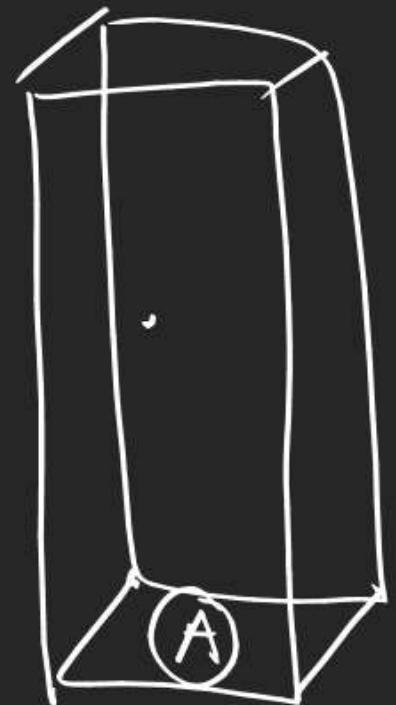
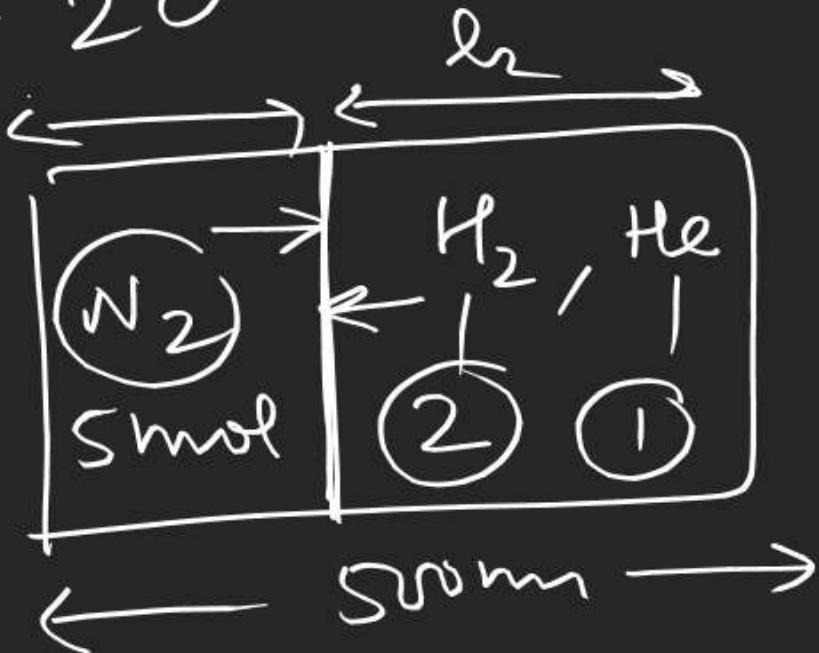


Ideal Gas

20-22, 24

16 - 20

(22)



(A) X height

$$P_{N_2} = P_{H_2} + P_{He}$$

$$\frac{n_{N_2}RT}{A \times l_1} = \frac{n_{H_2}RT}{A \times l_2} + \frac{n_{He}RT}{A \times l_2}$$

