	SCQ (20)			Numerical (5)		
	Attempted	Wrong	Marks	Attemp	wrong	Marks
Physics						
Maths						
Chem						

Chem ─ PC
     ─ OC
     ─ iOC

Total marks   −ive

Physics

Maths

PC

OC

10C

Physical

③ Wrong

Sol^n

④ Unattempted

Q.1 Number of moles of H atoms present in H_2SO_4 which contains 12.8 gm Sulphur

(A) 0.4

(B) 4

(C) 0.2

(D) 0.8

no. of moles of Sulphur

$$= moles \ of \ H_2SO_4$$

$$moles \ of \ H_2SO_4 = \frac{12.8}{32}$$

$$moles \ of \ 'H' = \frac{12.8}{32} \times 2$$

$$\frac{1000}{58.5} \longrightarrow 7$$

$$\boxed{\frac{1000}{342}} \longrightarrow 14$$

Q.4 If 1kg of common salt(NaCl) costs Rs. 7 and 1 kg of sugar ($C_{12}H_{22}O_{11}$) costs

Rs. 14. What would be the cost of 1 mole of each of salt and sugar –

(A) Both will have the same cost

(B) The cost of sugar will be half the cost of salt

(C) The cost of sugar will be more than that of the salt

(D) The cost of sugar will be twice the cost of salt

$$\frac{1000}{58.5} \longrightarrow 7 \, Rs$$

$$1 \longrightarrow \frac{7 \times 58.5}{1000}$$
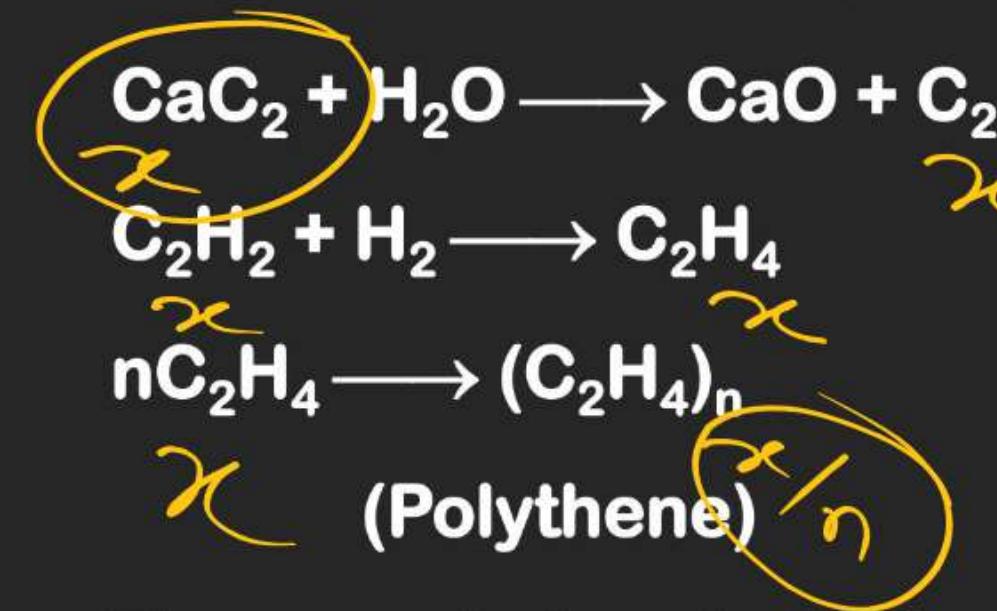
$$\frac{14 \times 342}{1000}$$

Q.7 The volume of a gas in discharge tube is 1.135×10^{-7} ml. at STP. Then the number of molecule of gas in the tube is –

(A) 3.01×10^4

(B) 3.01×10^{15}

(C) 3.01×10^{12}

(D) 3.01×10^{16}

$$N_A \times \frac{1.135 \times 10^{-7} \text{ ml}}{22700 \text{ ml}} \text{ mol}$$

