

Homework

① Find pressure due to water at a depth 2m inside it [Given, density of water = 1 g/cm^3 , $= 1000 \text{ kg/m}^3$]

$$[g = 10 \text{ m/s}^2]$$

$$\rightarrow P = h\rho g$$

$$P = 2 \times 1000 \times 10$$

$$P = \boxed{20000 \text{ Pa}}$$

② A circular pillar of area of cross section $6 \times 10^{-3} \text{ m}^2$ supports a weight of 60 kg. Calculate the pressure exerted on the pillar.

$$\rightarrow \text{Area} = 6 \times 10^{-3} \text{ m}^2$$

$$W = 60 \text{ kg} = 60 \times 10 = 600 \text{ N}$$

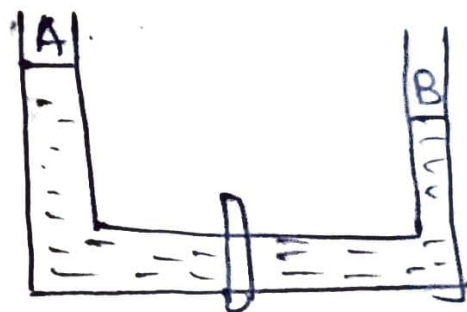
$$P = \frac{F}{A} = \frac{600}{6 \times 10^{-3}}$$

$$= \frac{100 \times 10^2}{6 \times 10^{-3}}$$

$$P = \boxed{10^5 \text{ Pa}} \text{ OR } 10^5 \text{ N/m}^2$$

③ (a) The levels of water, in the two arms of A and B of a U-tube, are shown in diagram. A valve is put in between the two arms. State the direction of flow of water, when this valve is removed, and give the reason for the same.

\rightarrow The water will flow from A to B because water flows from higher level to lower level.



(b) From which hole water travels, the largest distance? why?

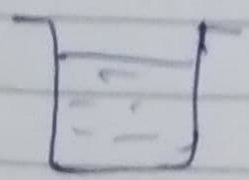
→ hole 'D' will cover largest distance because the further down we go, the greater the weight of liquid, so depth increases



(4) The pressure of the water at the surface of the pond is lower than that at the bottom of the pond.

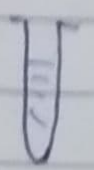
(5) Which is not a factor affecting fluid pressure? → (c) Color of fluid.

(6) Observe the vessels A, B, C, D carefully. Arrange them in the order of decreasing pressure at the bottom of containers.



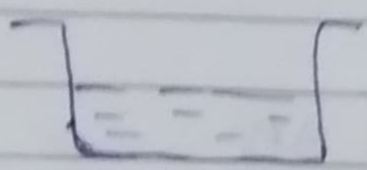
300 ml

A



50 ml

B



500 ml

C



60 ml

D

→ $D > B > A > C$

* The pressure at the base of each vessel is given by ρgh where ρ is a density of water, g is accⁿ due to gravity & h is the height. Pressure at base directly proportional to the height of water level.
 $D > B > A > C$

7) A force of 16 N acts on an area of 50 cm². What is the pressure in pascal?

$$\rightarrow \text{Area} = 50 \text{ cm}^2 = 0.005 \text{ m}^2$$

$$\rightarrow F = 16 \text{ N}$$

$$\rightarrow P = \frac{F}{A} = \frac{16}{0.005} = 3,200 \text{ Pa}$$

(a) 3200 Pa.

8) What force will produce a pressure of 50000 Pa on an area of 0.2 m².

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

$$= 50000 = \frac{F}{0.2}$$

$$50000 \times 0.2 = 10,000 = F$$

(a) 10000 N

9) A force of 300 N, while acting on an Area A, produces a pressure of 1500 Pa, what is the magnitude of A in cm².

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

$$1500 = \frac{300}{A}$$

$$1500 A = 300$$

$$A = \frac{300}{1500} = \frac{1}{5} \text{ m}^2 = 0.2 \text{ m}^2$$

$$1 \text{ m} = 100 \text{ cm}$$

$$\Rightarrow \frac{100 \times 100}{5} = 2000 \text{ cm}^2$$

$$0.2 \text{ m}^2 \times 100 = 2000 \text{ cm}^2$$

(10) Some piece of impurity (density = ρ) is embedded in ice. The ice is floating in water ($\rho = \rho_w$) when ice melts, level of water will -

→ (b) Remain unchanged, if $\rho < \rho_w$

(11) Statement - 1 → A man sitting in a boat which is floating on a pond. If the man drinks some water from the pond the level of the water in the pond decreases.

* Statement - 2 → According to Archimede's principle the weight displaced by body is equal to the weight of the body.

→ (5) Statement 1 → false, statement - 2 false.

* Statement - 1 → A needle placed carefully on the surface of water may float, whereas a ball of the same material will always sink.

* Statement - 2 → The buoyancy of an object depends both on the material and shape of the object.

→ (3) Statement - 1 is True, Statement - 2 is false.