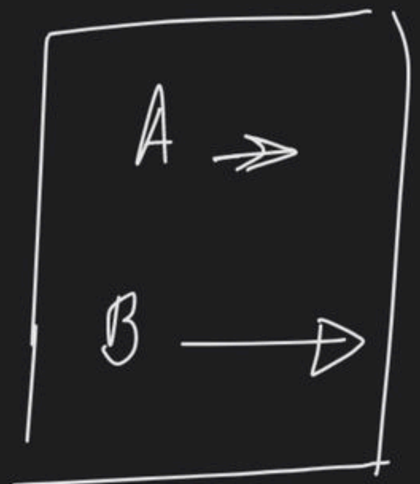
Kinetic Theory of Gases

Course on States of Matter for Class XI

akhilesh • Lesson 10 • July 26, 2021



2 mol

3 mol

$$\frac{n_A}{n_B} = \frac{2}{3}$$

$$P \propto n$$

$$\frac{P_A}{P_B} = \frac{2}{3}$$

% by mol of A = 40 %

= % by pressure

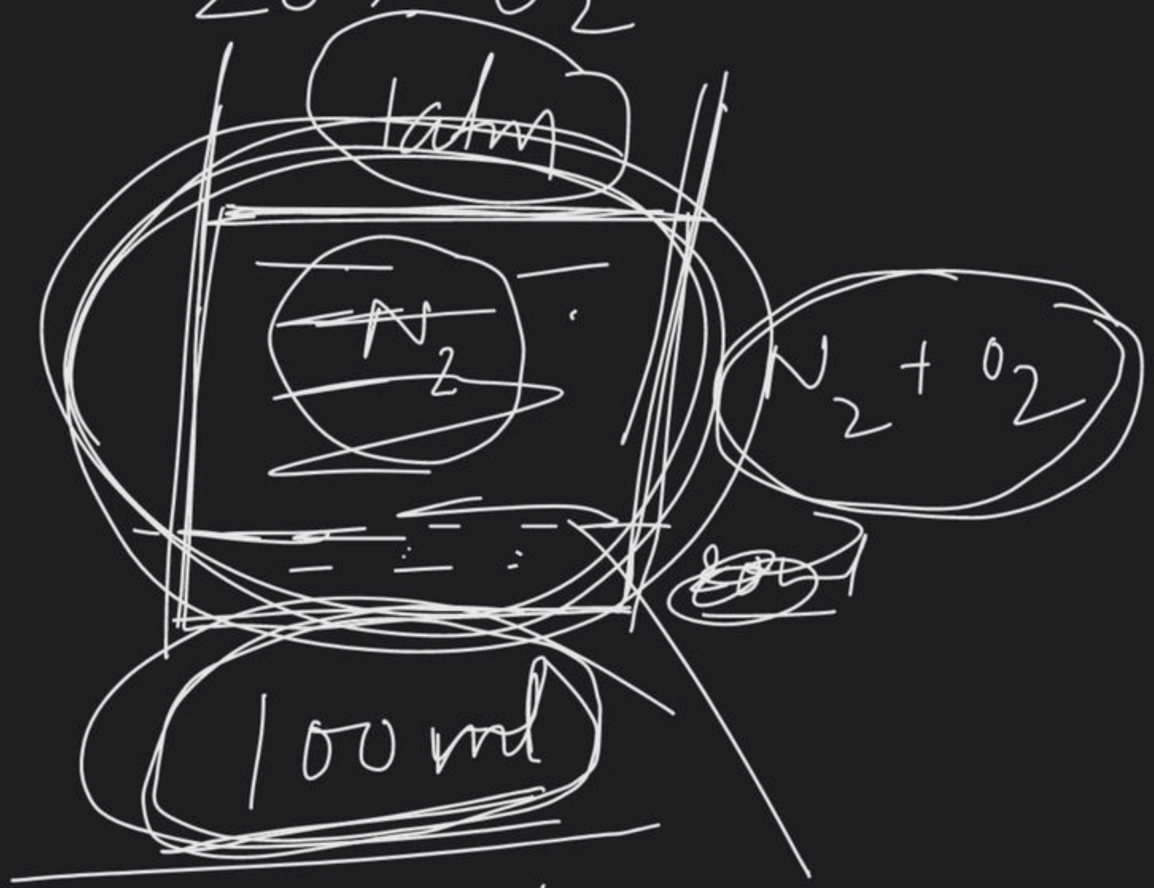
Amagat Law of partial volume: →

Total volume of two or more non-reacting gases is equal to the sum of the partial volume of componend gases.

Partial volume :→ Volume occupied alone a component gas if its present at same temperature and total pressure.