Q.10 Polythene can be prepared by CaC_2 by the following sequence of reactions.

$$CaC_2 + H_2O \longrightarrow CaO + C_2H_2$$

$$C_2H_2 + H_2 \longrightarrow C_2H_4$$

$$nC_2H_4 \longrightarrow (C_2H_4)_n$$

(Polythene)

The mass in kg of polythene that can be prepared by 20 kg CaC_2 [Atomic mass of Ca = 40]

(A) 4.1 kg

(B) 8.75 kg

(C) 3.78 kg

(D) 10 kg

mass of $(C_2H_4)_n = \frac{x}{x} \times 28 x$

$= 28 x$

$\frac{28 \times 20}{64}$

$\frac{20 \times 1000}{64} = x$

% by mass

Q.13 A compound contains 38.8% C, 16.0% H and 45.2% N. The empirical formula

of the compound would be –

(A) CH_3NH_2

(B) CH_3CN

(C) C_2H_5CN

(D) $CH_2(NH)_2$

(44) (18)

Q.16 The relative density of a mixture of $CO_2(g) \& H_2O(g)$ with respect to gaseous hydrogen atoms is 30. The mole % of the CO_2 in the mixture is:

(A) $\frac{600}{13}$

(B) $\frac{2400}{13}\%$

(C) $\frac{240}{13}$

(D) None of these

$V \cdot D = \dfrac{Mol\ man}{1}$

CO_2 H_2O
44 18

$M_{avg} = 30$

$\%\ by\ mole\ CO_2 = \dfrac{12}{26} \times 100$

Q.19 Molality(m) of a sulphuric acid solution in which the mol fraction of water is 0.85 is :

(A) 4.9

(B) 9.8

(C) 19.6

(D) Can not be determined

H_2SO_4

0.15 mol

0.85 mol

$0.85 \times 18 \text{ gm}$
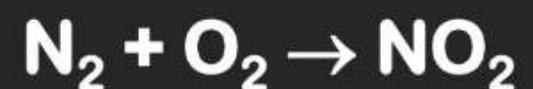
$$m = \frac{0.15}{0.85 \times 18} \times 1000$$

SECTION 2
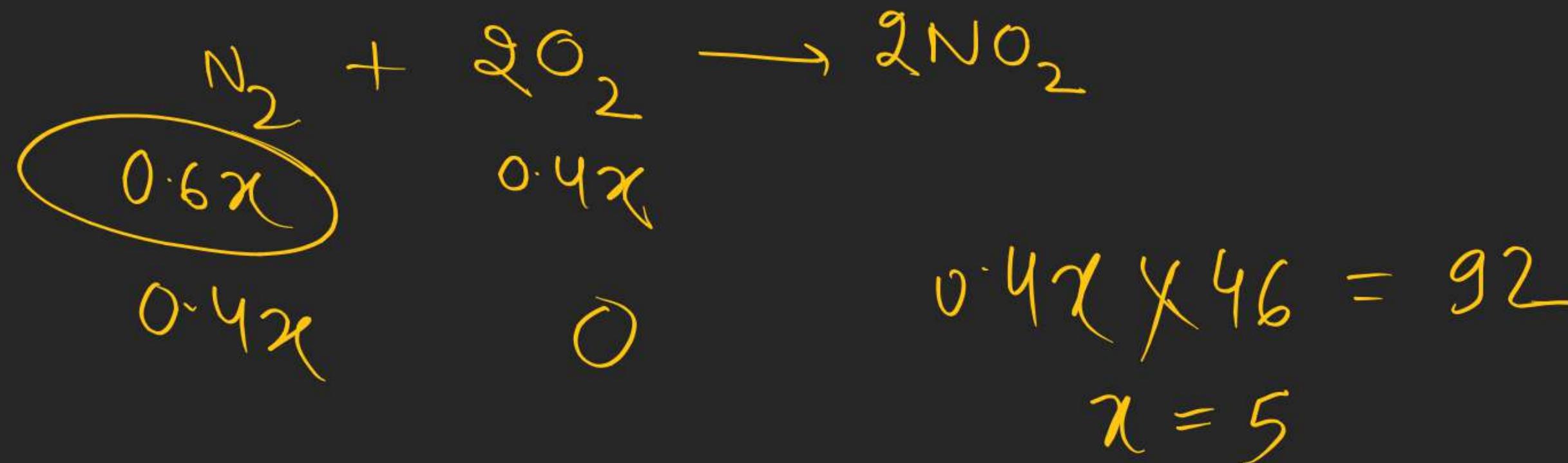
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	80
Mark As Answered Required :	Yes

