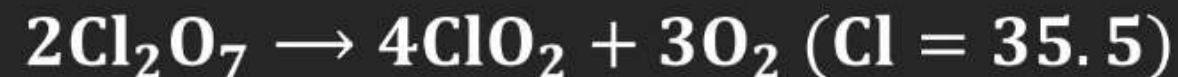


Consider the balanced reaction



What can be concluded from the coefficients of species in this balanced equation?

- (A) For this reaction, exactly 2 g of Cl_2O_7 must be taken to start the reaction
- (B) For this reaction, exactly 2 mol of Cl_2O_7 must be taken to start the reaction
- (C) Mole ratio of Cl_2O_7 , ClO_2 and O_2 during a chemical reaction at any instant (excluding any negative sign) are 2, 4 and 3 respectively
- (D) The ratio of change in number of moles of Cl_2O_7 , ClO_2 and O_2 is 2:4:3 (excluding any negative sign)

$$\begin{array}{rcl} O-L & 26-37 \\ S-I & 28-34 \end{array}$$

(27)

O_2 gas

$$n_{O_2} = n_{\text{gas}}$$

$$\frac{w_1}{32} = \frac{w_2}{M}$$

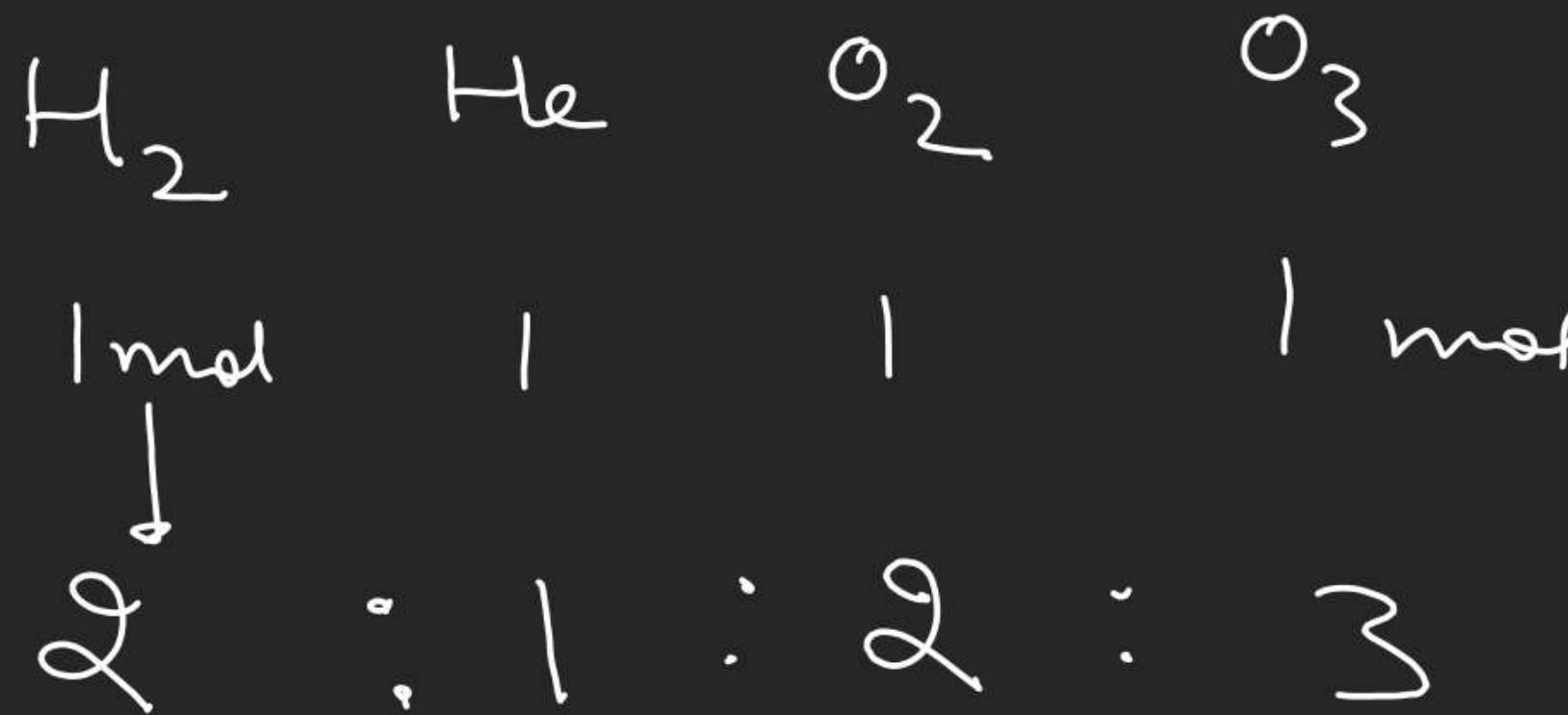
$$\frac{1}{32} = \frac{2.375}{M}$$

P, V, T

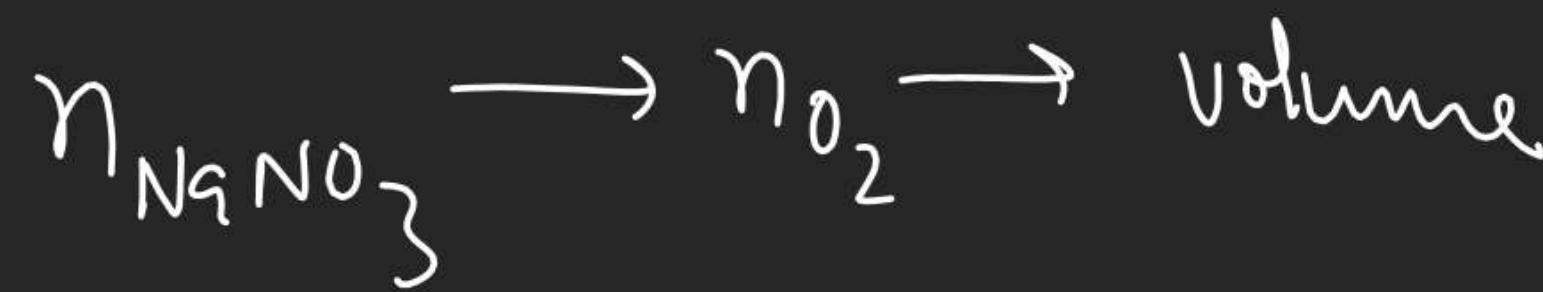
$$n = \frac{PV}{RT}$$

∴

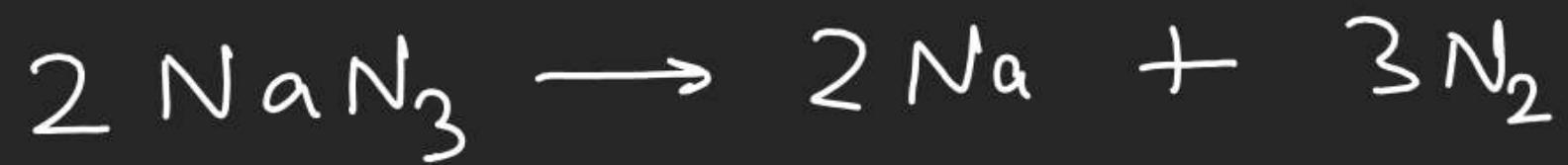
(28)



