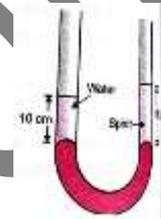


PHYSICS POINT

ASSIGNMENT FLUID

1. There is an iceberg in the sea (i) calculate the fraction of iceberg below the surface of water and (ii) calculate the fraction of iceberg above the surface of water. Given, density of ice = 917 kg m^{-3} and density of sea water = $1.024 \times 10^3 \text{ kg m}^{-3}$.
2. A block of brass has a mass of 0.5 kg and a density of $8 \times 10^3 \text{ kg m}^{-3}$. It is suspended from a string. Find the tension in the string (i) if the block is in air, and (ii) if it is completely immersed in water.
3. A jeweller claims that he sells ornaments made of pure gold that has relative density of 19.3. he sells a bangle weighing 25.250 g to a person. The person weighs a bangle by immersing it in pure water and finds that the weight of the bangle is 23.075 g. Is the bangle made of pure gold?
4. What should be the maximum average velocity of water in a tube of diameter 2 cm so that the flow is laminar? The viscosity of water is $10^{-3} \text{ Nm}^{-2} \text{ s}^{-1}$.
5. Water stands at a depth H in a tank whose side walls are vertical. A hole is made on one of the walls at a depth h below the water surface. Find at what distance from the foot of the wall does the emerging stream of water strike the floor?
6. A tube contains water and spirit separated by mercury. The mercury column in the two arms are in level with 10.0 cm of water in one arm and 11.5 cm of spirit in the other. What is the relative density of the spirit?



7. A column of water contains 40 cm high supports a 30 cm column of an unknown liquid. What is the density of the liquid? **[Ans. $1.33 \times 10^3 \text{ kg m}^{-3}$]**
8. A cylindrical jar of cross-sectional area 50 cm^2 is filled with water to a height of 20 cm. It carries a piston of negligible mass. Calculate the pressure at the bottom of the jar when a mass of 1 kg is placed on the piston. Neglect atmospheric pressure.
9. The average mass that must be lifted by a hydraulic press is 80 kg. If the radius of the larger piston is five times that of the smaller piston. What is the minimum force that must be applied? **[Ans. 31.4 N]**
10. A solid floats in water with $\frac{3}{4}$ of its volume below the surface of water. Calculate the density of the solid?
11. A piece of wood of relative density 0.25 floats in a pail containing oil of relative density 0.81. What is the fraction of volume of the wood above the surface of the oil? **[Ans. 0.69]**
12. The reading of a pressure meter attached to a closed water pipe is $3.5 \times 10^5 \text{ Nm}^{-2}$. On opening the valve, the reading of the pressure is reduced to $3 \times 10^5 \text{ Nm}^{-2}$. Calculate the speed of water flowing in the pipe? **[Ans. 10 ms^{-1}]**
13. A tank containing water has an orifice 10 meter below the surface of water in the tank. If there is no wastage of energy, find the speed of discharge. **[Ans. 14 ms^{-1}]**
14. A pipe is running full of water. At a certain point A, it tapers from 50 cm diameter to 15 cm at point B. The pressure difference between A and B is 10 cm of water column. Find the rate of flow of water through the pipe. The pipe is being horizontal. **[Ans. $2.49 \times 10^4 \text{ cm}^3 \text{ s}^{-1}$]**
15. What is the minimum pressure required to force blood from the heart to the top of the head (vertical distance 50 cm)? Assume the density of blood to be 1.04 g cm^{-3} , neglect friction. **[Ans. $5.096 \times 10^3 \text{ N m}^{-2}$]**