$$\frac{n_{N_2}}{l_1} = \frac{n_{H_2}}{l_2} + \frac{n_{He}}{l_2}$$

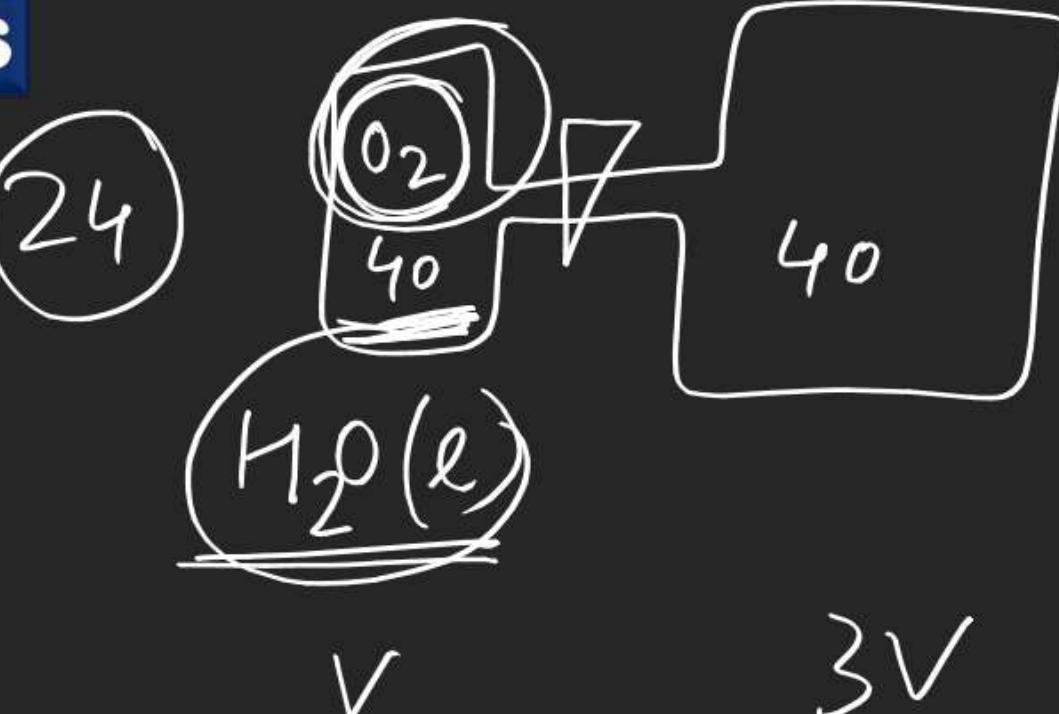
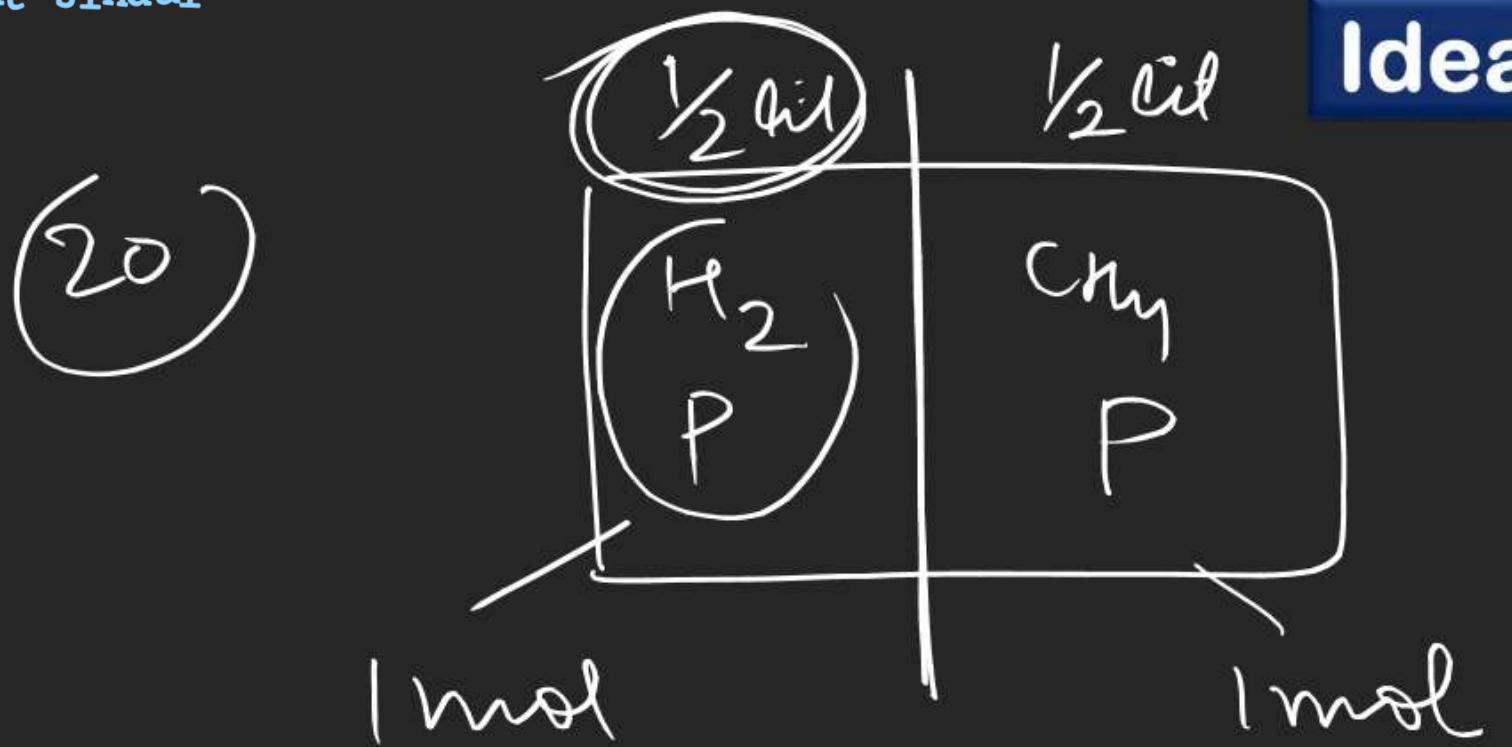
$$\frac{s \cancel{l_1}}{l_1} = \frac{3}{l_2}$$