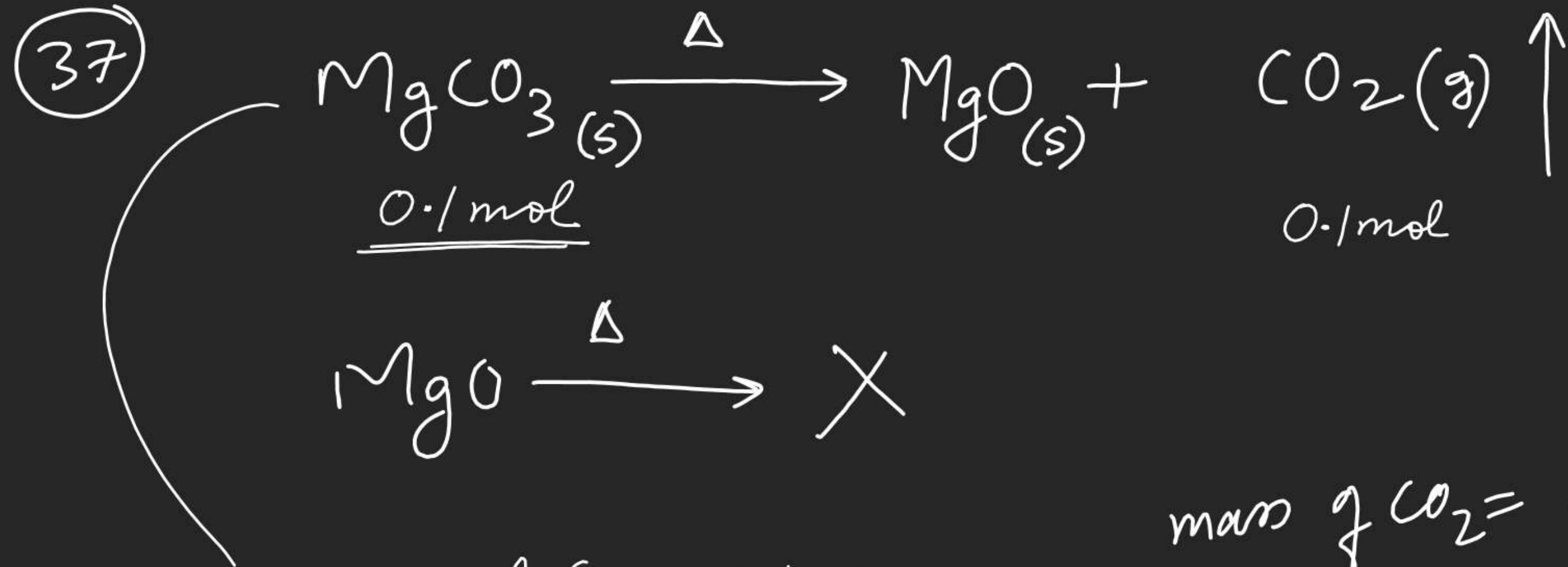
(31)



(32)



