Question = 1 **IDNO:-7913**

(a)

Viscosity: viscosity is a property of fluid which opposes the relative motion b/w the two surfaces of the fluid have dif viscosity depends upon the inter molecular force in fluid.

e.g: Honey is more viscus than water.

Newton Equation of viscosity: It's state that'; "the share stress in a flowing of fluid is directly proportional to the rate of shear strain."

Mathematically:

$$\tau \propto \frac{du}{dy}$$

$\tau \rightarrow$ shear stress

$$\tau \propto \frac{du}{dy}$$

Change the sign of $\propto$

$$\tau = \mu \frac{du}{dy}$$

(P.T.O)

(P.T.O)

μ = viscosity , dynamic viscosty

$$\mu = \mu \frac{du}{dy}$$

The fluid which follows newton law of viscosity are called "Newton's fluid".

Part "B"

Desity :- Property of fluid density can be define as" "Mass per unit volume of a fluid

$$\text{Density} = \frac{\text{mass}}{\text{Volume}}$$

$$\rho = m/V = kg/m^3$$

Specific Weight :- " The specific weight is the weight prossessed by unit volume of a fluid
Denoted by "w"

$$w = W/V = N/m^3.$$

Relation between Density & specific weight.

as $w = W/V$

we know that $W = mg$

$$w = \frac{mg}{V}$$

$w = \rho g$ ∵ $\rho = m/V$

ρ is a density

Specific volume: Property of fluid.

specific volume is the volume of fluid (V) occupied per unit mass (m).

It is recciprocal of density

specific volume $= v = V/m = \frac{m^3}{kg}$

$$v = \frac{1}{\rho}$$

Part (C) :-

Given data:

Specific volume of gas $v = 0.72 m^2/kg$

Required data:

Specific weight in $N/m^3 = ?$

Solution:

As we know that,

$v = 1/\rho$

So density "ρ" $= 1/v$

$= 1/0.72$

$= 1.389\ kg/m^3$

Specific weight "ω" $= \rho \times g$

$= 1.389 \times 9.8$

$= \boxed{13.62\ N/m^3}$

P=5

Q No 2

(a) Define pressure? What is atusulate and guage pressure?

(Ans):

Pressure: Pressure is define as "The force applied perpendicular to the surface of an object per unit area over which that force is disturbuted".

Unit: Pascal is the unit of pressure.

Gauge pressure: Gauge pressure is the pressure relative to atmospheric pressure. Gauge pressure is positive for pressure above atmospheric and negative for pressure below it.

Mathematically: Total pressure or obsoulute pressure is that the sum of gauge pressure and atmospheric pressure

(P.T.O)

$P_{abs} = P_g + P_{atm}$

Where,

P_{ab} = Absolute pressure

P_g = Gauge pressure

P_{atm} = Atmospheric pressure

Absolute pressure:

It is the total pressure at a point in a fluid equally the sum of gauge pressure and the atmospheric pressure:

Mathematical form:

$$P_{abs} = P_g + P_{atm}$$

e.g: for example of your fire gauge reads 39psi punds per square inch then the absolute pressure is 39psi plus 14.7 Psi as 53.7psi, (equalent to 3.7[illegible]).

Q2 (b) part

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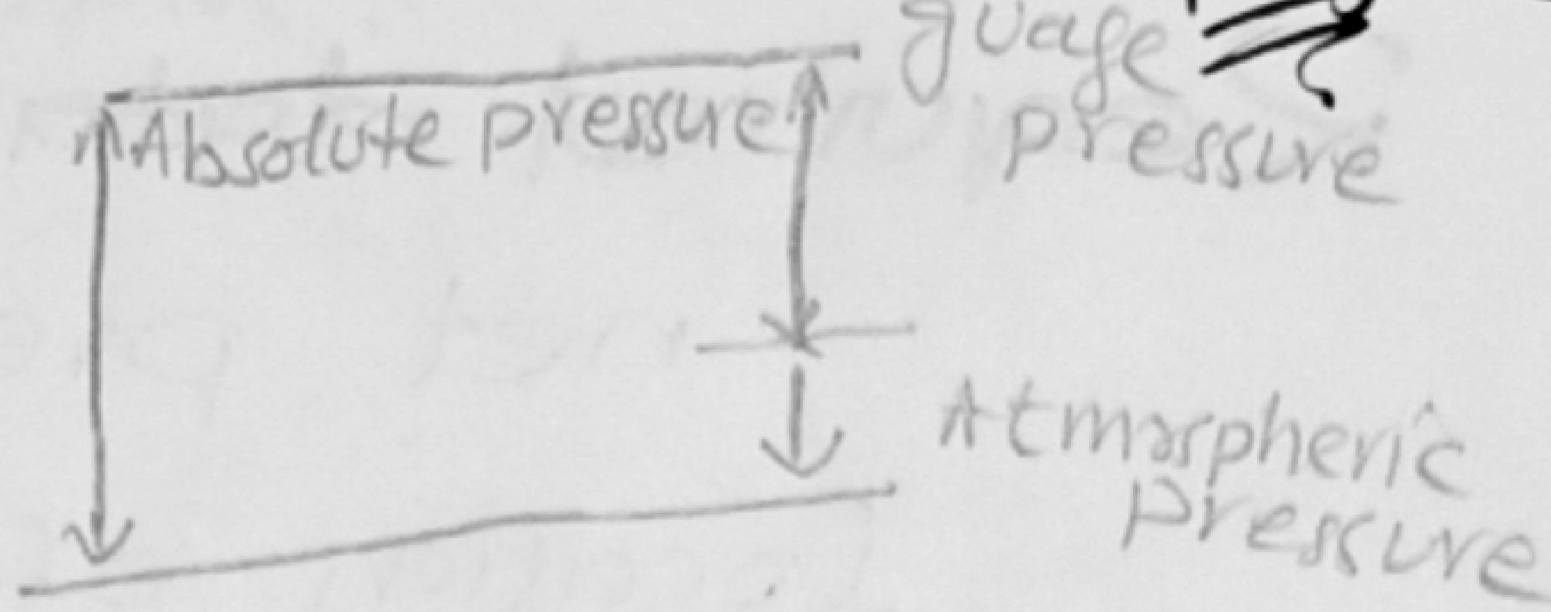

A water tank having dimensions of 1500mm x 1500 mm. Depth of water tank is equal to your student ID number in mm. what is the net pressure on the walls of water tank,
find the location of forced appxication of water tank level drop to the half of the depth, what will be the force and point of appxication of force?

Given data:

length = l = 1500 mm = 1.5m

Breadth = b = 1500mm = 1.5m

Depth = h = 7913mm = 7.913 m

unit weight of water = 9.81 kN/m3

(P.T.O)

P=3 ~

Required data:

net pressure = P = ?

location of force = ?

If water level drops half of depth find P as location of force.

Solution

(a) Net pressure

$P = \gamma h$

$P = 9.81 \times 7.913$

$P = 77.5474\ kN/m^2$

(Part B) force applied centriod:

$\bar{y} = h/3$

$y' = \frac{7.913}{3}$

$y' = \boxed{2.637\ m}$

half Depth :-

pressure at half depth = $p' = \gamma h/2$

$$p' = 9.81 \times \frac{7.913}{2}$$

$$p' = 38.94 \text{ KNm}^2$$

Centroid = $y^{-1} = h/2 \times \frac{1}{3}$

$$y^{-1} = \frac{7.913}{2} \times \frac{1}{3}$$

$$y^{-1} = 1.3188 \text{ m}$$