$$\frac{l_1}{l_2} = \frac{s}{3}$$

$$l_1 = \frac{5}{8} \times 500$$

$$l_2 = \frac{3}{8} \times 500$$

Ideal Gas



1 mol

V

$3V$

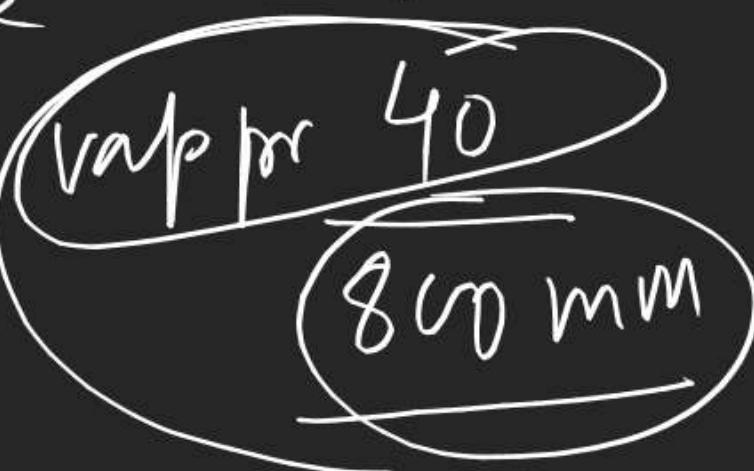
$$P_{\text{H}_2} = P/2$$

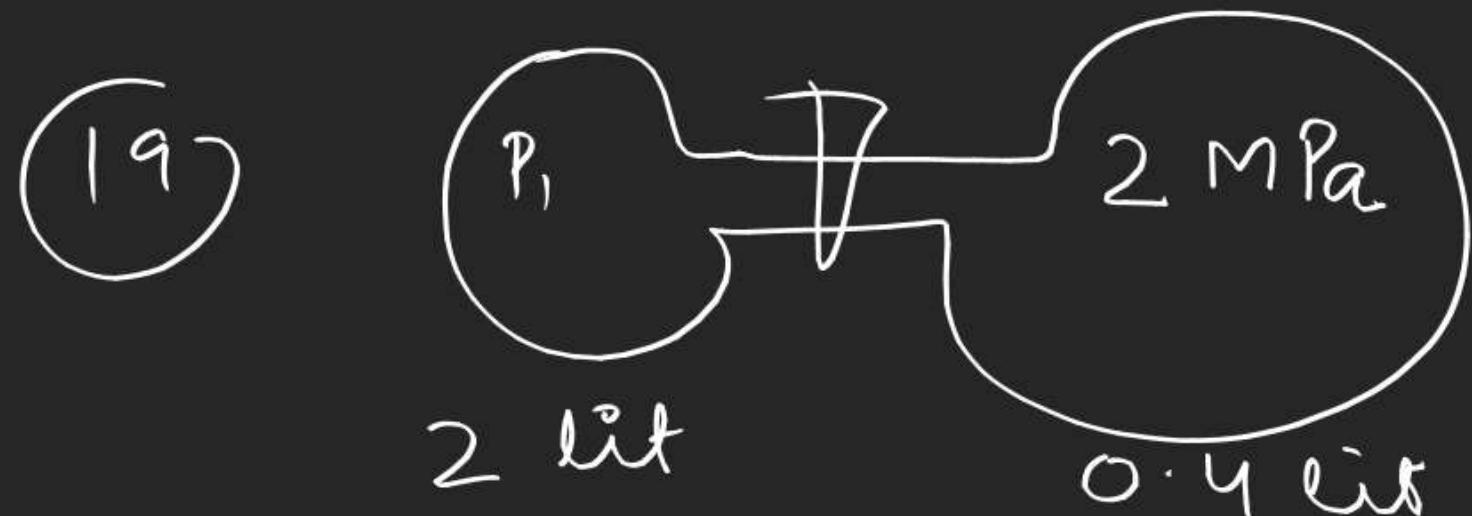
$$P_{\text{C}_{\text{air}}} = P/2$$

$$840 \text{ mm}$$

$$8w \times V = P \times 4V$$

$$2w = P$$

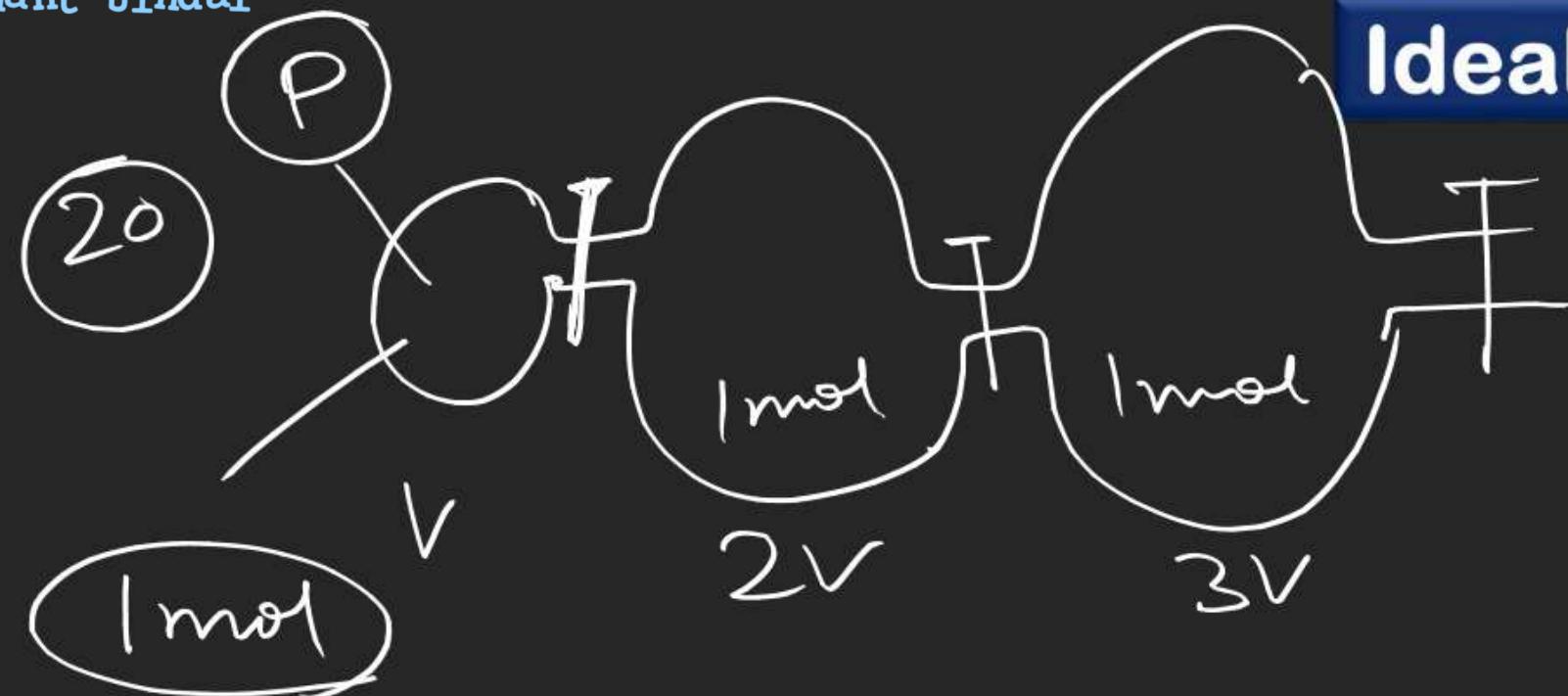




$$\frac{7}{6} \text{ MPa} = \frac{7}{6} \times 10^6 \text{ Pa}$$

$$P_1 \times 2 + 2 \times 0.4 = P_f \times 2.4$$

Ideal Gas



$$\eta = \frac{P_f V}{RT} + \frac{P_f (2V)}{RT} + \frac{P_f (3V)}{RT} - \dots$$

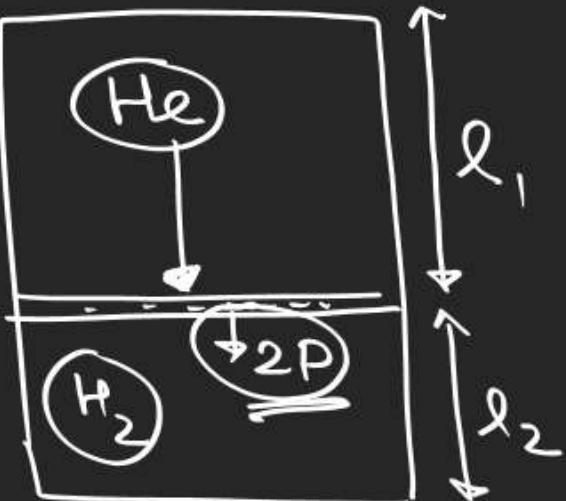
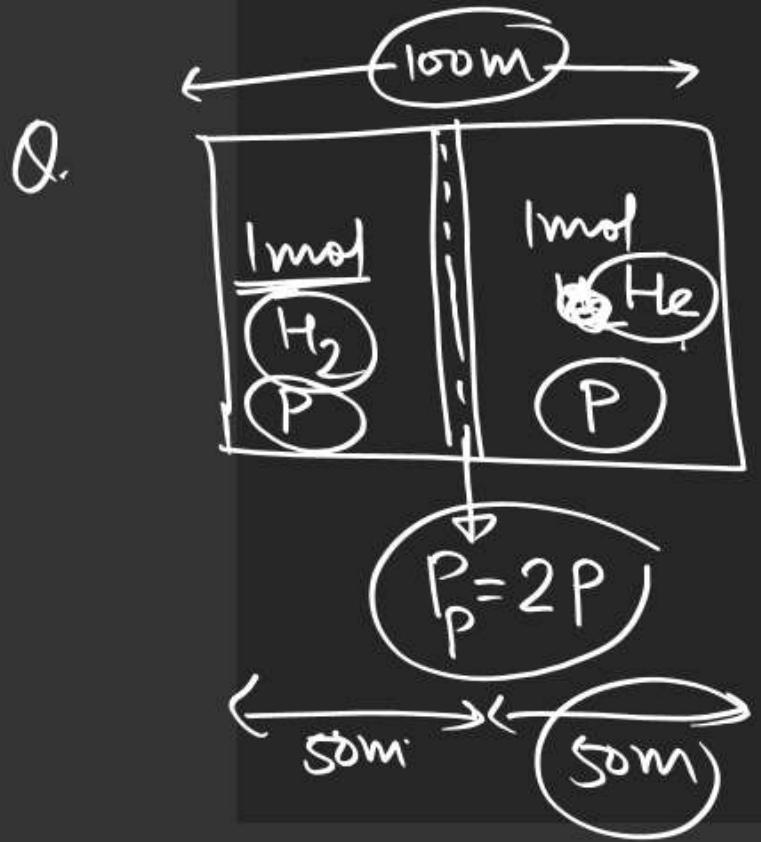