let Total moles $= x$

Q.1 A gaseous mixture of N_2 & O_2 containing 60% by mole N_2 is allowed to react with each other according to the following equation.

$N_2 + O_2 \rightarrow NO_2$

If 92 gm of NO_2 is formed, find the mole of N_2 present in the mixture.

$$N_2 + 2O_2 \longrightarrow 2NO_2$$

$0.6x$

$0.4x$

$0.4x \qquad\qquad 0$

$0.4x \times 46 = 92$

$x = 5$

Q.4 If 340 g. of mixture of N_2 and H_2 in their stoichiometric ratio gave a 20% yield of NH_3. The produced mass of NH_3 would be

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

$$\text{1 mol} \qquad \text{3 mol}$$

$$34\,gm = \quad 28\,gm \qquad 6\,gm$$

$$280\,gm \qquad 60\,gm$$

$$\underline{10\,mol} \qquad \underline{30\,mol}$$

$$20\,mol \times \frac{20}{100} = \underline{4\,mol}$$

Q.7 An unknown solution [mol. wt. of solute = 250] is 20% (w/w). Molarity of solution is.

[Given $d_{solution}$ = 1.25 g/ml]

M

$\% \, W/W$

O-I 22-25 ✓

S-I 17-26

O-II 7,8,9,11,13,14

(25)

100 ml HCl
10% v/v

10 ml HCl

10 ml × d_{HCl}

$$\frac{10 \ gm}{36.5}$$
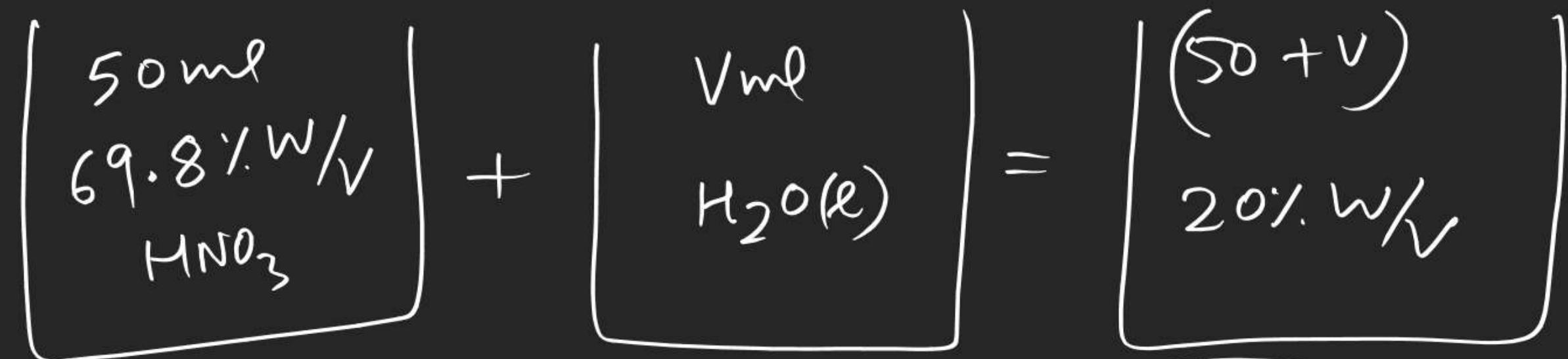
1000 ml NaOH
10% v/v