mass of N_2
 $= 368 \times 1.12 \text{ gm}$



$$\text{mass of MgCO}_3 = 0.1 \times 84 \\ = 8.4 \text{ gm}$$

$$\text{mass of MgO} = 12.46 - 8.4$$

$$\text{mass of CO}_2 = 4.4 \text{ gm}$$

$$\text{moles} = \frac{4.4}{44} = 0.1$$



$$27x + 24y = W = 1$$



$$\left(\frac{3}{2}x + y \right) \times 2 = W_1 = \frac{1}{10}$$

$$n_{\text{H}_2} = \frac{1.12}{22.4} = \frac{1}{20}$$

$$\text{Mass of H}_2 = \frac{1}{20} \times 2 = \frac{1}{10}$$

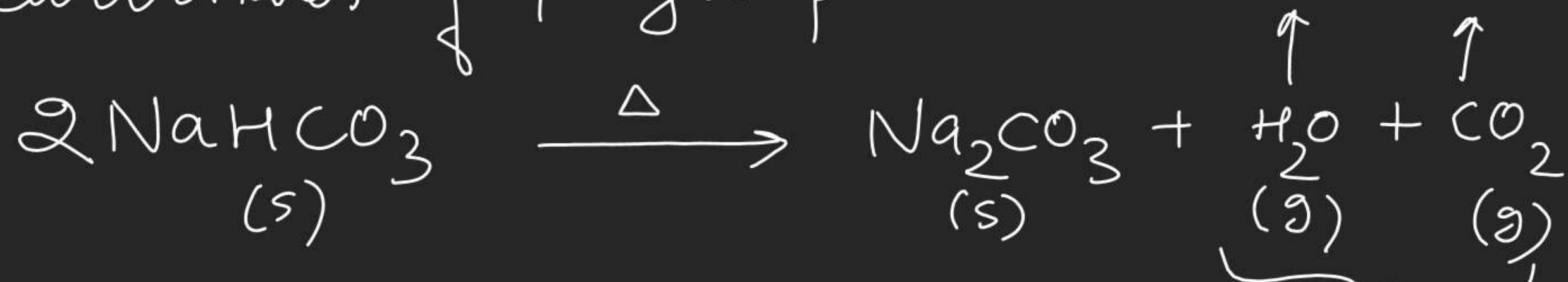
Carbonates of 1st group (Na, K, -)



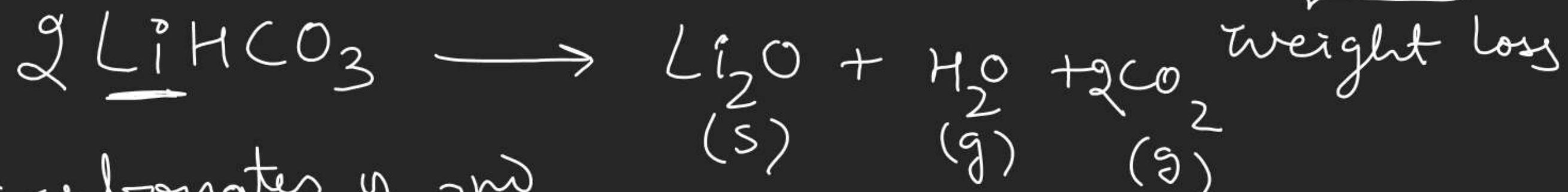
Carbonates of 2ⁿ (Be, Mg, Ca, -)



Bicarbonates ⚡ 1st group



~~Except~~



Bicarbonates ⚡ 2nd





AgBr(ppt)

AgI(ppt)

$\text{BaSO}_4\text{(ppt)}$

$\text{CH}_3\text{COOAg(ppt)}$

720 gm mixture $\text{CaCO}_3(s)$ & $\text{MgCO}_3(s)$ is heated.

If weight loss equals to 352 gm, find mass of each in original mixture.