$$n = \frac{P_f V}{RT} (1 + 2 + 3 + \dots + n)$$

$$P_f = \frac{nRT}{V}$$

$$PV = RT$$

$$\frac{V}{RT} = \frac{1}{P}$$

$$P_f = \frac{2P}{n+1}$$



$$\begin{aligned}
 P \times 50 &= P_{He} \times l_1 \\
 P \times 50 &= P_{H_2} \times l_2 \\
 \frac{P \times 50}{l_1} + 2P &= \frac{P \times 50}{l_2} \\
 \frac{50}{l_1} + 2 &= \frac{50}{100 - l_1} \\
 2 &= 50 \left[\frac{1}{100 - l_1} - \frac{1}{l_1} \right] \\
 2 &= 50 \left[\frac{2l_1 - 100}{(100 - l_1)l_1} \right]
 \end{aligned}$$

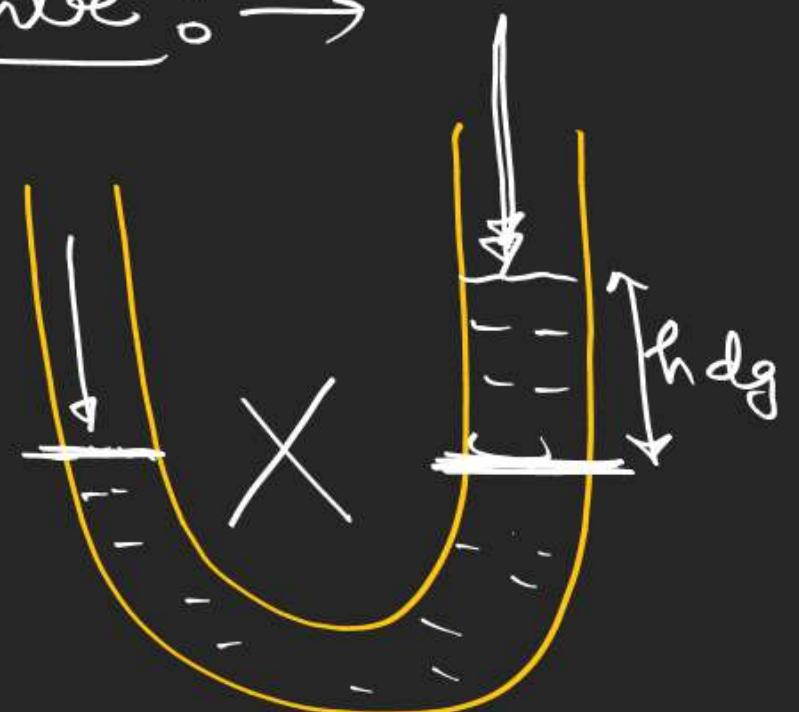
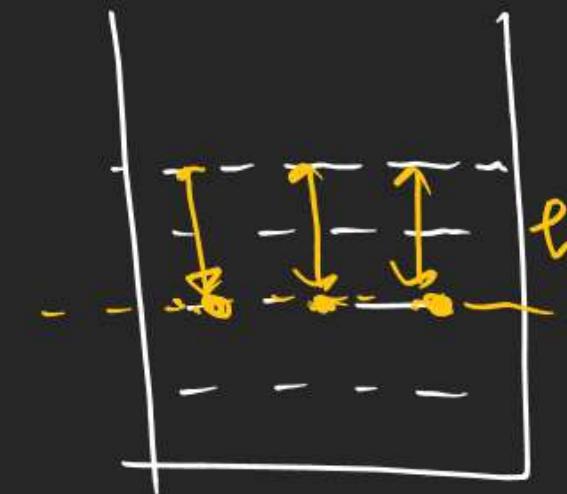
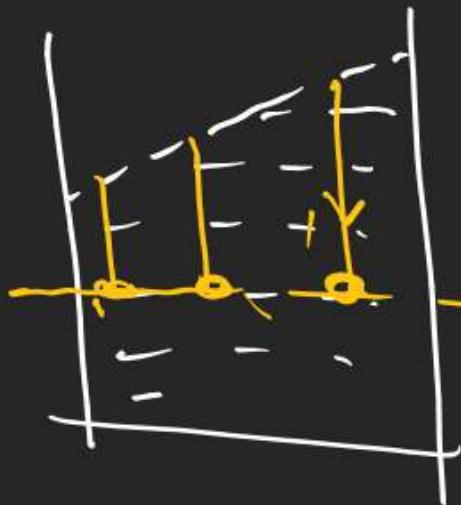
$\ell = \frac{50 + 50\sqrt{5}}{2}$
 $l_1 = 25(1 + \sqrt{5})$