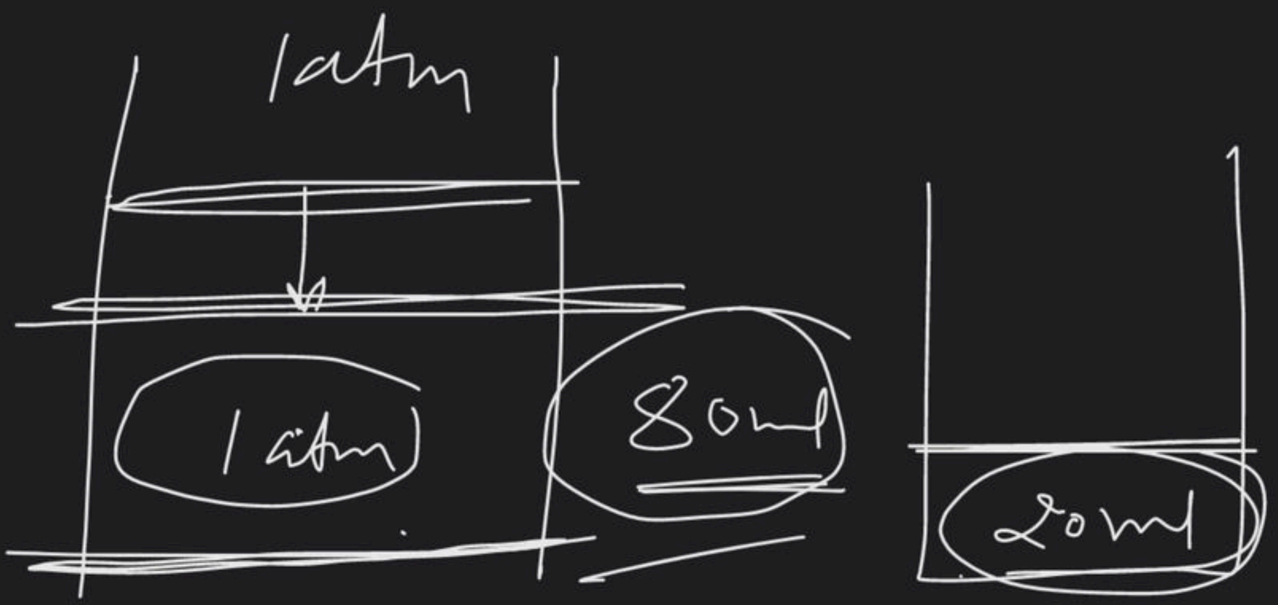
80% N_2

20% O_2



100 ml → 80 ml N_2

→ 20 ml O_2



$$P_T = P_A + P_B$$

Same V, T

$$V_T = V_A + V_B$$

same P & T

$$P V_T = (n_A + n_B) RT$$

$$P V_A = n_A RT$$

$$P V_B = n_B RT$$

$$V_A = X_A V_T$$

50 ml + 100 ml = 150 ml

P, T P, T P, T

50 + 100 ml

% by pressure

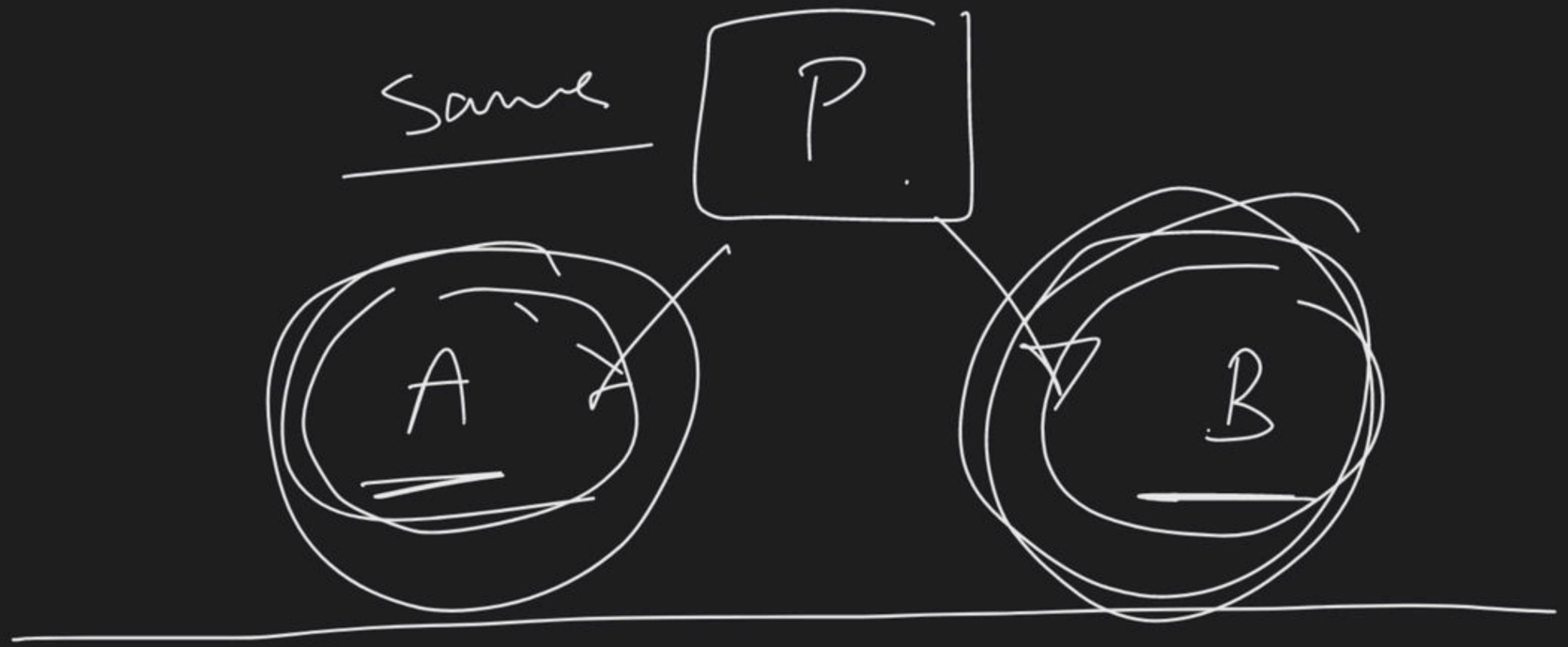