-

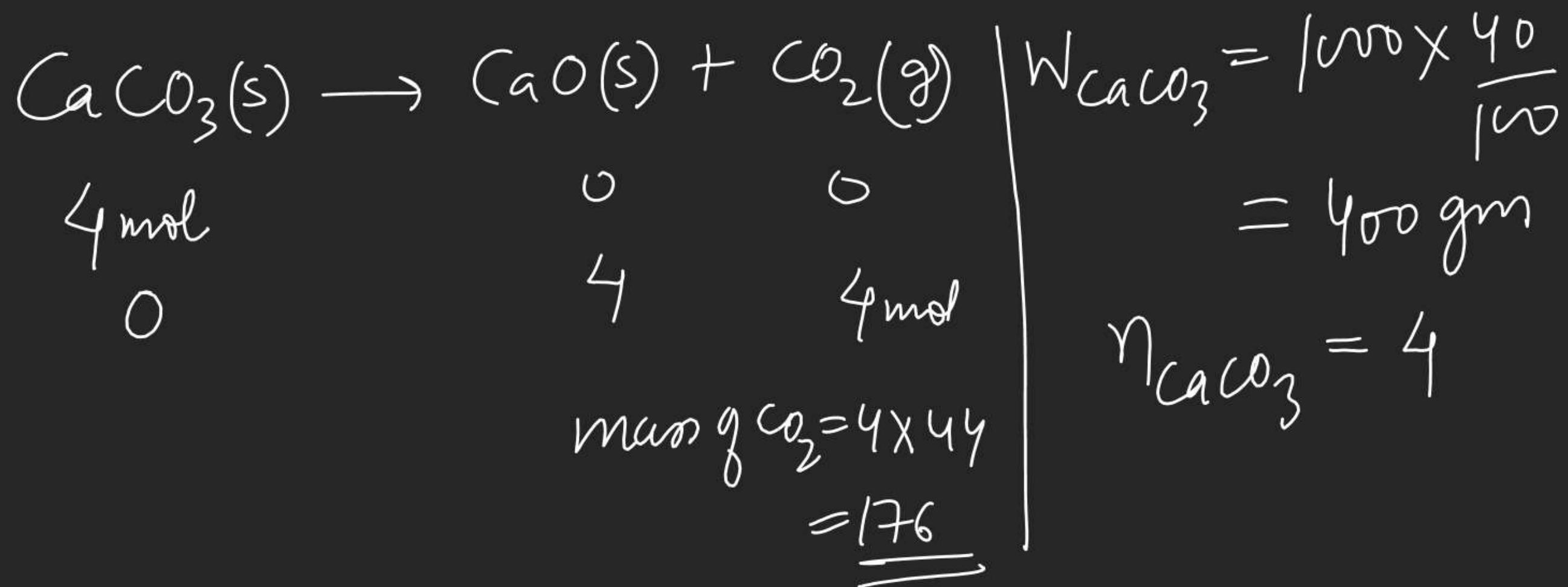
$$100x + 84y = 720 \quad \text{--- (1)}$$

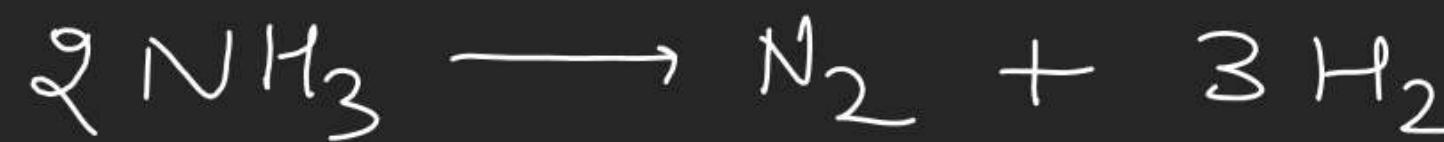
$$(x+y) \times 44 = 352 \quad \text{--- (2)}$$

$$\boxed{\begin{aligned} x &= 3 \\ y &= 5 \end{aligned}}$$

Type-4 Problems :- Problems related with % Purity & % Yield.

Q. 1000 gm sample of CaCO_3 of purity 40% is heated. find the mass of CO_2 produced



1. Yield

10 mol

(5 mol) (15 mol) *Expected*

(3 mol) (9 mol) *actual moles produced*

$$\boxed{\% \text{ yield} = \frac{(\text{actual moles produced})}{(\text{Expected moles})} \times 100} = \frac{3}{5} \times 100 = 60\% \quad \boxed{= 60\%}$$

$$\text{actual moles produced} = \frac{\% \text{ yield}}{100} \times \text{expected moles}$$

Q. Calculate % yield of Rxn if 20 moles of NH_3

produce 8 moles of N_2 .



