \longrightarrow M_3X_8$$
30 — 10

10 mol

$$M_3X_8 + 4Na_2CO_3 \longrightarrow M_3O_4 + 8NX + 4CO_2$$
10 — 10

$$3M \longrightarrow M_3O_4$$
30 — $\frac{1}{3}30 = 10$



Sample

$2\,H_3PO_4 \longrightarrow Mg_2P_2O_7$

All the 'P' is converted → Qualitative anylysis

→ Quantitative estimation

Type-6 problems :→ Problems related with parallel Rxn.

$$2KClO_3 \longrightarrow 2KCl + 3O_2$$
$$x \qquad\quad x \qquad\quad \tfrac{3}{2}x$$

$$4KClO_3 \longrightarrow 3KClO_4 + KCl$$
$$y \qquad\quad \tfrac{3}{4}y \qquad\quad \tfrac{y}{4}$$

$\frac{3}{2}x = 9$

$x = 6$

$x + y = 20$

$y = 14$

Q. 20 mol $KClO_3$ are heated to produce KCl, O_2 & $KClO_4$. If moles of O_2 produced 9; find the moles of $KClO_4$ produced.

$$n_{KClO_4} = \frac{3}{4}y = \frac{3}{4} \times 14 = \frac{42}{4}$$

Nishant Jindal

12 gm 'C' reacts with 20 gm O_2 to produce both CO & CO_2. find mass of CO & CO_2 produced

11 – CO_2

21 – CO

$C + O_2 \longrightarrow CO_2$

x x x

$C + \frac{1}{2}O_2 \longrightarrow CO$

y $y/2$ y

$n_{CO_2} = x = 1/4$

$W_{CO_2} = \frac{1}{4} \times 44 = 11$

$x + y = 1$

$x + y/2 = \frac{20}{32} = \frac{5}{8}$

$y/2 = 3/8$

$y = 3/4$

$x = 1/4$

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S - II 1 - 10

S - I

0 - 1

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O-I 38 - 44

S-I 35 - 42

O-II 9, 10, 11

38

$$MgCO_3 \longrightarrow MgO + CO_2$$

x mol — x

$$2NaHCO_3 \longrightarrow Na_2CO_3 + H_2O + CO_2$$

y mol — $y/2$ — $y/2$

$$\frac{3}{1} = \frac{\eta_{CO_2}}{\eta_{H_2O}} = \frac{x + y/2}{y/2}$$

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41

$$0.2 \times \frac{80}{100}$$

$$= 1.6 \text{ mol}$$

$$= 1.6 \times 17$$

44.

$$CaCO_3 \rightarrow CaO + CO_2$$

$$Na_2CO_3 + H_2O + CO_2 \longrightarrow Na_2CO_3$$

21.2 kg

$$n_{Sulphur} = \frac{(474 \times 10^6\ gm) \times \frac{1.3}{100}}{32} = n_{SO_2}$$

(41) $CHCl_3$ CH_3COCH_3

Chloroform acetone

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(41)

$$2\,CH_3COCH_3 + 6\,CaOCl_2 \xrightarrow{75\%} Ca(CH_3COO)_2 + 2\,CHCl_3 \text{ ----}$$

x mol

$x \times \frac{75}{100}$ mol

$x \times \frac{3}{4} \times M_{CHCl_3} = 30$

O-II 9, 10, 11

$(NH_4)_3PO_4$ NH_4^+ PO_4^{3-}

3 mol 1

N	H	P	O
3	12	1	4

mol $20N_A$

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mass of
& KCl
duced by
.0gm Cl_2.
: 39
: 35.5

692.5

Q. Using following series of Reaction

$$Cl_2 + 2KOH \xrightarrow{50\%} KClO + KCl + H_2O$$

x $\quad$ $x \times \frac{50}{100}$

$$3KClO \xrightarrow{25\%} KClO_3 + 2KCl$$

$(x \times 1/2)$ $\quad$ $\frac{1}{3} \times (x \times 1/2) \times 1/4$

$$4KClO_3 \xrightarrow{20\%} 3KClO_4 + KCl$$

$\frac{1}{3} \times x \times 1/2 \times 1/4$ $\quad$ $\left(\frac{3}{4} \times 1/3 \times x\right)\left(\frac{1}{2} \times 1/4 \times 1/5\right)$

$\frac{x}{4} \times 1/2 \times 1/4 \times 1/5$

$W_{KClO_4} = 5$

$= 6$

$n_{KCl} = x +$

$= \frac{2}{}$

$= 3$

$W_{KCl} = 35$

$= 260$

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$$\eta_{KClO_4} = \frac{x}{4} \times Y_1 \times Y_2 \times Y_3$$

$$= \frac{20}{4} \times \frac{1}{2} \times \frac{1}{4} \times \frac{1}{5}$$

$$= \frac{1}{8}$$

$Cl_2 + 2KOH \longrightarrow 1KClO + KCl + H_2O$

(Cl_2: x)

$3KClO \longrightarrow 1KClO_3 + 2KCl$

$4KClO_3 \longrightarrow 3KClO_4 + KCl$

$$n_{KClO_4} = \text{moles of } Cl_2 \times \left(\frac{\text{st. coeff of } KClO}{\text{st coeff of } Cl_2}\right) \times \left(\frac{\text{st. coeff of } KClO_3}{\text{st. coeff of } KClO}\right) \times \left(\frac{\text{st. } KClO_4}{\text{st. } KClO_3}\right)$$

$$= x \times \frac{1}{1} \times \frac{1}{3} \times \frac{3}{4} = \frac{x}{4}$$

find moles of $KClO_4$ produced in above reactions if % yield of 1st, 2nd and 3rd reaction are 50%, 25% & 20% respectively.