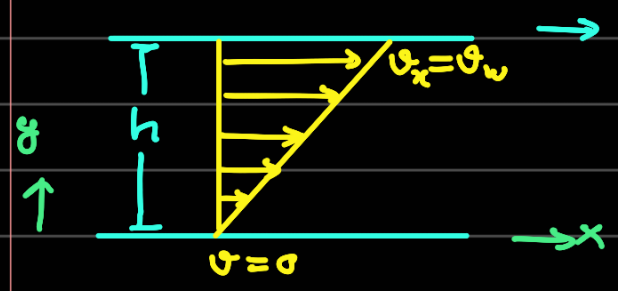
Day-4



$$v_x = v_w\left(\frac{y}{h}\right)$$

$$\tau_{xy} = \mu \frac{dv_x}{dy}$$

For Newtonian fluid

constitutive relation (based on observation)

$$\vec{v} = \begin{bmatrix} v_x \\ 0 \\ 0 \end{bmatrix}$$

1D flow

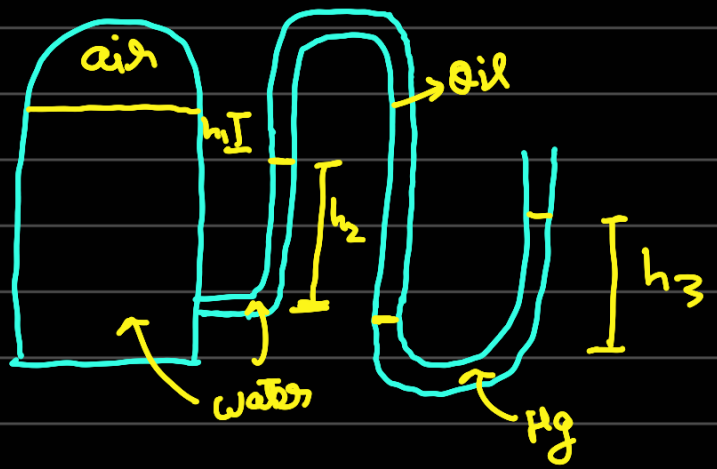
$\frac{dv_x}{dy}$ → Strain rate / velocity gradient

μ → Viscosity coefficient

If not 1D flow, then

$$\tau_{xy} = \mu\left[\frac{\partial v_x}{\partial y} + \frac{\partial v_y}{\partial x}\right]$$

→

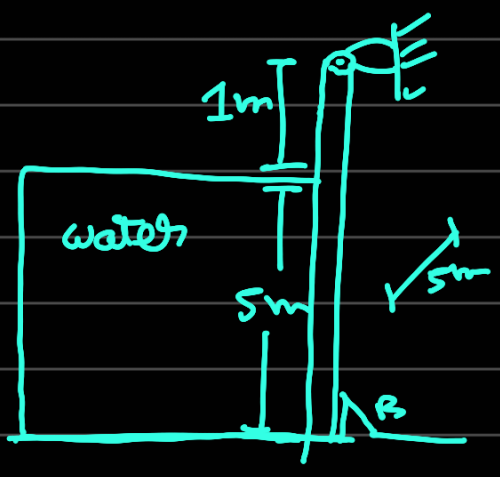


Find Pair.

Ans) $P_{air} + 850 \times 10 \times 0.1$

$+ 1000 \times 10 \times 0.2 = 85600 + 13600 \times 10 \times 0.3$

→



Find F_B.

→ $\vec{v}(\vec{x}) = \begin{bmatrix} Ax^2y \\ Bxy^2 \\ 0 \end{bmatrix}$ $(A = 2, B = 1)$

Streamline equation?

Ans) $\frac{dy}{dx} = \frac{By}{Ax} = \frac{y}{2x}$ $(x, y \neq 0)$

$\Rightarrow \ln|y| = \frac{1}{2}\ln|x| + \ln C$

$\Rightarrow y = C\sqrt{x}$ $(C > 0)$