% by volume

(A) equal

(B) inversely

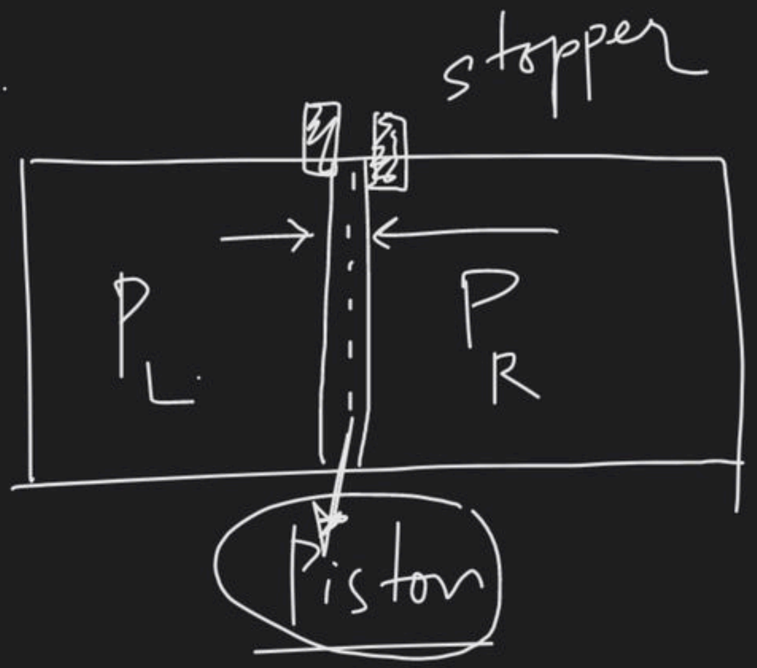
$$\frac{V_A}{V_B} = \frac{n_A}{n_B} = \frac{2}{3}$$

% by pressure = % by mole = % by volume

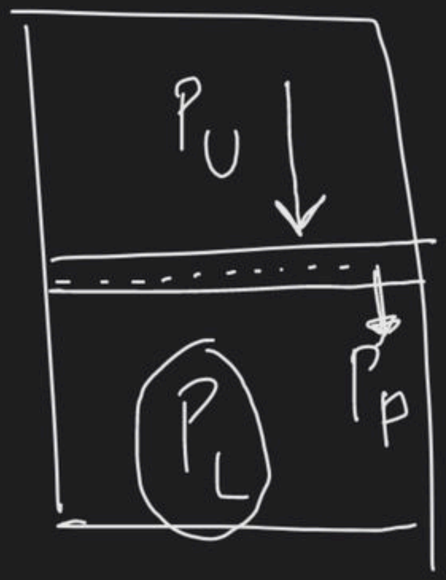


Same V

Problems related with Piston fitted container

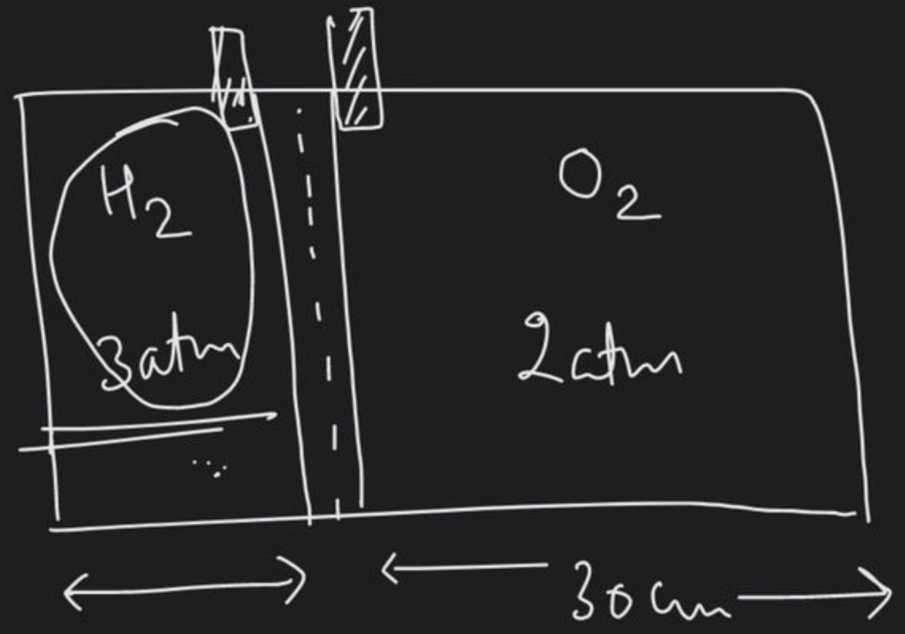


$P_L = P_R$



$P_L = P_U + P_p$

Q.



