

MOLE CONCEPT

(52)



$$M_{avg} = \frac{80}{1 + \frac{\alpha}{2}} = 56$$

V.D α M_{avg}

GB Sir

HIN

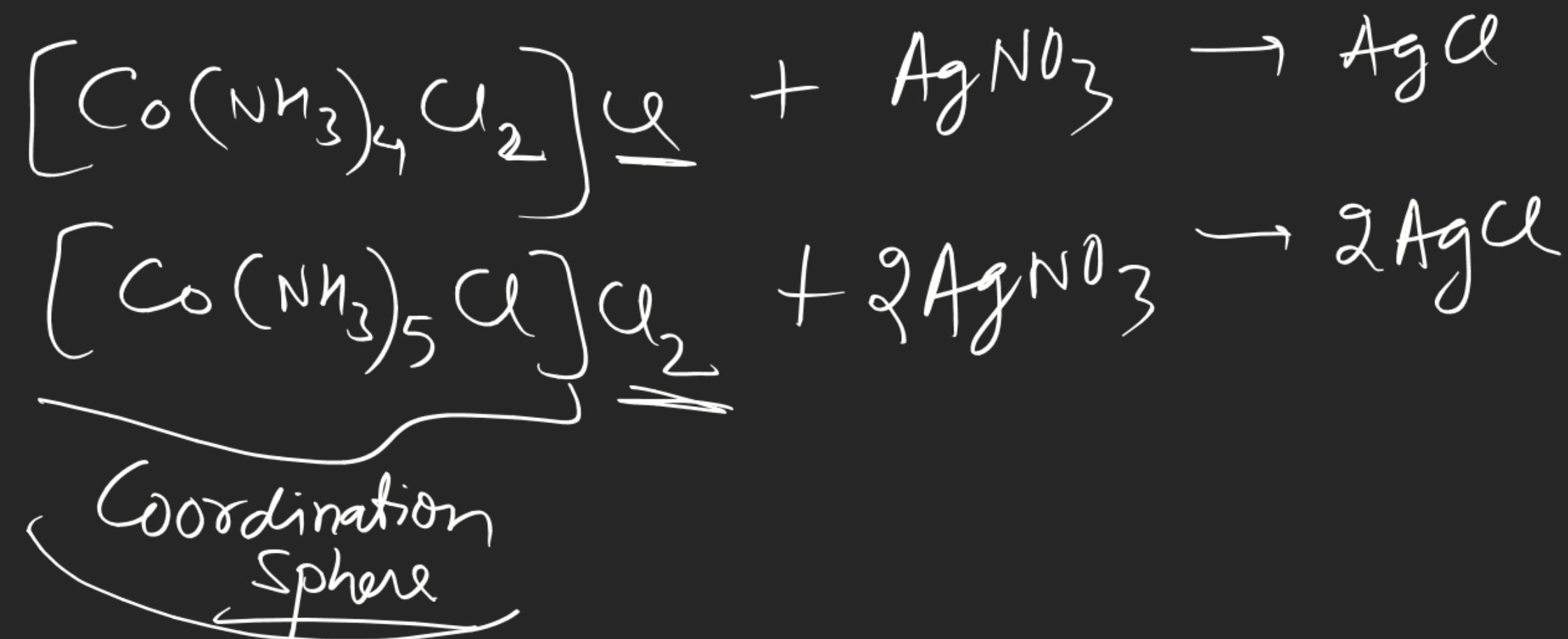
Example XII
S. L. Honey

S-1

(48)