$$l_1 = \frac{+50 \pm \sqrt{2500 + 4 \times 2500}}{2}$$

Ideal Gas

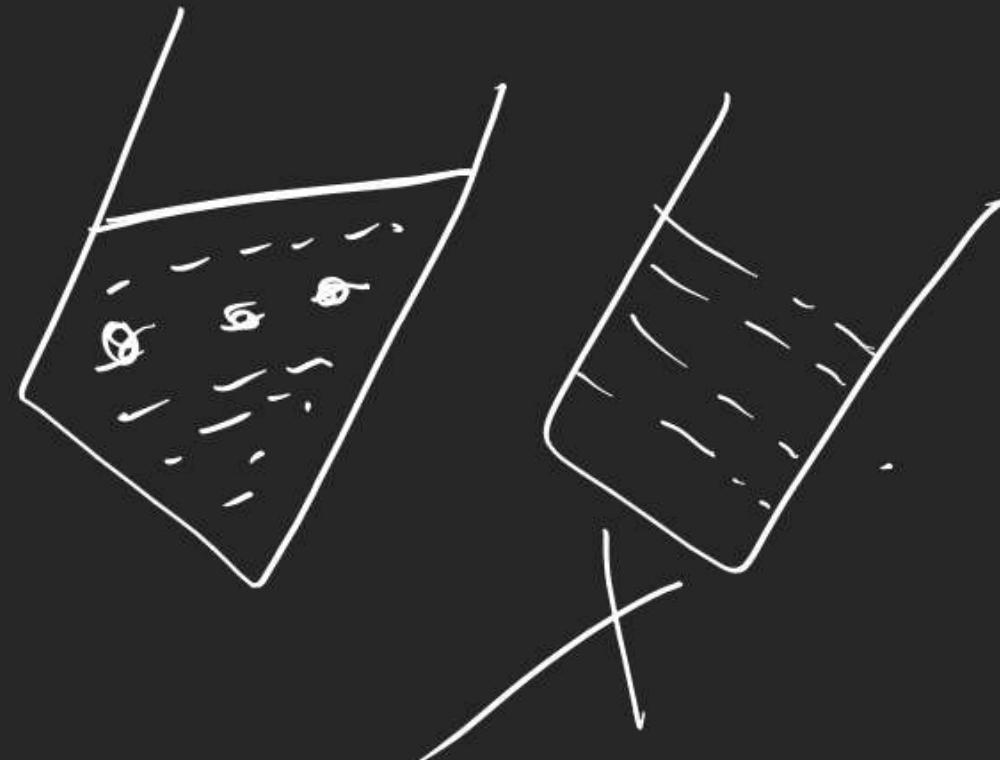
Problems with

Mercury tube : →



A diagram of a U-tube manometer with a circular cross-section. A vertical dashed line extends from the top of the tube down to the bottom, labeled h_{dg} . To the right, there is a vertical column with a circle labeled d at the top and a circle labeled h at the bottom. Below this, a formula is written:

$$P = \frac{mg}{A} = \frac{(A \times h) \times d \times g}{A}$$



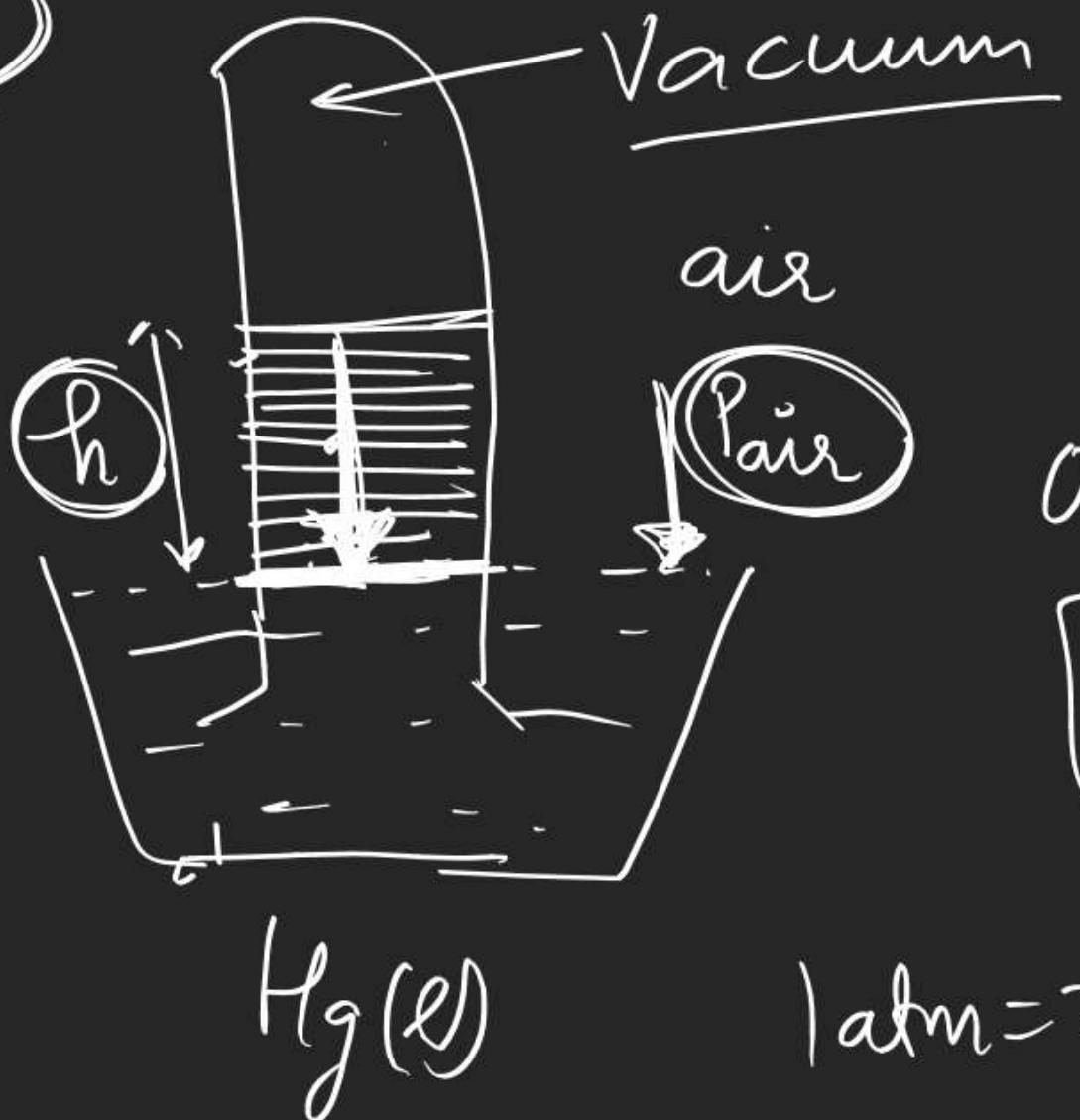
A diagram of a U-tube manometer where both legs are tilted at an angle. The left leg is tilted upwards to the left, and the right leg is tilted upwards to the right. Both legs have horizontal sections at the top and vertical sections below. They meet at a common bottom point. A vertical dashed line extends from the top of the tube down to the bottom, labeled h_{dg} .

