

NAME:

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I.D:

7880

SUB:

FLUID MECHANICS I

INST:

SIR NAHEED.

DEPT:

CIVIL

QUESTION- 1 (2)

①

FLUID MECHANICS:

Fluid mechanics is the branch of physics concerned with the mechanics of fluids (liquids, gases, and plasma) and forces acting on them. It has applications in wide range of disciplines including civil, mechanical, chemical, biomedical engineering. It can be divided into two main branches.

Fluid mechanics

- ① Fluid ~~Statics~~ Statics
- ② Fluid dynamics.

FLUID STATICS:-

(2)

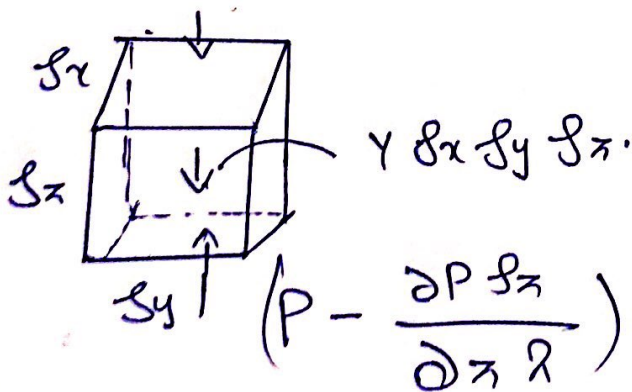
Fluid Statics also known as hydrostatics. It is concerned to fluid at rest and the pressure in a fluid or exerted by a fluid on an immersed body.

The pressure at any point in a fluid is same in every direction.

In continuous fluid with constant density the pressure increases linearly with depth and pressure is the same along horizontal planes.

$$p + \left(\frac{\partial p}{\partial z} \right) \delta x \delta y$$

$$\frac{dp}{dz} = -\gamma = -\rho g$$



constant density

$$p - p_1 = \gamma (z - z_1) = \gamma h.$$

FLUID DYNAMICS:-

(3)

It is the branch of applied science that is concerned with the movement of liquids and gases.

According to American Heritage Dictionary, Fluid dynamics is one of two branches of fluid mechanics, which is it the study of ~~flow~~ fluids and how forces affect them. Other branch is fluid statics.

Fluids can flow steadily or be turbulent. In steady flow fluid passing a given point maintains a steady velocity. For turbulent flow, the speed or direction of flow varies.

(4)

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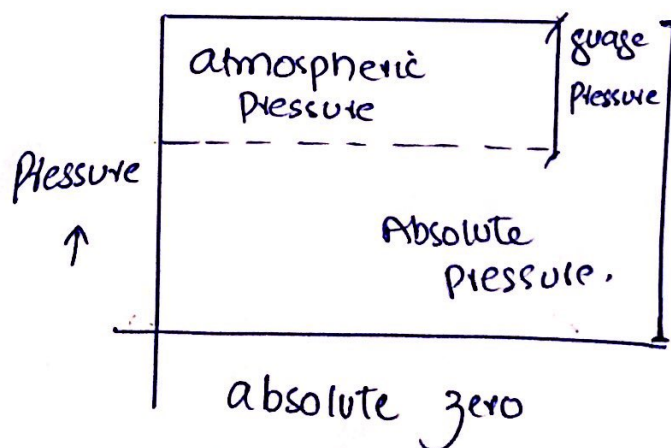
ABSOLUTE AND GAUGE PRESSURE

"If pressure is measured relative to absolute zero, it's called absolute pressure."

"When it is measured relative to atmospheric pressure as base, it is called pressure"

If pressure is below atmospheric it is vacuum.

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



QUESTION- 2.

5

GIVEN DATA:

$$\gamma = \text{Specific weight} = 9810 \text{ N/m}^3$$

$$h = 7880 \text{ mm} = 7.88 \text{ m}$$

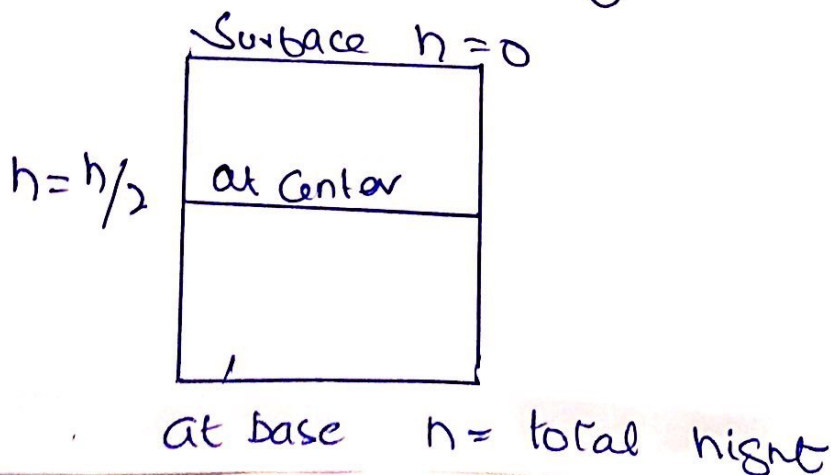
$$\text{Area} = 0.1 \text{ m}^2$$

REQUIRED:

Pressure at Surface of water = ?

Pressure at Center of tank = ?

Pressure at base of tank = ?



SOLUTION:-

(6)

① Pressure at surface of water

$$P = \rho h$$
$$= \rho h_1$$

as on surface of water height is zero

$$= 9810 \times 0$$
$$\Rightarrow 0 \text{ N/m}^2.$$

② Pressure at center

$$P_c = \rho h$$
$$= \rho h/2$$

$$= 9810 \times 7.88/2$$

$$\Rightarrow 38651.4 \text{ N/m}^2.$$

③ Pressure at base of tank.

$$P_B = \rho h$$

$$h = 7.880$$

$$\Rightarrow 9810 \times 7.88 \Rightarrow 77302.8 \text{ N/m}^2.$$