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Section : B.

Subject : Flurd machanics.

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Q.No 1:-

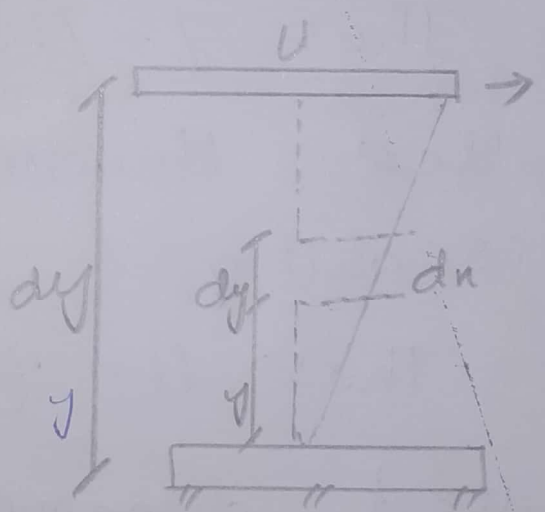
Part a. **Viscosity:-**

It is the property of fluid which it imparts resistance of fluid motion by offering resistance to fluid motion movement of one layer over another.

unit μ ($N \cdot S/m^2$) or (kg/ms)

Newton equation of viscosity:-

According Law



Now consider tow Parallel plates placed at distance "y" and Space b/w is filled with fluid. Lower surface is assumed to

be stationary while upper moved with velocity U - Thus

$$F \propto \frac{AU}{y}$$

or

$$F = \frac{\mu AU}{y} \text{ or } F/A = \frac{\mu U}{y}$$

Thus $$\tau = \frac{\mu U}{y}$$

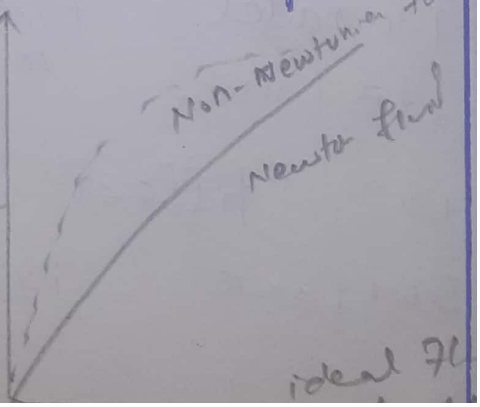
for dy, The velocity with be dU.

Thus $\tau = \mu \frac{dU}{dy}$. Thus is called Newton equation of viscosity.

Thus $\mu = \tau / dU/dy$ - This is called dynamic coefficient of velocity as absolute viscosity.

Ided fluid with no viscosity is represented by horizenal axis.

Unit "$\frac{N \cdot S}{m^2}$"



Vari B

Density:-

Density of fluid is its mass per unit volumes of fluid.

It is denoted by "ρ" & its unit is kg/m³

Specific weight:-

It is weight per unit volume of fluid. It is represented by gamma & $\gamma = \frac{w}{V}$. It unit is n/m³.

Specific volume:-

It is a volume occupied by unit mass of fluid its unit is m³/kg

$$V = \frac{V}{m} = 1/\rho.$$

Relation b/w Specific weight & Density:-

AS $\gamma = \frac{w}{V}$ where $w = mg$

Thus $\gamma = \frac{mg}{V}$ As we have $\frac{m}{V} = \rho$

Thus $\gamma = \rho \times g$

or $\rho = \kappa$.

Part 2

C

Given data:-

Specific volume of gas $V = 0.72 \, m^3/kg$

Required data:-

Specific weight in N/m^2 = ?

Solution:-

As we know that

$V = 1/\rho$

So density "ρ" $= 1/V$

$\rho = 1/0.72$

$\rho = 1.389 \, kg/m^3$.

Specific weight "w" $= \rho \times g$

$w = 1.389 \times 9.8$

$w = 13.62 \, N/m^2$

Q. No = 2 :-

a Pressure :-

The force applied perpendicular to the surface of an object per unit area over which that force is distributed.

SI base unit $1 N/m^2, 1 kg/(m \cdot s^2)$.

SI unit Pascal.

formula :- $P = F/A$.

Absolute pressure :-

Absolute pressure that is relative to the zero pressure in the empty air-free space to the universe. This refrence pressure is the ideal or absolute vacum. it is denoted with the subscript "abs" P_{abs}.

Gauge pressure:-

The gauge pressure is defined as the difference b/w an absolute pressure and the prevailing atmospheric pressure. it is denoted with subscript "e": Pe and is calculated as follows:

$$P_e = P_{abs} - P_{amb}.$$

B

Given data:-

Length $L = 1500mm = 1.5m$

Breadth $b = 1500mm = 1.5m$

Depth $h = 7936 = 7.936m$

unit weigh of $H_2O = 9.81 kn/m^3$

Required data:-

Net pressure $P = ?$

Location of force ~~of~~ at water level drops half of depth find P & location of force

Sol

Net pressure:-

$$p = \gamma h$$

$$= 9.81 \times 7.936$$

$$= \boxed{77.8521 \text{ kN/m}^2}$$

Force Application (centroid)

$$\bar{y} = h/3$$

$$\bar{y} = \underline{7.936}$$

$$\boxed{\bar{y} = 2.6453}$$

Halt Depth:-

pressure at half depth

$$p' = \gamma h/2$$

$$p' = 9.81 \times \frac{7.936}{2}$$

$$\boxed{p' = 38.92608}$$

Centroid:-

$$\bar{y} = h/2 \times 1/3$$

$$\boxed{\bar{y} = 1.323 \text{m}}$$