Ideal Gas

density = 13.6 gm/ml Barometer

$$760 \text{ mm} = 76 \text{ cm} = \underline{\underline{0.76 \text{ m}}}$$

$$\underline{\underline{760 \text{ mm of Hg}}}$$



$$h dg = P_{\text{air}} = \underline{\underline{P_{\text{atm}}}}$$

$$0.76 \text{ m} \times 13.6 \times 10^3 \frac{\text{kg}}{\text{m}^3} \times 9.81 \frac{\text{N}}{\text{kg sec}^2} = \underline{\underline{1.01325 \times 10^5 \text{ Pa}}} = \underline{\underline{P_{\text{atm}}}}$$

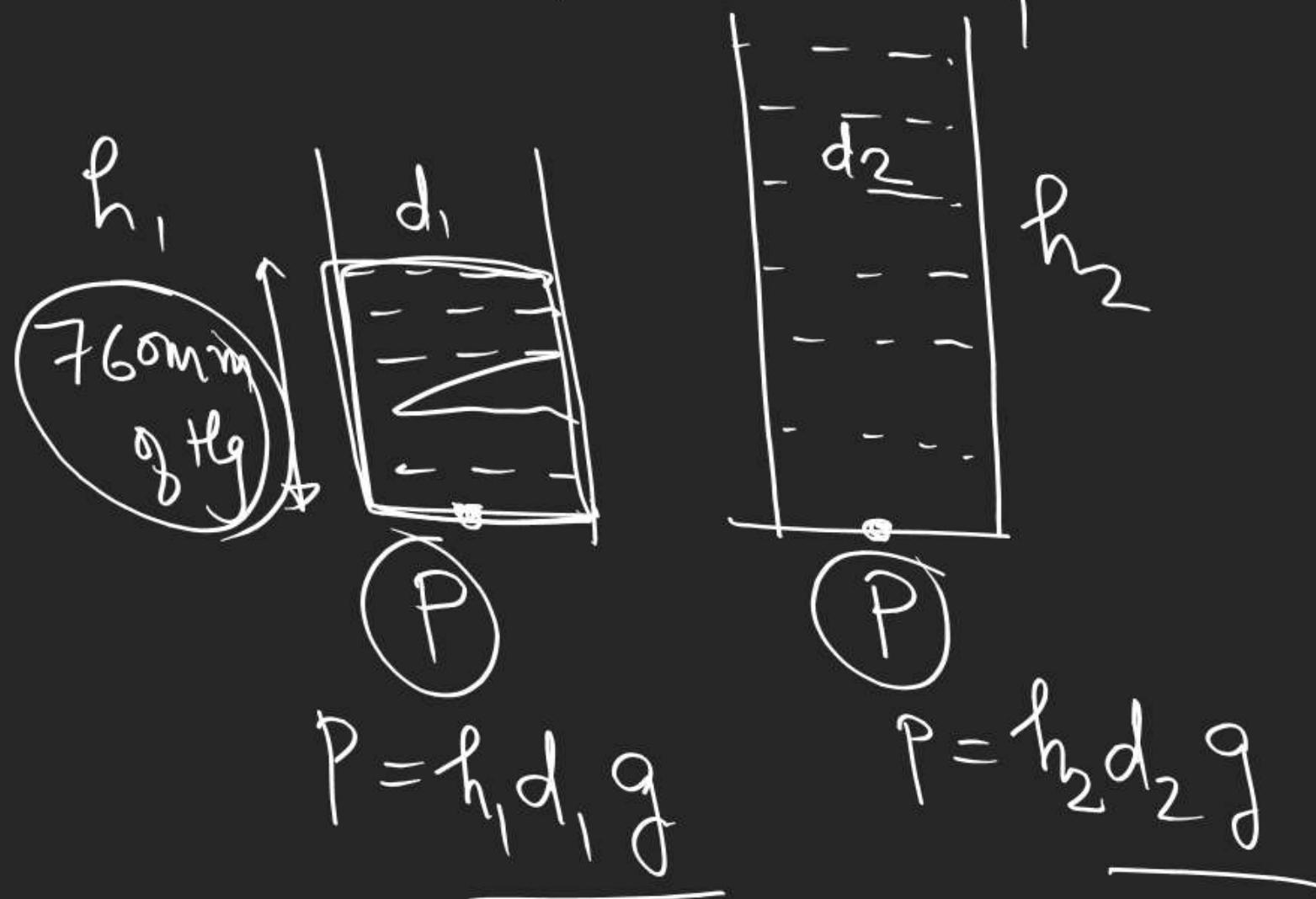
$$= 1 \text{ atm}$$

$$1 \text{ atm} = \underline{\underline{760 \text{ mm of Hg}}} = \underline{\underline{760 \text{ torr}}}$$