Calculate final pressure of each gas and position of piston if stoppers are removed.

(A) 2.5

(B) 2.25

(C) 2.75

(D) None

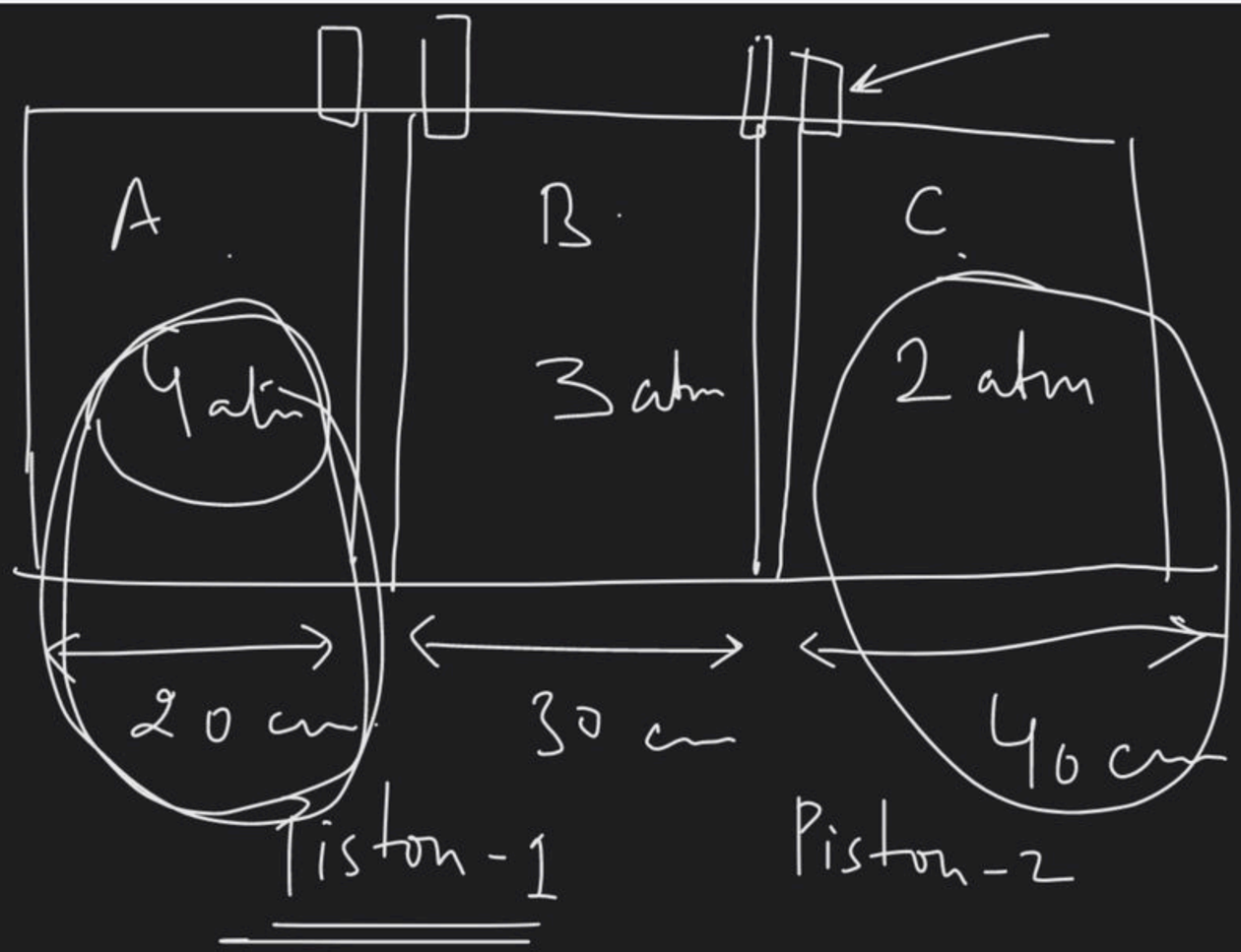
$$P_1 l_1 + P_2 l_2 = P(l_1' + l_2')$$

$$3 \times 10 + 2 \times 30 = P \times 40$$