10 ml NaOH

10 d_{NaOH}

$$\frac{15 \ gm}{40}$$

(19)

$$\begin{bmatrix} 50\,ml \\ 69.8\%\,W/V \\ HNO_3 \end{bmatrix} + \begin{bmatrix} V\,ml \\ H_2O(\ell) \end{bmatrix} = \begin{bmatrix} (50+V) \\ 20\%\,W/V \end{bmatrix}$$

(20)

$$\begin{bmatrix} V\,ml \\ 2.2\,M\,H_2SO_4 \end{bmatrix} + \begin{bmatrix} 10V\,ml \\ H_2O \end{bmatrix} = \begin{bmatrix} \boxed{11V \times 0.98} \\ [H_2SO_4] = x \end{bmatrix}$$
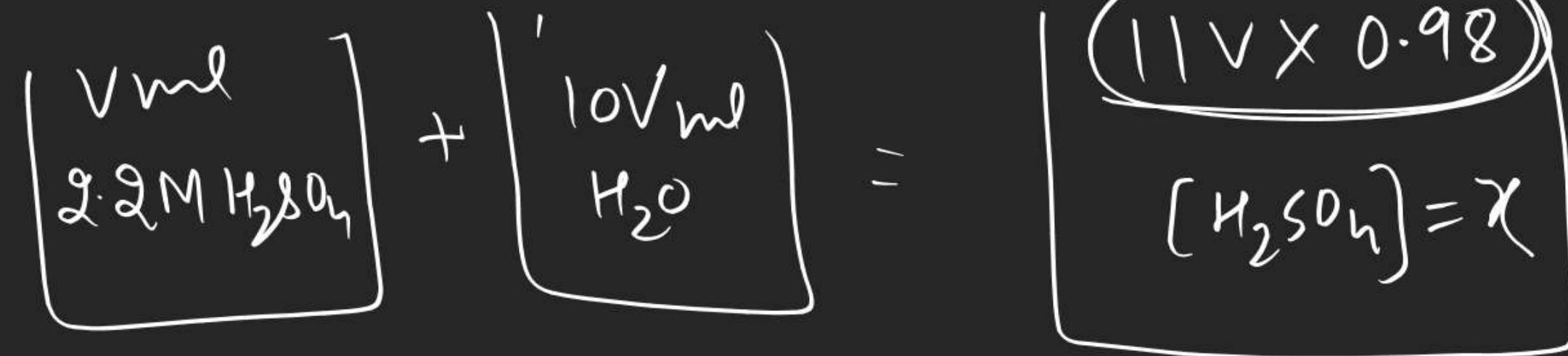
$$2.2 \times V + 0 = x \times 11V \times 0.98$$
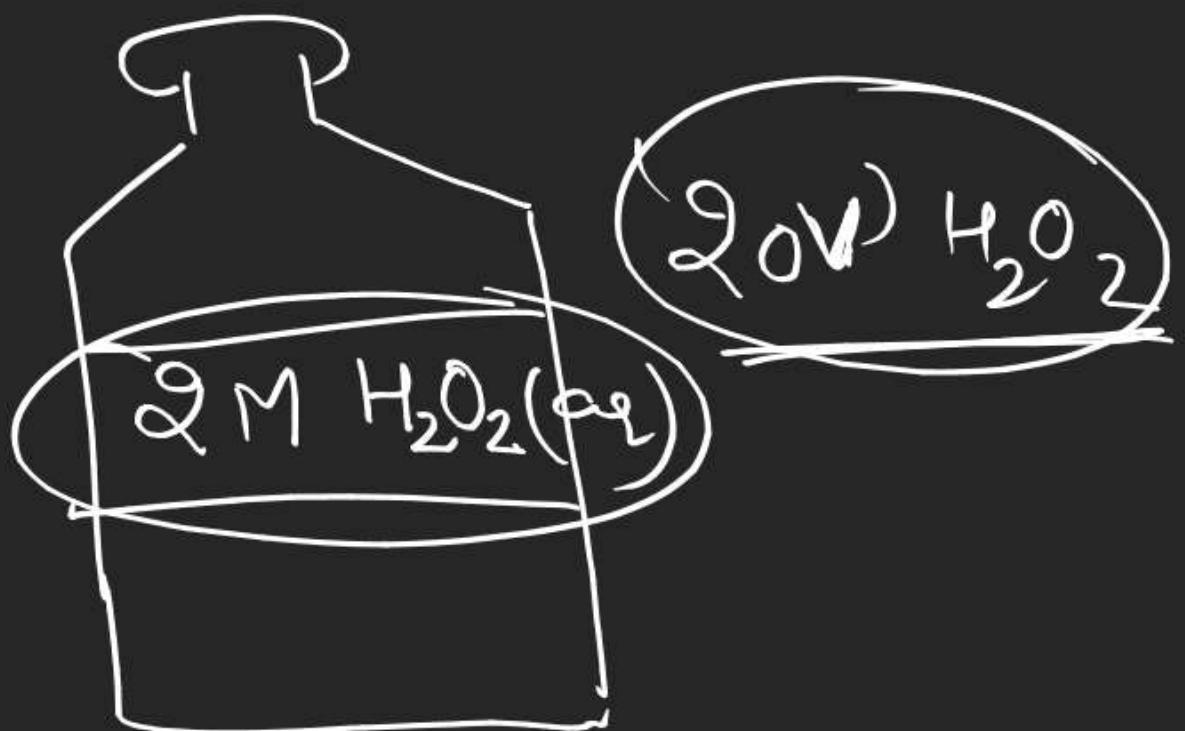
(25) 3 V_1 V_2
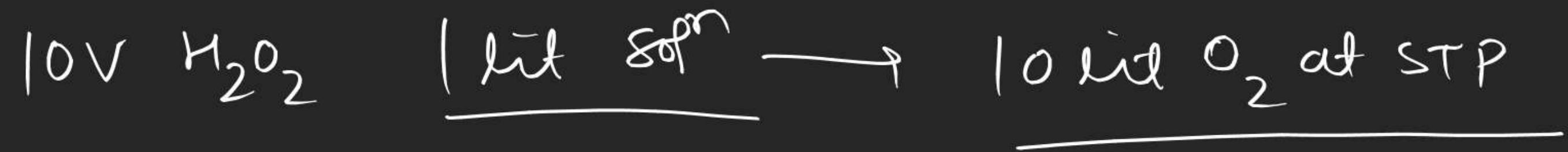
Volume strength of H_2O_2 (aq)