$$= 760 \text{ torr}$$

Ideal Gas

Q. Calculate the height of water column which will exert pressure equal to 1 atm or 760 mm of Hg



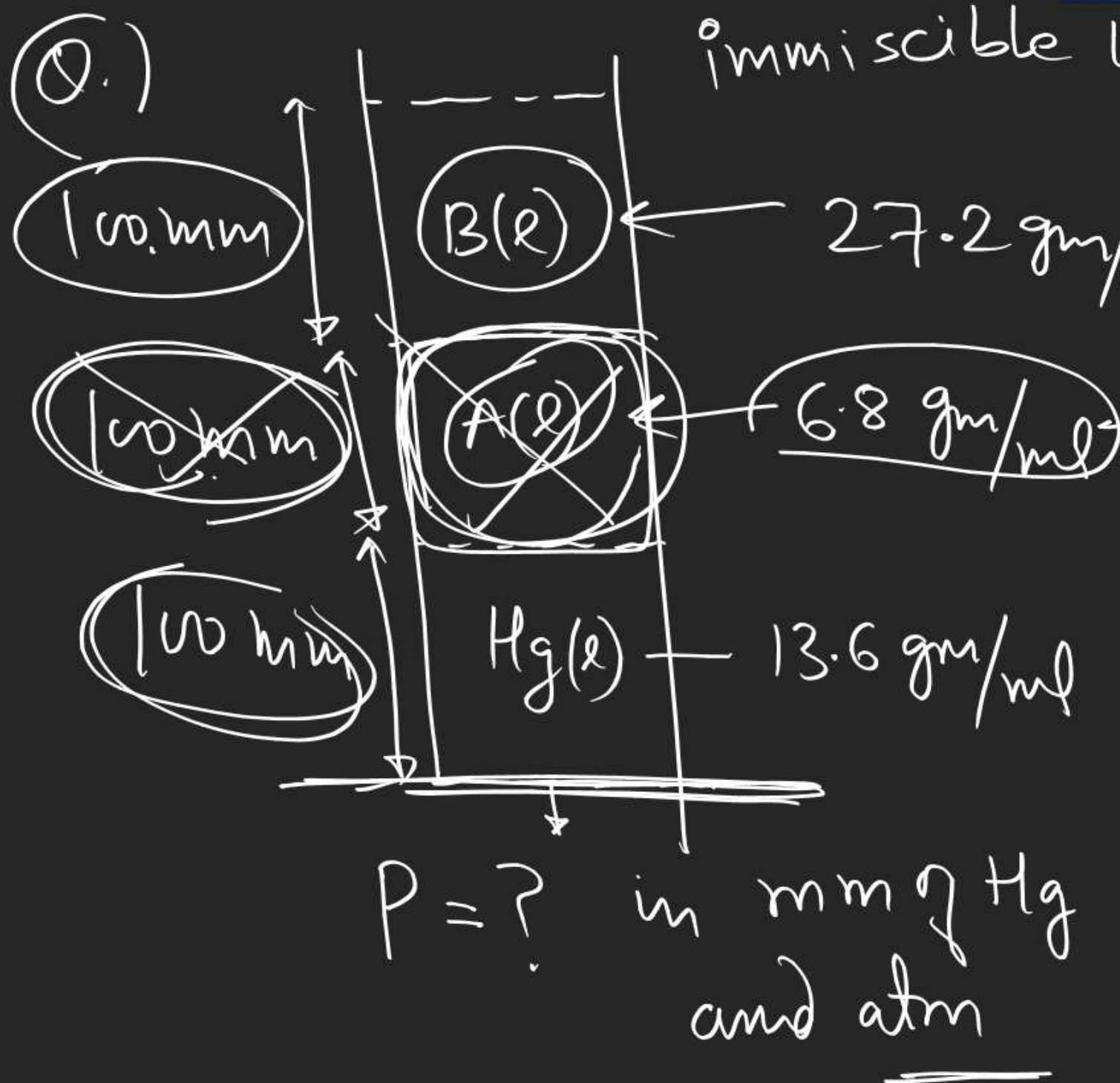
$$h_1 d_1 = h_2 d_2$$

$$\frac{760\text{mm} \times 13.6\text{gm/ml}}{1\text{gm/m}} = h$$

$$10336\text{mm} = h$$

$$10.336\text{m of H}_2\text{O} = h$$

Ideal Gas



$$100 \times 27.2 = h \times 13.6$$

$$200 \text{ mm} = h$$

$$h_2 d_2 g = 100 \times 6.8 = h \times 13.6$$

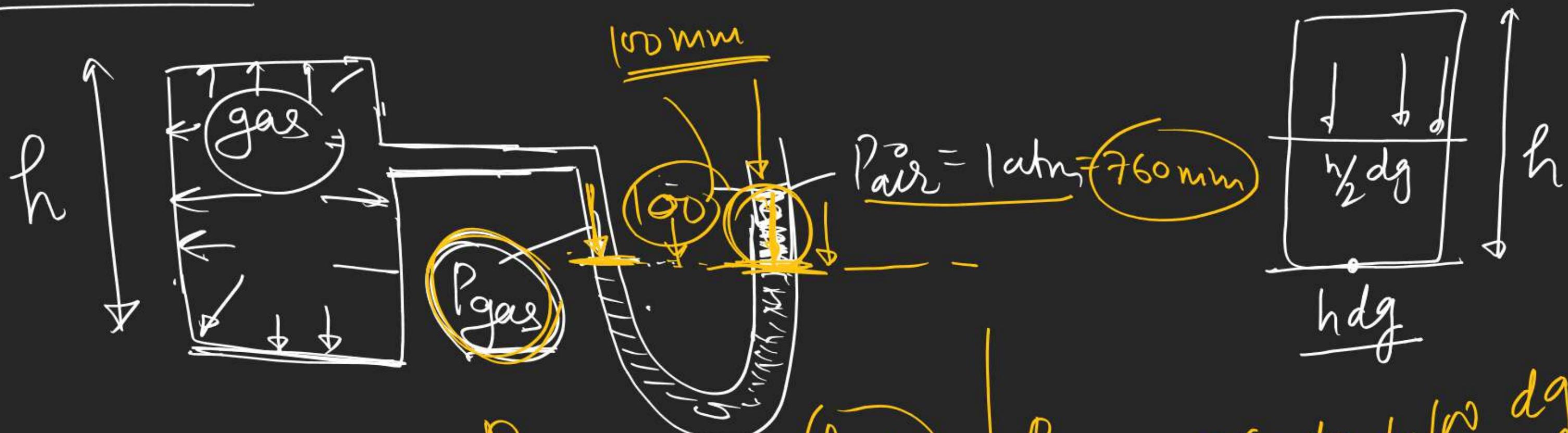
$$\underline{50 \text{ mm} = h}$$

$$h_1 d_1 g + h_2 d_2 g + h_3 d_3 g = P_{\text{Total}}$$

Ideal Gas

Manometer
Container.