20	<u>10</u>	<u>30</u>	Expected
----	-----------	-----------	----------

$$\% \text{ yield} = \frac{8}{10} \times 100 = 80\%$$



10 mol

$$5 \times \frac{60}{100}$$

$$= 3$$

$$15 \times \frac{60}{100}$$

$$= 9$$

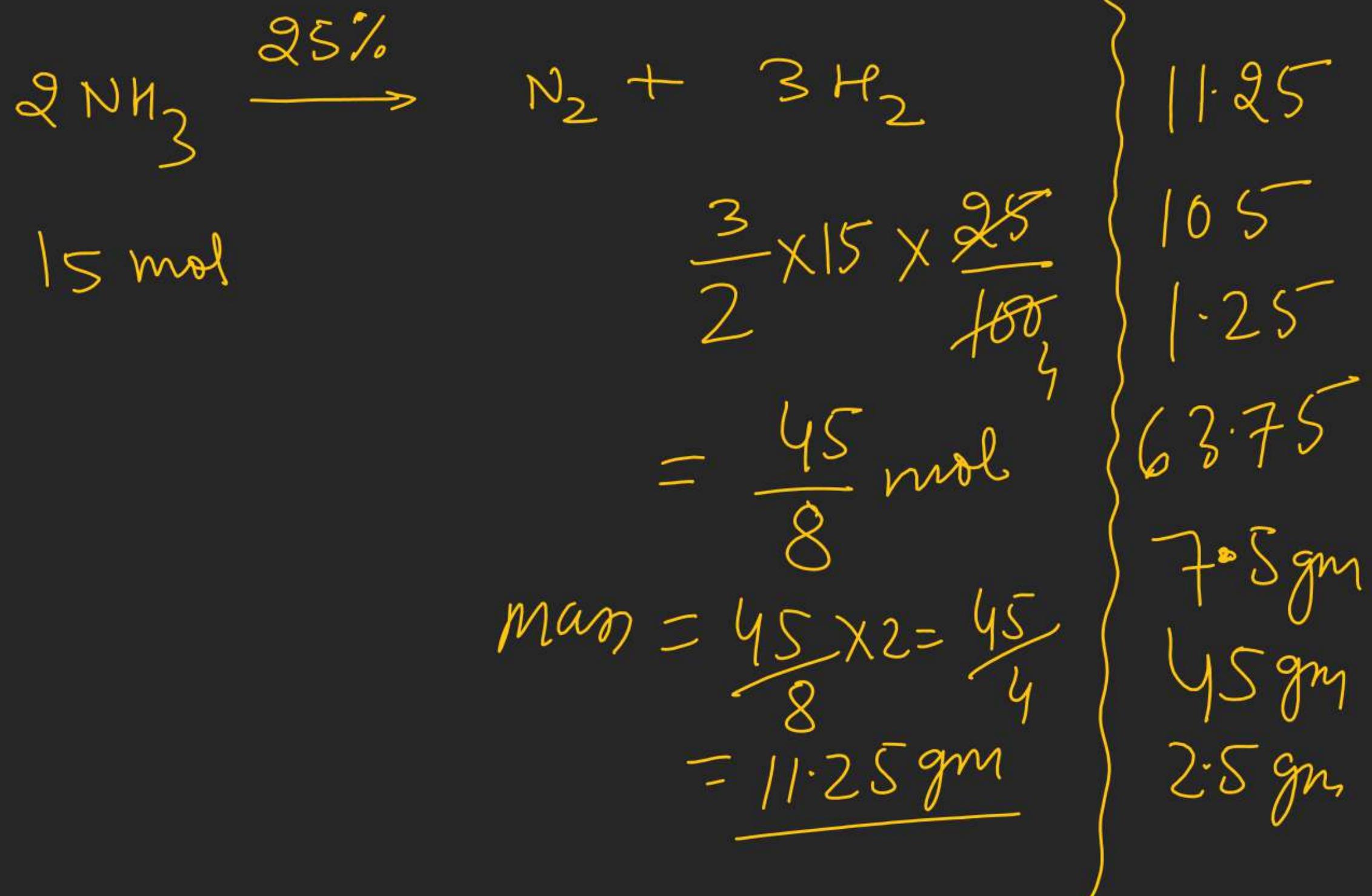
$$n_{\text{N}_2} =$$

$$n_{\text{H}_2} =$$

find mass of H_2 produced by 255 gm NH_3

Given

$$n_{NH_3} = \frac{255}{17} \\ = 15$$



In a certain operation 358 g of TiCl_4 is reacted with 96 g of Mg. Calculate % yield of Ti if 32 g of Ti is actually obtained [At. wt. Ti = 48, Mg = 24]

