Concept of Pressure. (Slide 2).

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Laws of Pressure

① Pressure increases with the depth
$P \propto h$

② Two points at the same level will experience same Pressure
[Press. at same Level is equal] ★★

- Pressure = $\frac{\text{force}}{\text{Area}}$

$P = \frac{F}{A}$ or $P = \frac{W}{A}$ (units $N m^{-2}$)

- Pressure = $\rho g h$ ρ = density
derivation is REQ g = acc.
h = depth

$P = \frac{F}{A}$

$P = \frac{mg}{A}$

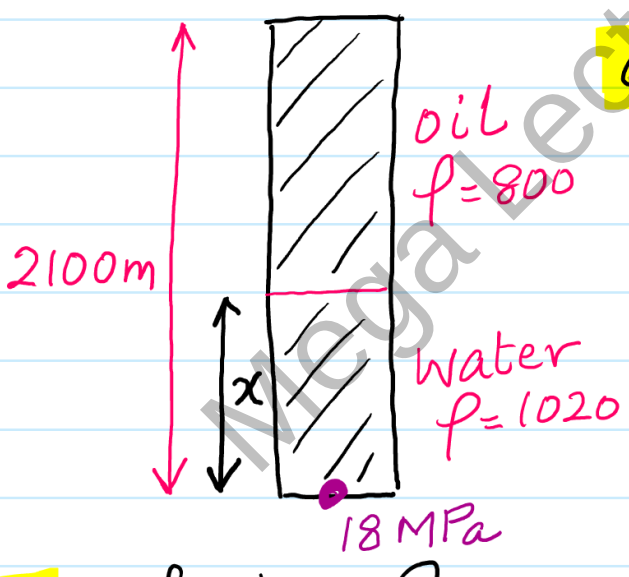
$P = \frac{\text{density} \times \text{Vol} \times g}{A}$

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

$P = \rho g h$.

P_{AT} = 760 mm of Mercury
OR
$P_{AT} = 1.01 \times 10^5$ Pa.

Ex.1



closed

P_{AT} = ignored

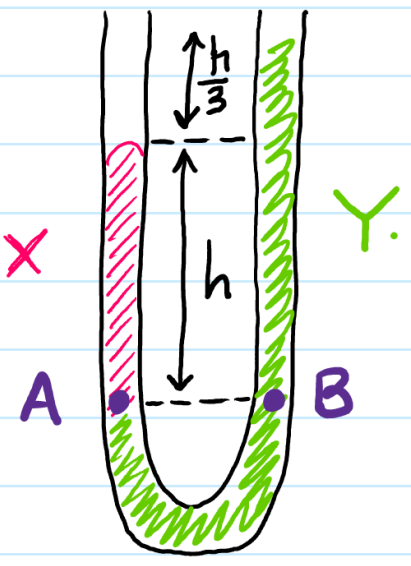
find x if the Pressure at the base of the Tank = 18 MPa.

$P_{base} = P_{water} + P_{OIL}$

$18 \times 10^6 = (1020)(9.81)(x) + (800)(9.81)(2100 - x)$

$x = 704$ m

Ex.2



Liq. columns at rest. Use Pressure concept to calculate ratio of $\frac{\text{density of X}}{\text{density of Y}}$?

$P_A = P_B$

$P_X + P_{AT} = P_Y + P_{AT}$

$\rho_X \cdot g \cdot (h) = \rho_Y \cdot g \left(h + \frac{h}{3}\right)$

$\frac{\rho_X}{\rho_Y} = \frac{4}{3}$ Ans.