$\uparrow$

hydrogen peroxide

bleaching

$$2H_2O_2(aq) \longrightarrow 2H_2O(\ell) + O_2(g)$$

$2M \, H_2O_2(aq)$

$20V \, H_2O_2$

Volume strength **in lit**
= Volume of $O_2(g)$ produced at STP
by the complete decomposition of
$H_2O_2(aq)$ present in 1 lit solution

'20V' H_2O_2 $\boxed{\text{1 lit sol}^n}$ $\longrightarrow$ $\boxed{\text{20 lit } O_2 \text{ at STP}}$

10V H_2O_2 $\underline{\text{1 lit sol}^n}$ $\longrightarrow$ $\underline{\text{10 lit } O_2 \text{ at STP}}$

$$\boxed{\text{Vol. str} = M \times 11.35}$$

Q. find volume strength of $\boxed{4M}$ $H_2O_2(aq)$ soln.

let the volume of soln $= 1 \underline{\underline{lit}}$

$$2H_2O_2(aq) \longrightarrow 2H_2O(aq) + O_2(aq)$$
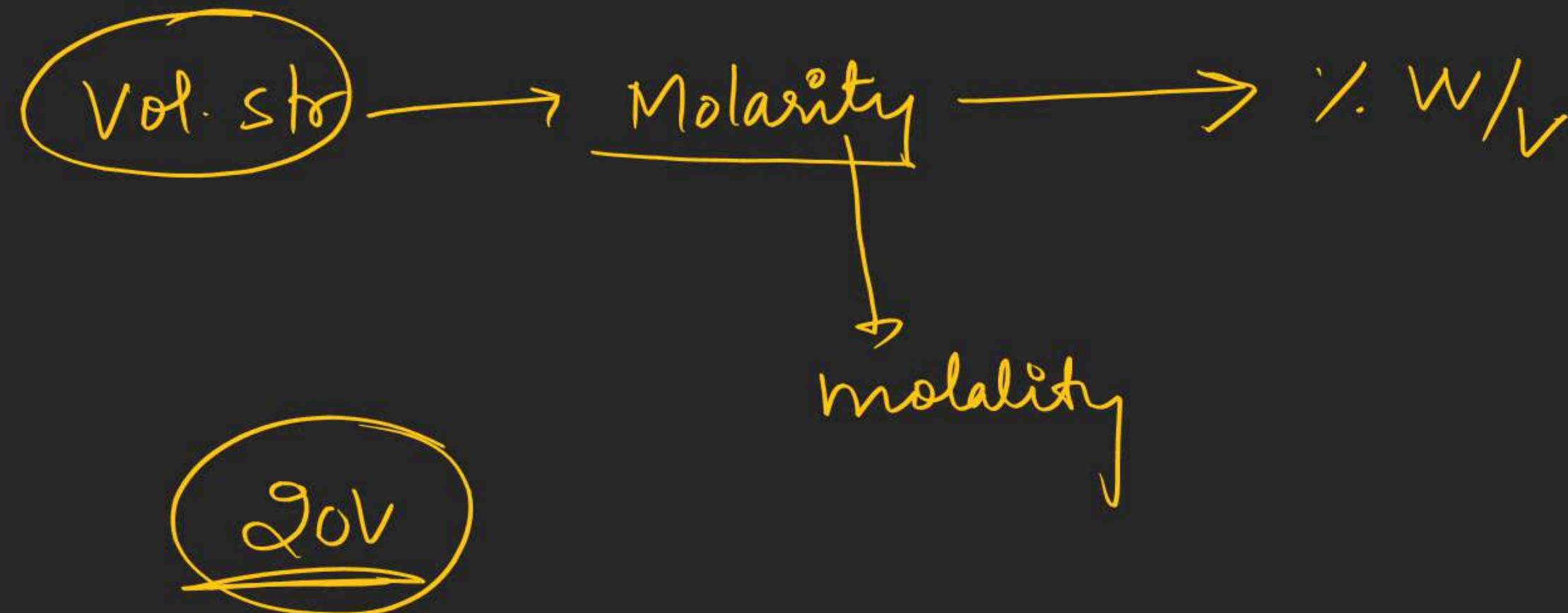
$\boxed{x} = \underline{\underline{4 \, mol}}$
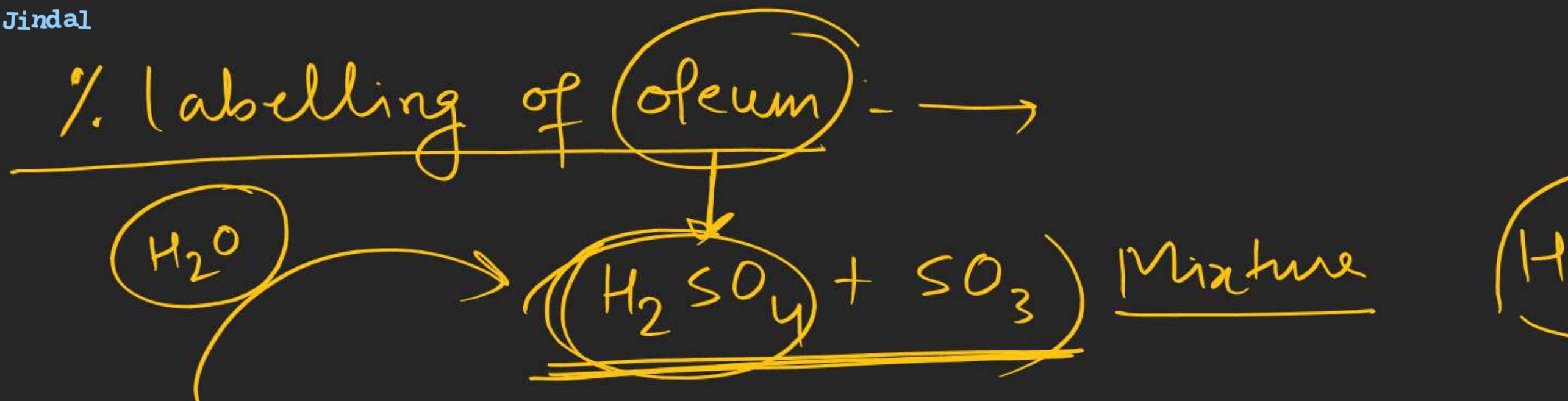
$\boxed{2 \, moles}^{x/2}$