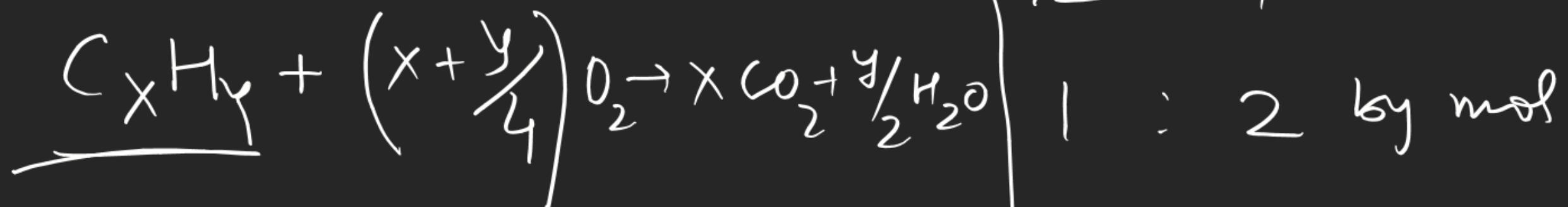
C	H	O
12	4	32

MOLE CONCEPT



MOLE CONCEPT

⑨


 $C : H$
 $\frac{6}{12} : \frac{1}{1}$ mass

 $1 : 2$ by mol

$$y = 2x$$

$$x = 2 \quad y = 4 \quad z = 3$$

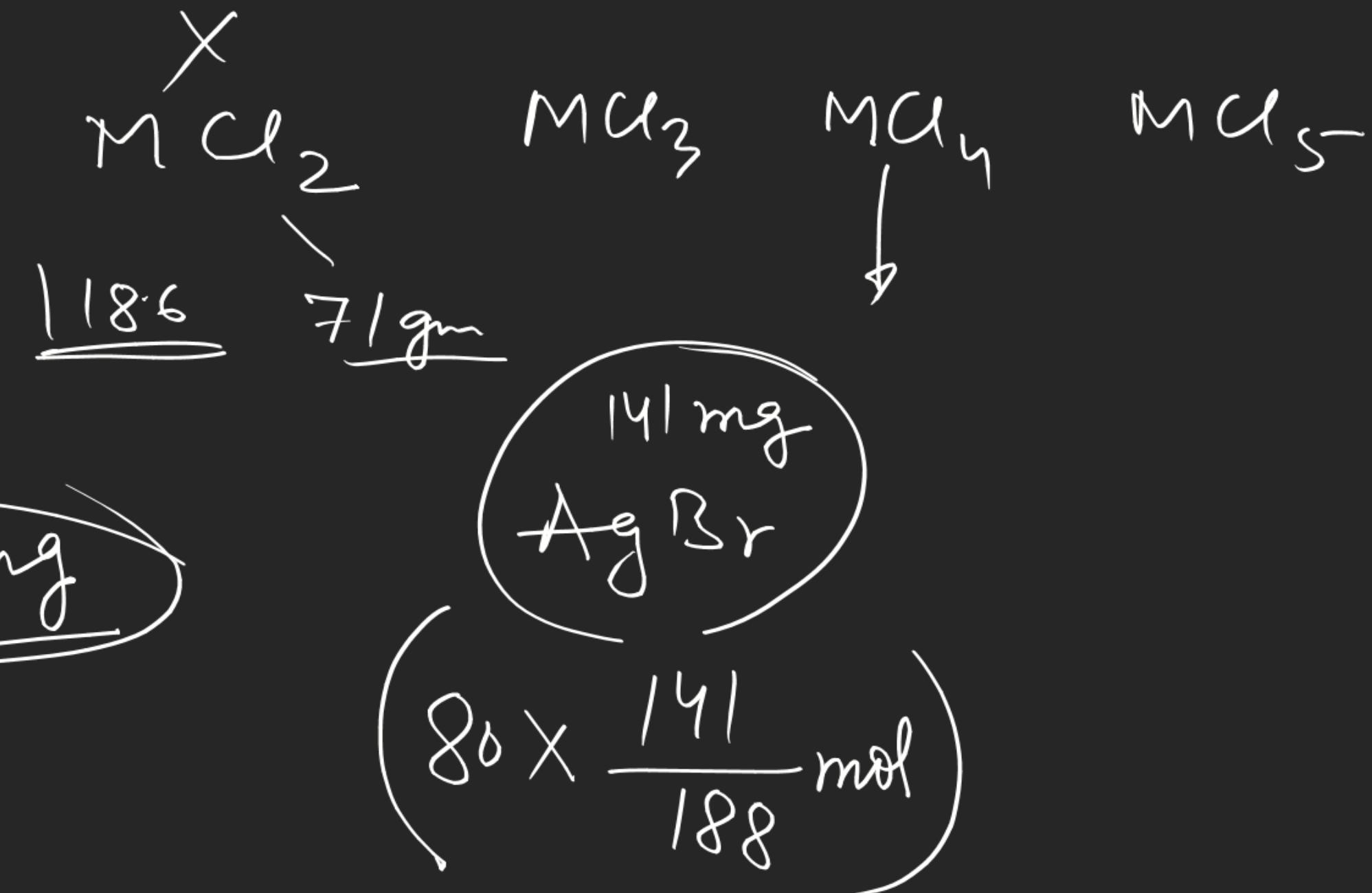
$$\cancel{\left(x + \frac{y}{4}\right) \times 2} = z$$