$$\frac{90}{40} = \frac{9}{4} = P$$

$$3 \times 10 = \frac{3}{4} \times l_{H_2}$$

$$\frac{40}{3} = l_{H_2}$$



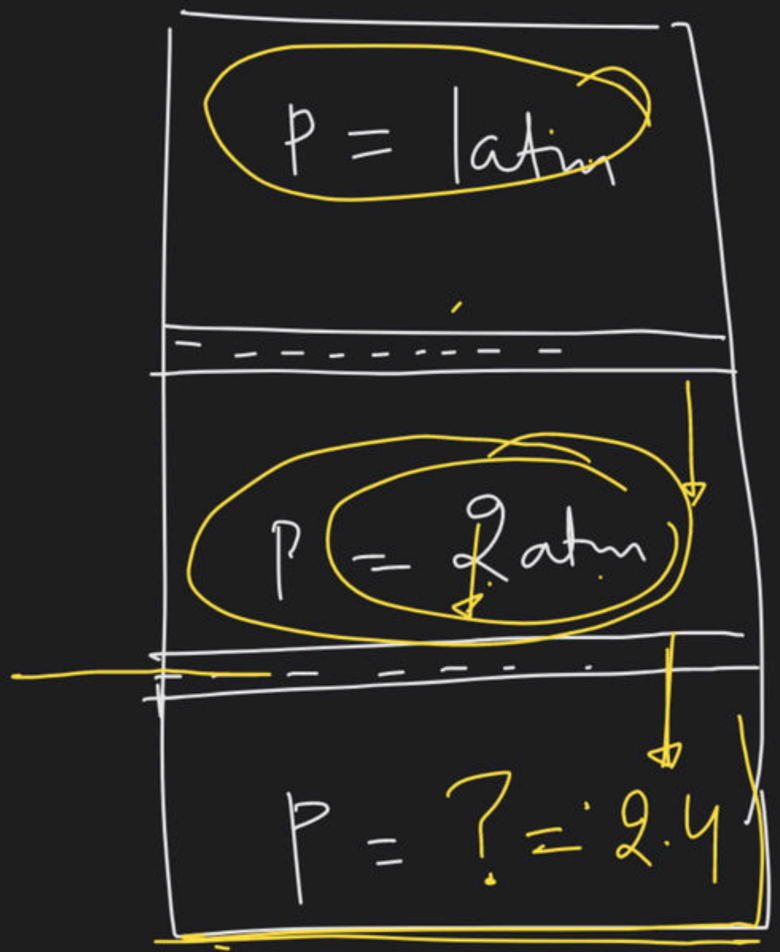
$\Rightarrow P_A = P_B = P_C$

$\Rightarrow P_{final}$

$\Rightarrow$

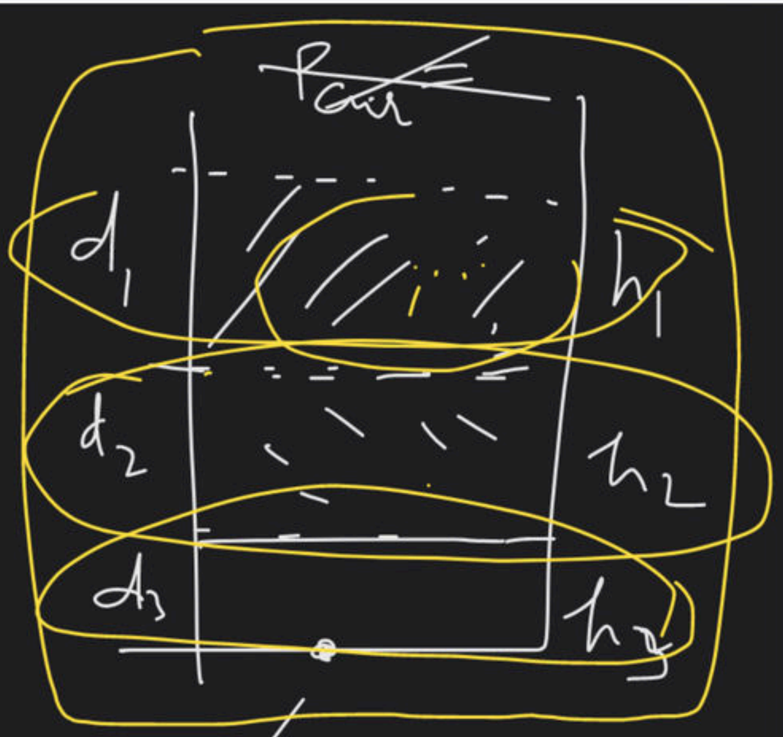