$\boxed{2 \times 22.7 \, lit}$ Ans

Vol. str $= \dfrac{x}{2} \times 22.7 \, lit$

$\boxed{Vol \, str = M \times 11.35}$

$$\boxed{\text{Vol. Str}} \longrightarrow \underline{\text{Molarity}} \longrightarrow \% \ W/V$$

$\downarrow$

molality

$$\boxed{20V}$$

% labelling of (oleum) $\longrightarrow$

H_2O $\longrightarrow$ ($H_2SO_4 + SO_3$) Mixture

$H_2S_2O_7$

$$SO_3 + H_2O \longrightarrow H_2SO_4$$
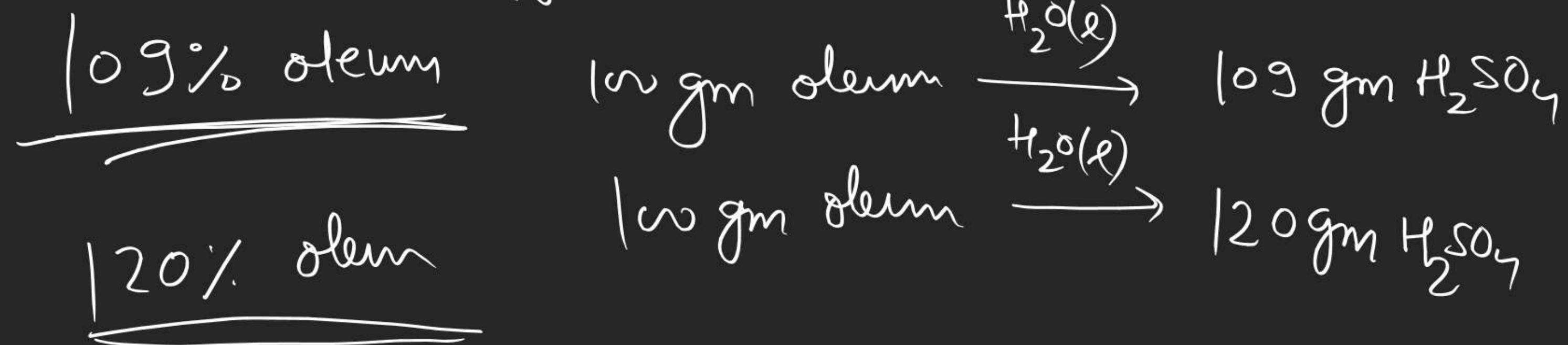
109% oleum or 109% H_2SO_4

% labelling = mass of H_2SO_4 obtained by <u>100 gm oleum</u>

when it is mixed with

sufficient H_2O

<u>109% oleum</u>

<u>120% oleum</u>

100 gm oleum $\xrightarrow{H_2O(l)}$ 109 gm H_2SO_4

100 gm oleum $\xrightarrow{H_2O(l)}$ 120 gm H_2SO_4

0-I   26 - 27

5-1   27 - 28

0-II from Last class