Used to measure the pressure of gas in a

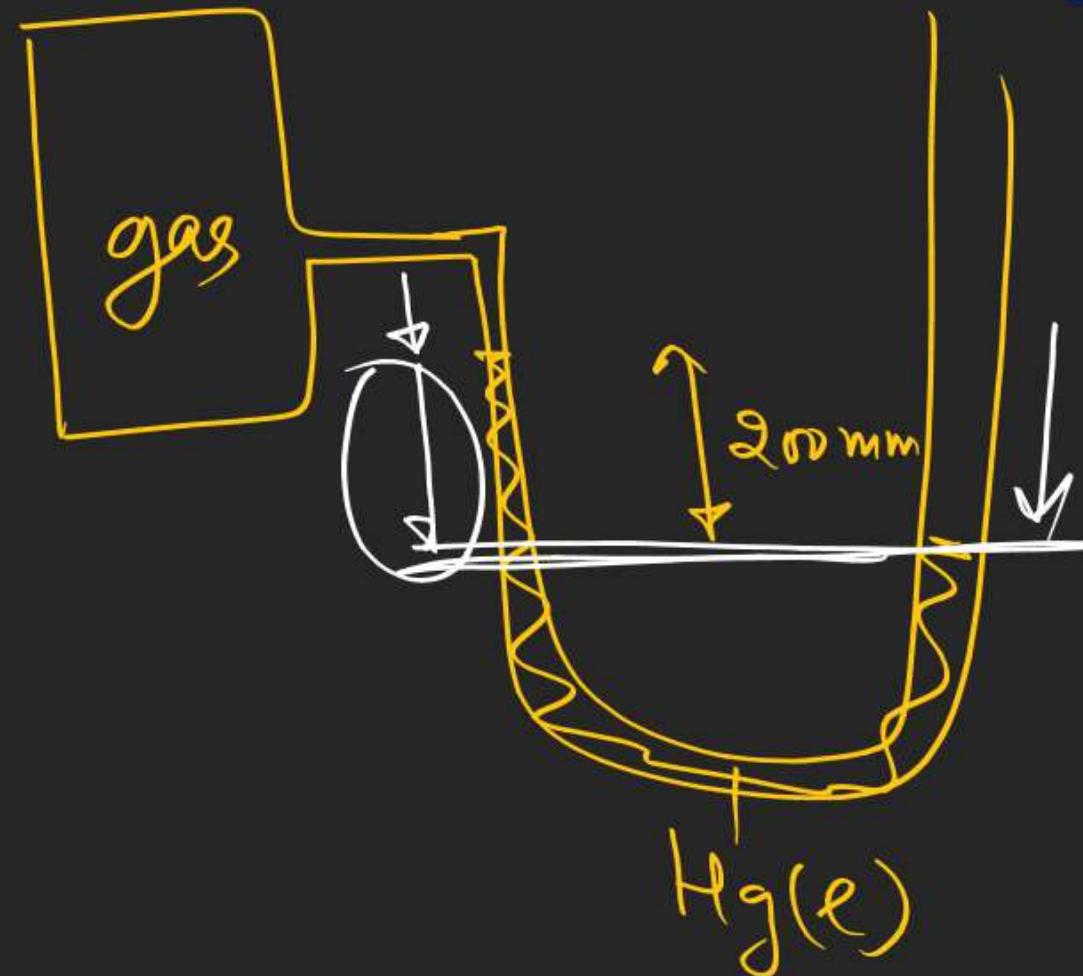


$$P_{\text{gas}} = P_{\text{air}} + (hdg)$$

$$\begin{aligned}
 P_{\text{gas}} &= 760 \text{ dg} + 100 \text{ dg} \\
 &= \underline{\underline{860}} \text{ dg}
 \end{aligned}$$

Ideal Gas

Q.



$$P_{\text{gas}} = ?$$

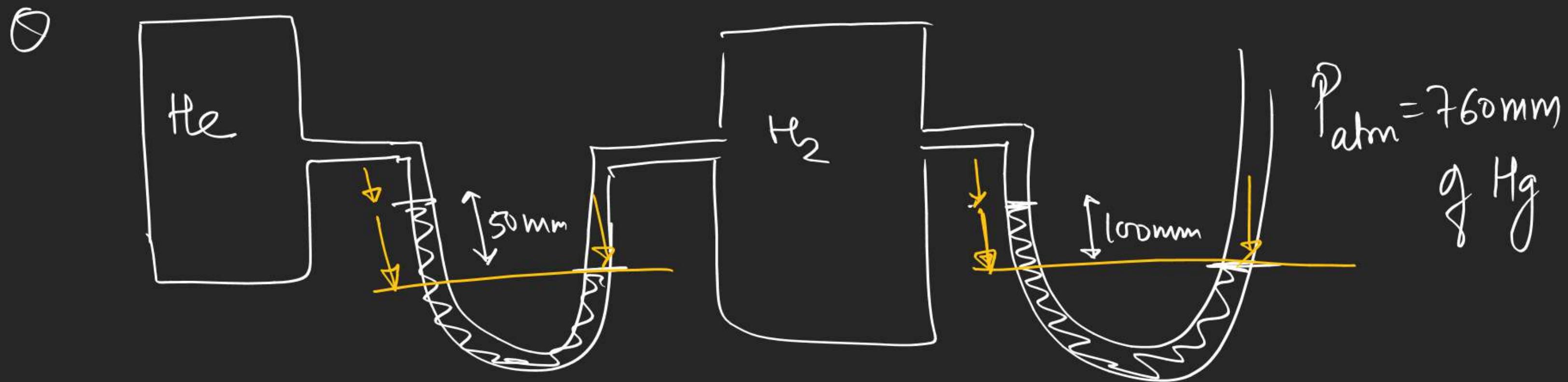
$$P_{\text{atm}} = 760 \text{ mm of Hg}$$

$$P_{\text{gas}} + 200 = P_{\text{atm}}$$

$$P_{\text{gas}} + 200 = 760$$

$$P_{\text{gas}} = 560 \text{ mm of Hg}$$

Ideal Gas



$$P_{He} + 50 = P_{H_2}$$

$$P_{He} + 50 = 660$$

$$\underline{P_{He} = 610}$$

$$P_{H_2} + 100 = 760$$

$$P_{H_2} = 660$$

Ideal Gas

0-T 16 - 19, 23

NSEC

S-T 13 - 15, 21

0-II 1-3, 16-18