 \cancel{x}

$$x + \frac{y}{4} = z$$

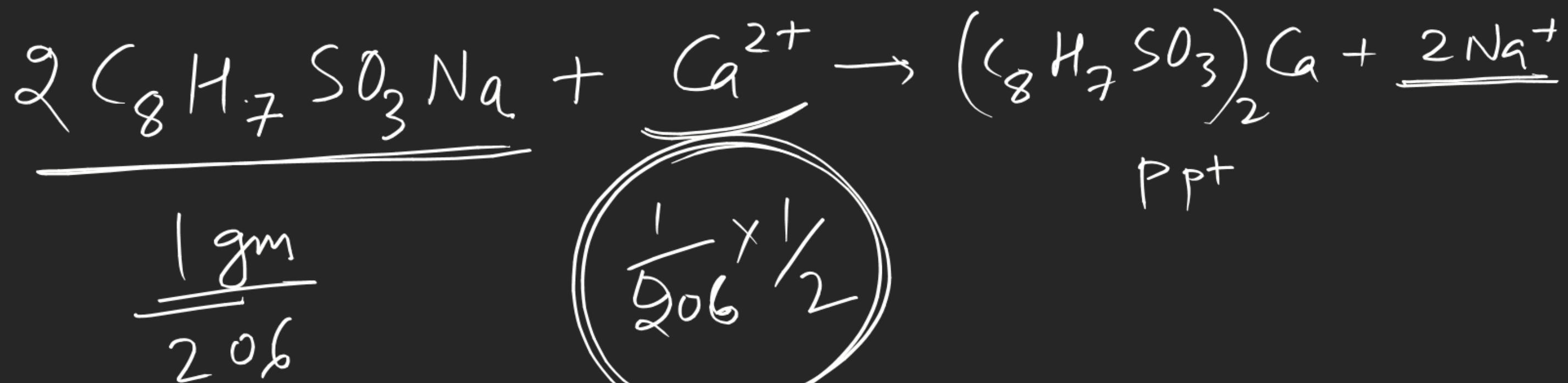
MOLE CONCEPT