$4 \times 20 = \frac{5}{9} \times l$

$l = \frac{144}{5}$

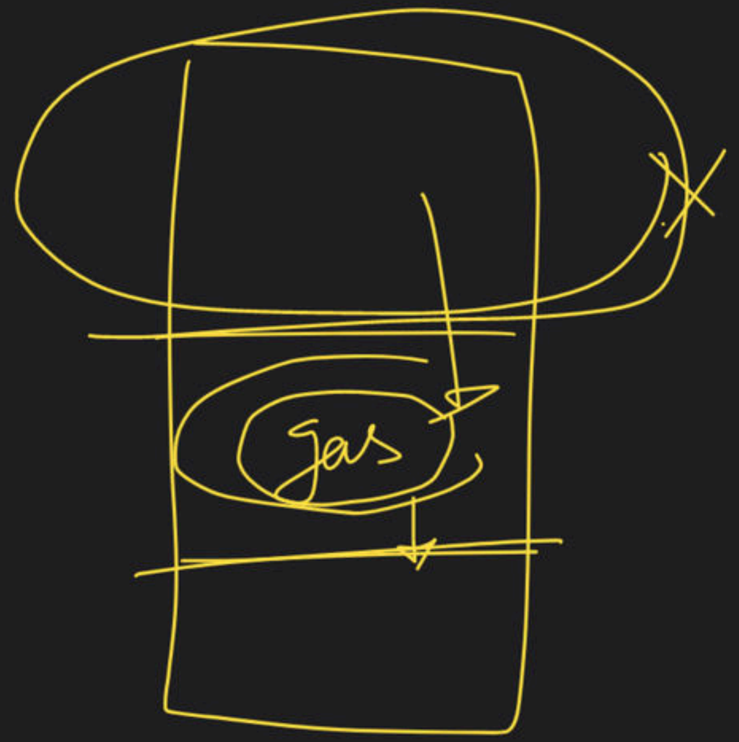


$P_p =$ [illegible] 1

$P_p = 0.4$ atm



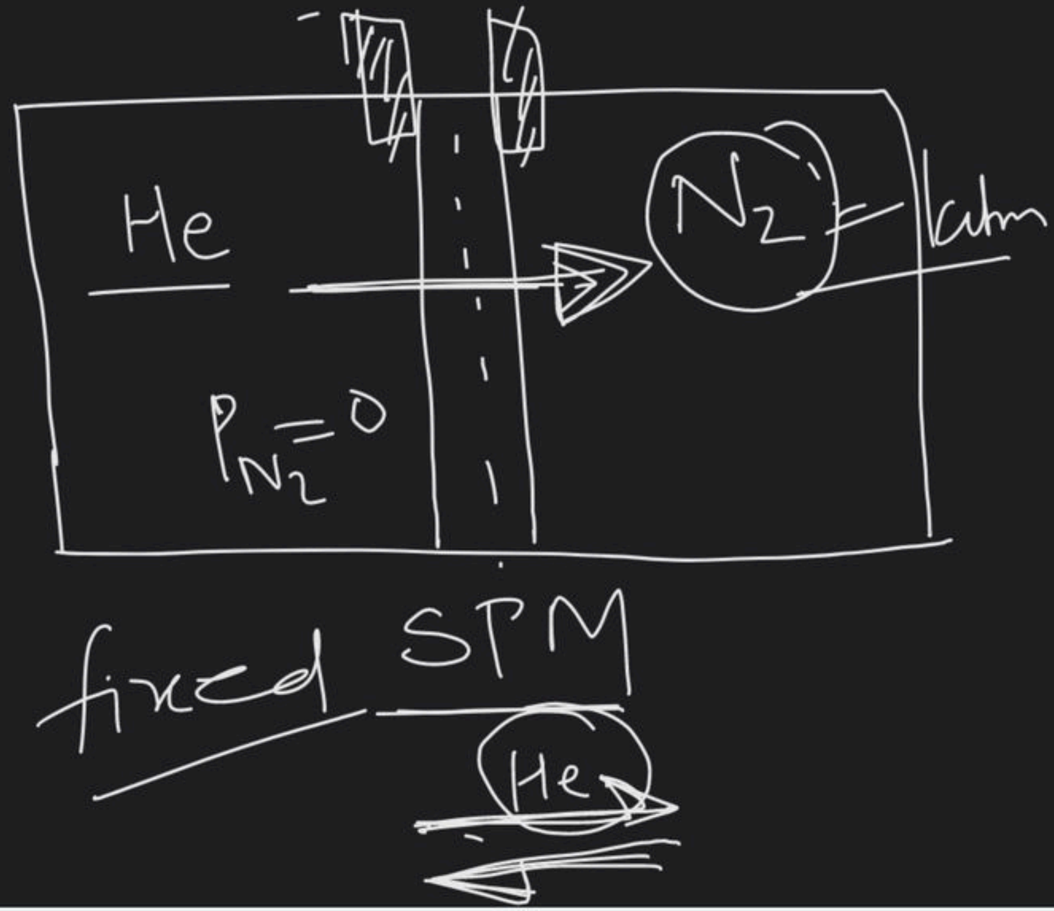
$P = (h_1 d_1 + h_2 d_2 + h_3 d_3) +$ 1 atm