Given: $\text{TiCl}_4 + 2\text{Mg} \rightarrow \text{Ti} + 2\text{MgCl}_2$

(A) 35.38%

(B) 66.6%

(C) 100%

(D) 60%



$$\frac{358}{190} \text{ mol} \quad 4 \text{ mol}$$

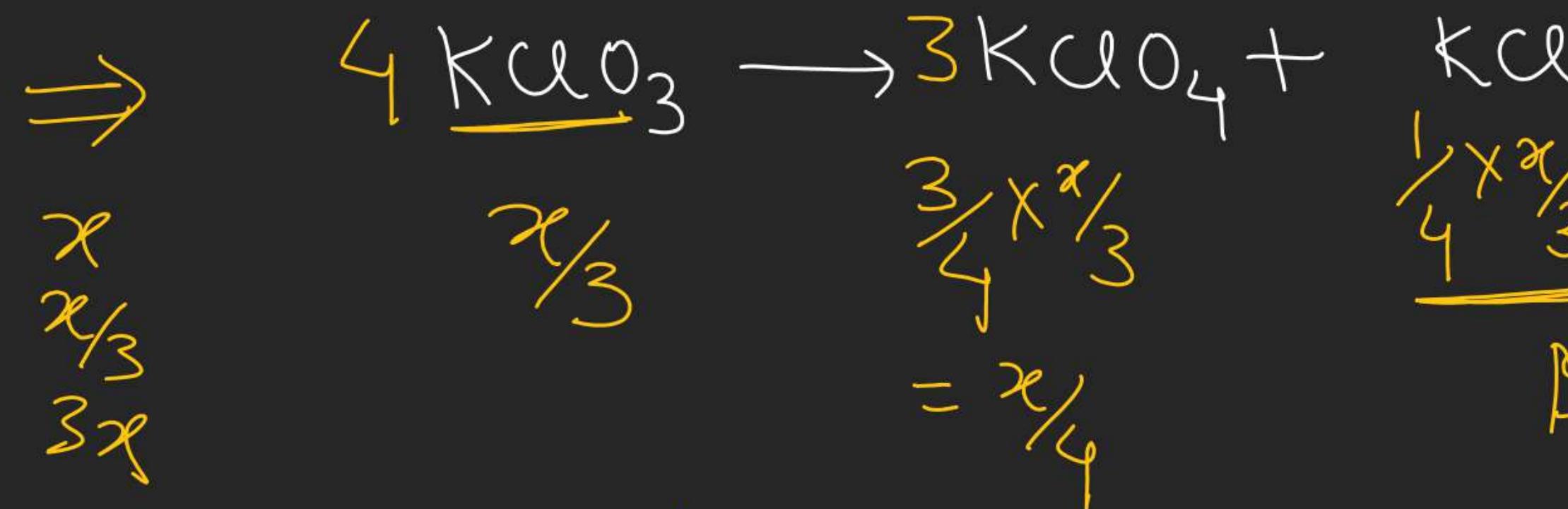
$$\% \text{ yield} = \frac{32}{\frac{358 \times 48}{190}} \times 100 = 35.38\%$$

$\frac{358}{190} \text{ moles} \leftarrow \text{Expected}$

Type-5 problems :- Problems involving Series of reaction



Intermediate product
= KClO



Reactant KClO_3
 Cl_2, KOH

Product: KCl, KClO₄, H₂O

O-I 38 — 44]
S-I 35 — 42 } 11th
O-II 9, 10, 11 }



1 mol