$$M = \frac{94.8 \times 2}{189.6}$$

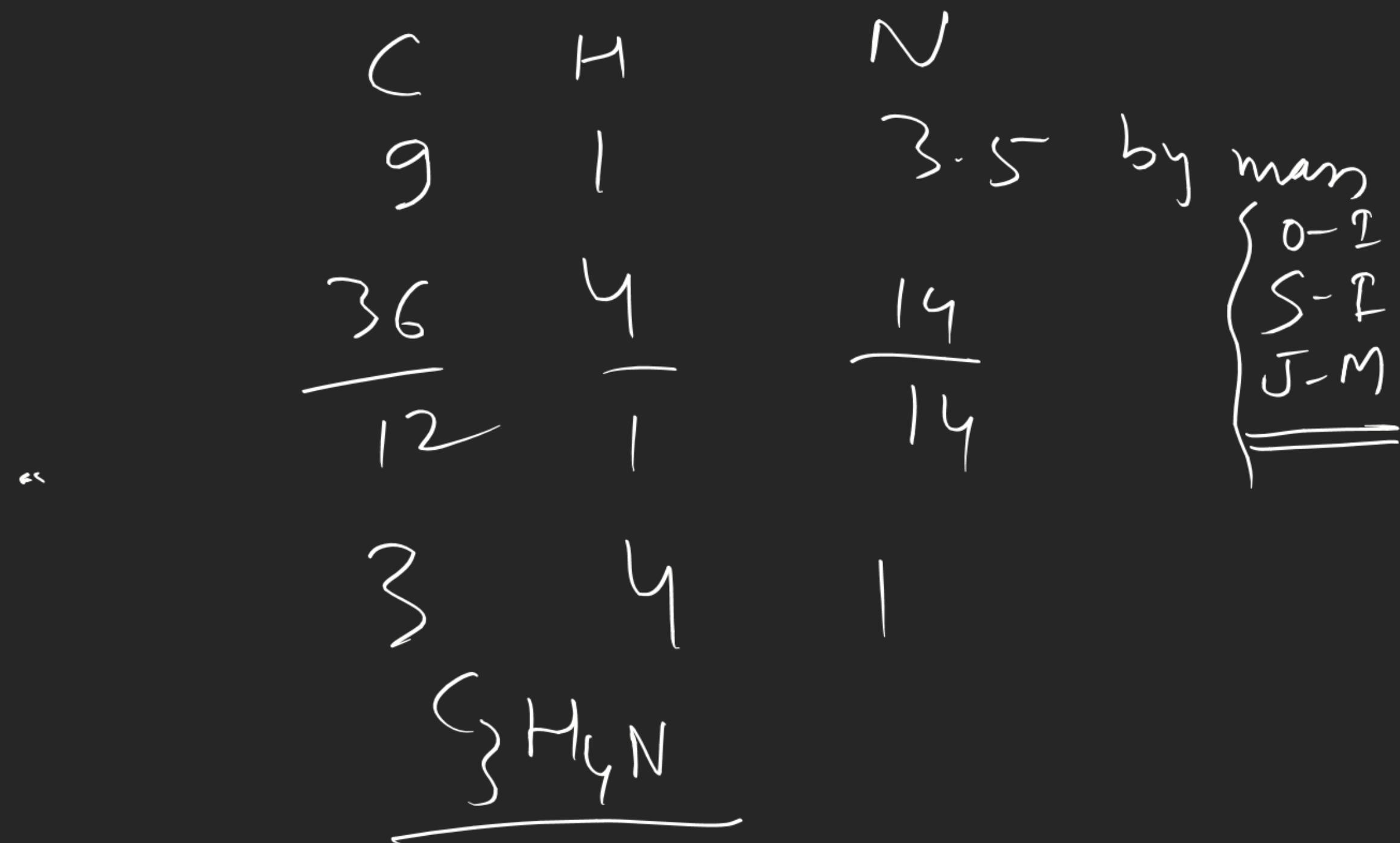


MOLE CONCEPT

(13)