gas

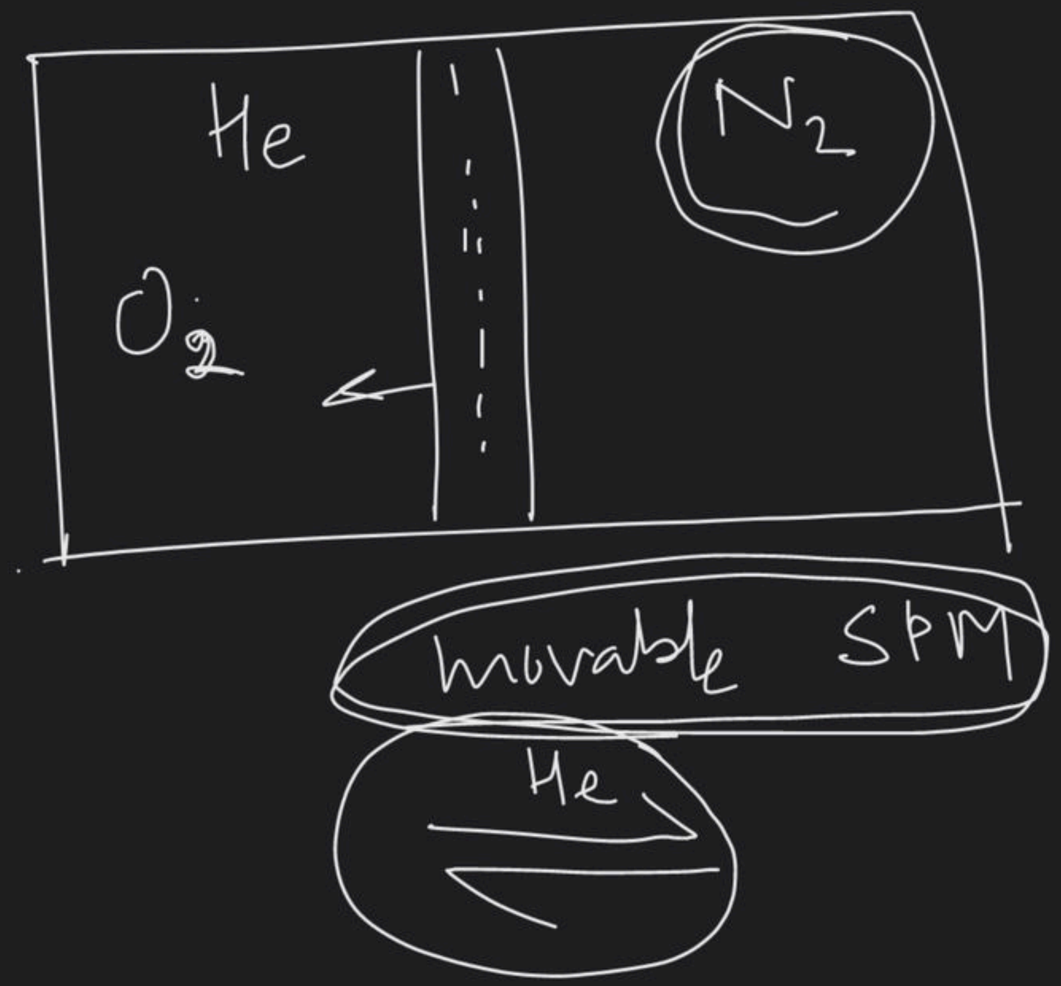
Problems related with SPM :→

↓

Semi permeable membrane



$$(P_{He})_L = (P_{He})_R$$

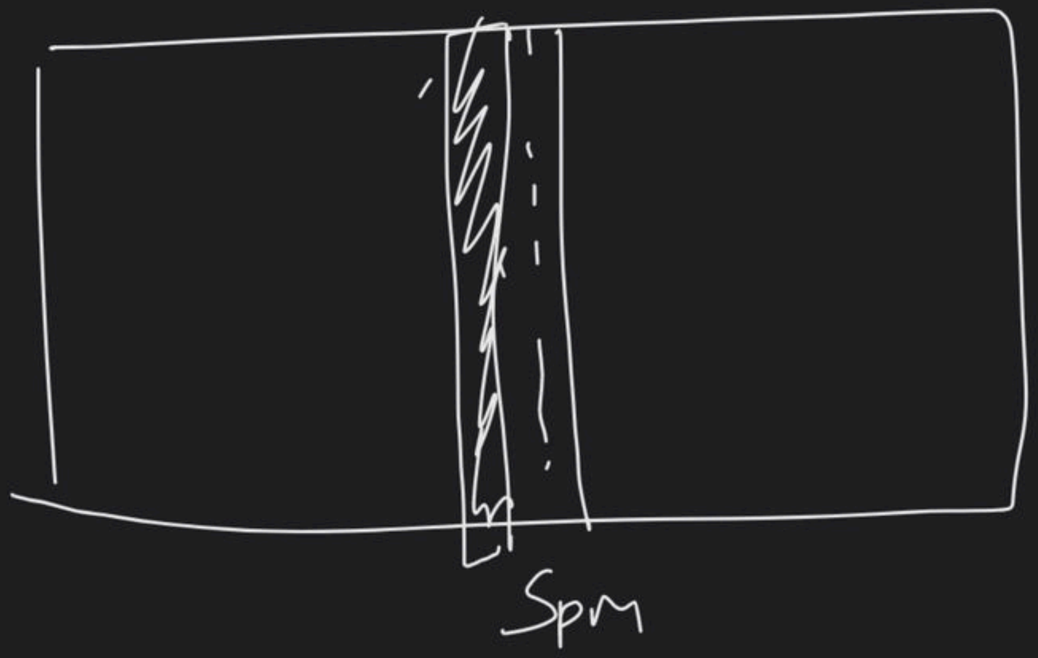


$$(P_{He})_L = (P_{He})_R$$

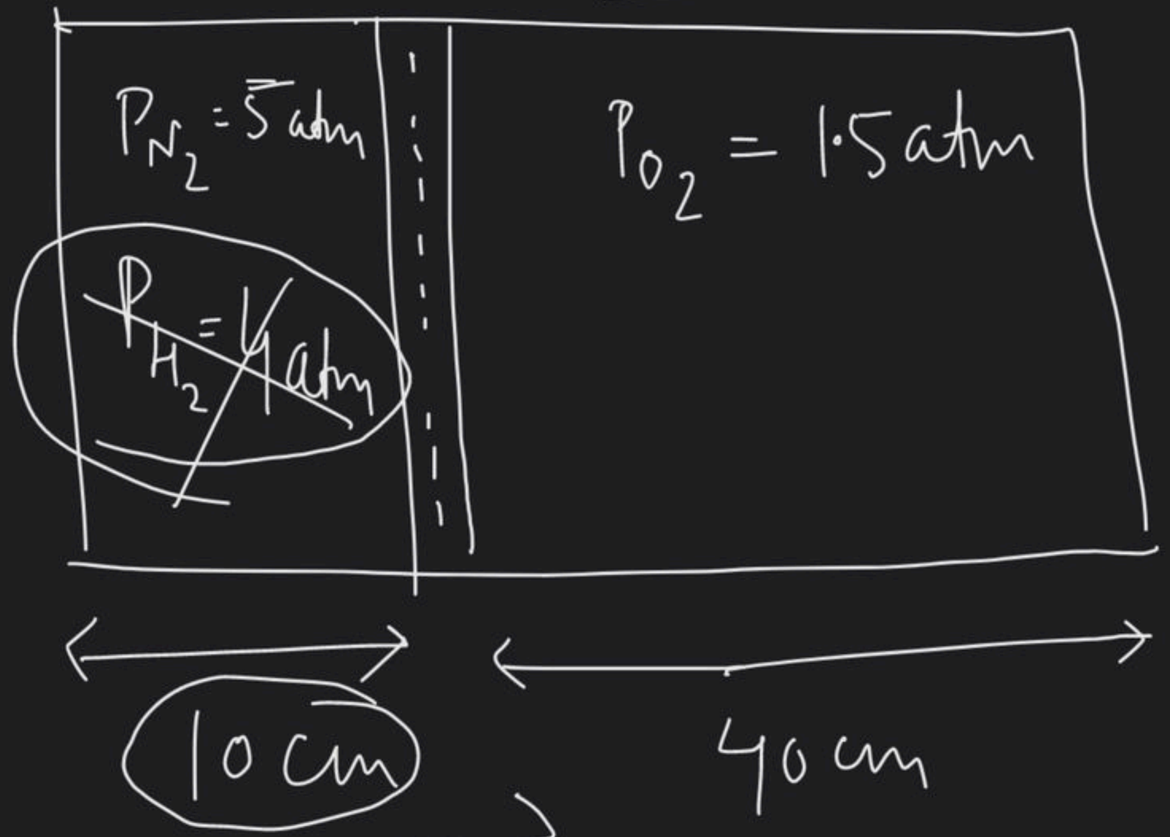
Since SPM is movable

$$(P_{Total})_L = (P_{Total})_R$$

$$P_{O_2} + P_{He} = P_{N_2} + P_{He}$$


Spm

movable SPM



H_2

$4 \times 10 = P_{H_2} \times 50$

$P_{H_2} = 0.8$

find $P_{O_2} =$

$P_{N_2} =$

$P_{H_2} =$

Δ position of SPM =