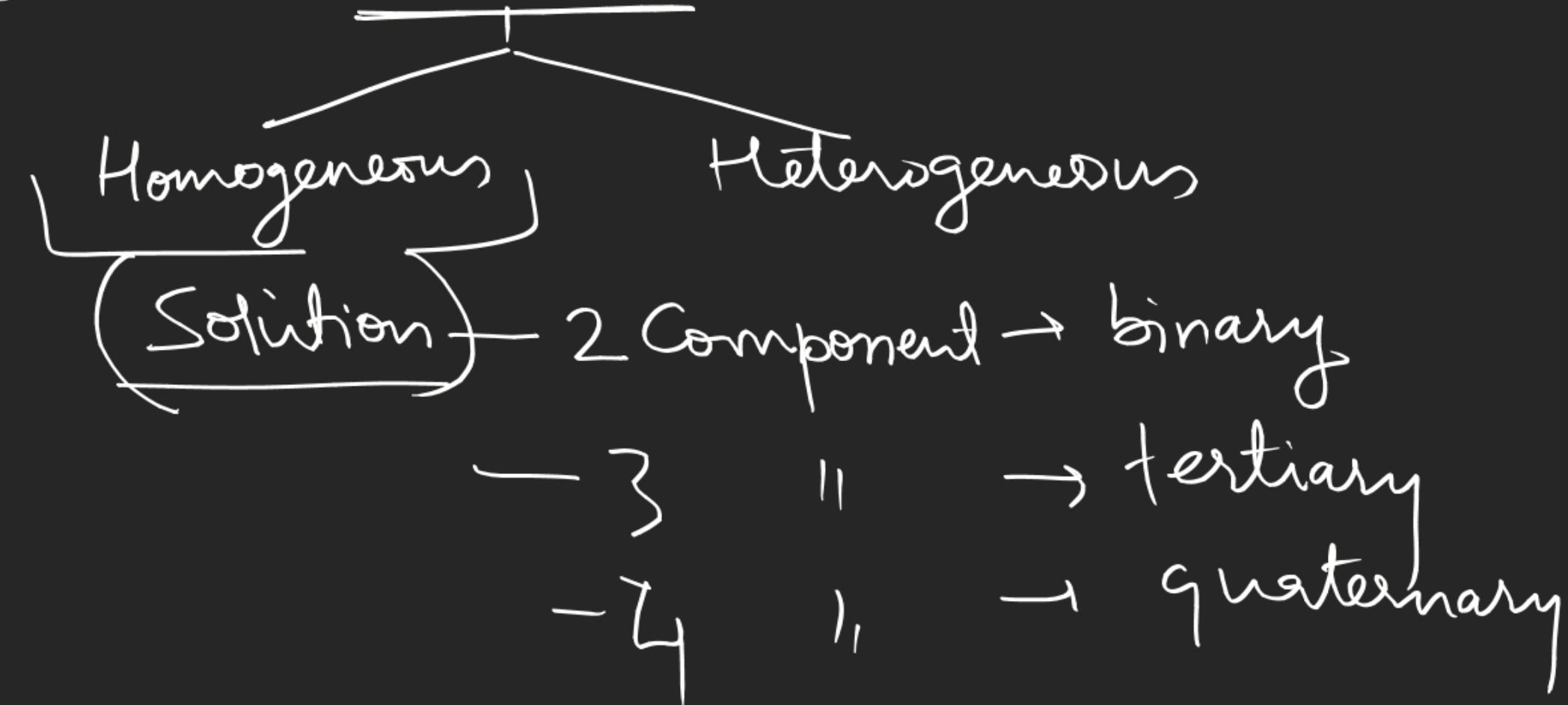
MOLE CONCEPT



MOLE CONCEPT

Concentration terms

Concentration terms are used to express the amount of a substance in its mixture



Binary solution \Rightarrow Solute + Solvent

↓ ↓
Which is Which is
less in more in
amount amount



1 % w/w (% by mass)

40% w/w NaOH (aq)

100 gm solution contains 40 gm NaOH

$$W_{\text{Solvent}} = W_{\text{H}_2\text{O}} = 60 \text{ gm}$$

② $\% \text{ w/v}$

40% w/v NaOH

100 ml solution contains 40 gm NaOH

Given density of soln = 1.5 gm/ml

$$\text{Mass of solution} = V \times d = 100 \times 1.5 = \underline{\underline{150 \text{ gm}}}$$

$$W_{\text{solvent}} = 110 \text{ gm}$$

$$\therefore \omega_h$$

③ %V/V (% by volume)

20% V/V O₂ in air (O₂+N₂)

100 ml air contains 20 ml O₂ P, T

$$\begin{aligned} \text{Vol of N}_2 &= 100 - 20 \\ &= 80 \text{ ml} \end{aligned}$$

⑦ gm/lit

40 gm/lit NaOH

(mass of solute
per litre soln)

1000 ml solution contains 40 gm NaOH
100 ml || || 4 gm NaOH

$$\% w/v \text{ NaOH} = 4$$

$$\boxed{\text{gm/lit} = 10 \times (\% w/v)}$$

PPM : \rightarrow (parts per million)

200 ppm CaCO_3 in H_2O

10^6 gm solution contains $2w$ gm CaCO_3

$$\underline{W_{\text{solvent}}} = (10^6 - 2w) \text{ gm}$$

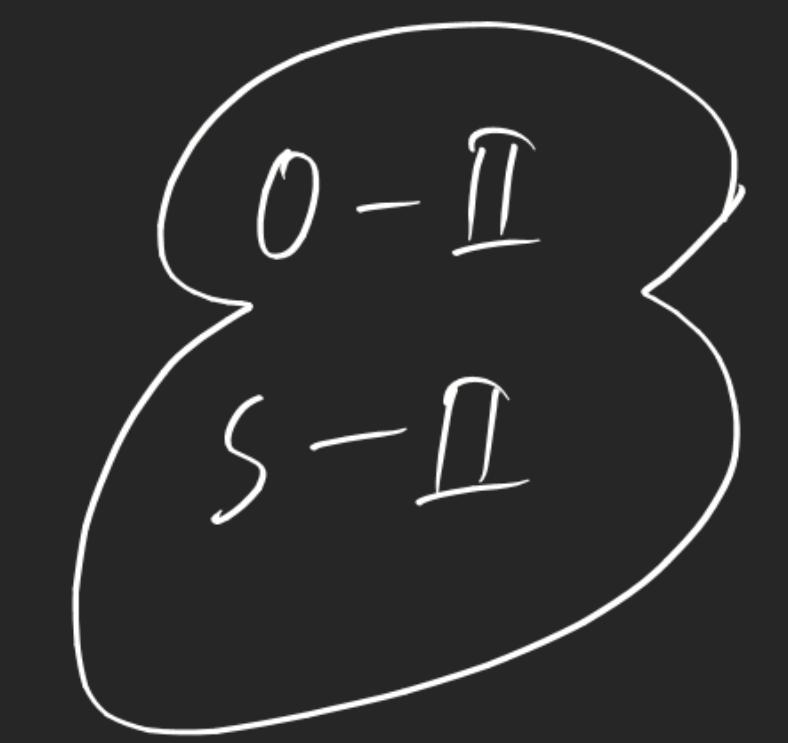
$$\leq 10^6 \text{ gm}$$

$$\boxed{\text{ppm} = 10^4 \times (\% w/w)}$$

$$10^6 \text{ gm} \rightarrow 2w$$

$$100 \text{ gm} \rightarrow \frac{2w}{10^6} \times 100 = \frac{2}{100} = 0.02 \text{ gm } \text{CaCO}_3$$

$$\therefore w/w = 0.02$$



Molarity (M): \rightarrow 2M NaOH(aq)

\downarrow (no. of moles per lit) \Rightarrow 1000 ml soln contains 2 mol NaOH

$$= 2 \times 40 \text{ gm NaOH}$$

$$= 80 \text{ gm NaOH}$$

(i) $\text{gm/lit} = 80$

(ii) $\% \text{w/v}$

1000ml \rightarrow 80 gm
100ml \rightarrow 8 gm

$$= 8$$

$\boxed{\text{gm/lit} = \text{Molarity} \times \text{Molar mass}}$

$$(M) \text{ Molarity} = \frac{\text{no. of moles}}{\text{Volume of Solution (lit)}}$$

$$= \frac{\text{no. of mol}}{V (\text{ml})} \times 1000$$

$$\text{no. of moles} = M \times V (\text{lit})$$

$$\text{no. of millimoles} = M \times V (\text{ml})$$

$$1 \text{ mol} = 10^3 \text{ mmoles}$$

$$\begin{aligned} &= 0.01 \text{ mol} \\ &= 10 \text{ mmoles} \end{aligned}$$

$$\text{no. of mmoles} = 1000 \times \text{no. of moles}$$

Molality (m)

2m NaOH

↓
1000 gm Solvent contains 2 mol NaOH

{ no. of moles
of solute
per kg solvent }

$$\text{mass of solution} = 1000 + 80 \\ = 1080 \text{ gm}$$

$$2 \times 40 \text{ gm NaOH} \\ = 80 \text{ gm NaOH}$$

$$\text{molality (m)} = \frac{\text{no. of moles of solute}}{\text{mass of solvent (kg)}} = \frac{2}{\frac{1000}{1000}} \times 1000$$