$$5 \times 10 + 1.5 \times 40 = P \times 50$$

$$2.2 = 11/5 = P_{N_2} = P_{O_2}$$

(3)

$$250/11$$

$$5 \times 10 + 1.5 \times 40 + 4 \times 10 = P \times 50$$

$$3 = P_{Total}$$

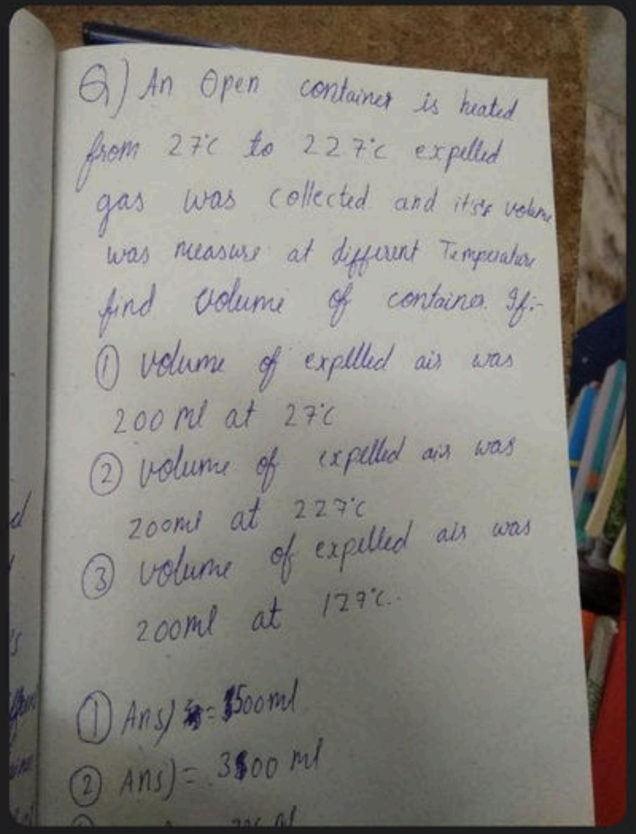
O - II 1, 8, 9, 10 - 13, 17 - 18

S - II 5, 6, 7

Question

from Sai

Sir yeh mera doubt hae yae mujjae samaj nahi aaya tho mainae ask your doubt mae bejha tho mujhe doosrae answers aarahae hae please explain this sir



$P_{O_2} = ?$

(A) 1.2 atm

(B) 2.2 atm

(C) 2.8 atm

(D) None