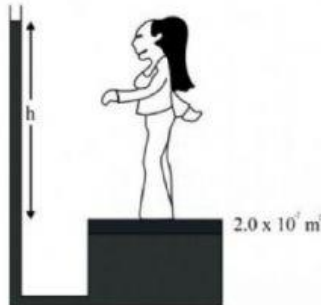
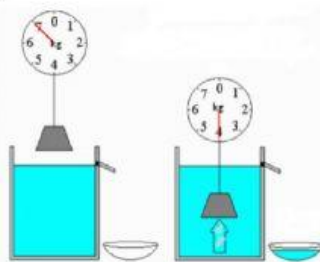


19. In the diagram below a person of mass 65 kg is standing on a platform over the piston of area $2.0 \times 10^{-2} \text{ m}^2$. What height of water, h will just support her? Assume that the density of water is 1000 kg m^{-3} .



20. From the figure below, find the buoyant force acting on the object.



$$F_B = W_1 - W_2$$

$$\text{Mass} = \quad \text{kg}$$

$$= \quad \text{kg}$$

$$\therefore F_B = \quad \times \quad \text{N}$$

21. The volume of a 0.75 kg sealed packet is $3.5 \times 10^{-4} \text{ m}^3$. If the density of water is 1000 kg m^{-3} ,

- Will the packet float or sink in water?
- Find the volume of the water displaced by this packet.
- Find the buoyant force
- Find the mass of water displaced by this packet.

$$m = \quad \text{kg}$$

$$V = 3.5 \times 10^{-4} \text{ m}^3 @$$

$$= \quad \text{m}^3$$

Answers

i) $\rho = \quad$

$= \quad$

$= \quad \text{kg m}^{-3}$

So the packet will

ii) $V_{\text{water}} = V_{\text{obj}}$

$= \quad \text{m}^3$

iii) $F_B = \rho_w V_w g$

$= \quad \times \quad \times$

$= \quad \text{N}$

iv) $\rho = \quad$

$m = V \rho$

$= \quad \times$

$= \quad \text{kg}$

22. A stone weight 160N. When it is fully immersed in the liquid A, its apparent weight is 115N. Calculate the density of the liquid A if the volume of the liquid A displaced by the stone is 3640cm^3 .

$$\begin{aligned}
 W_1 &= N \\
 W_2 &= N \\
 V &= \text{cm}^3 \times \frac{\text{m}^3}{1000\text{cm}^3} \\
 &= \text{m}^3 \\
 F_B &= W_1 - W_2 = \rho V g \\
 &= \rho \times \text{m}^3 \times 9.8 \\
 &= \rho \times 0.00364 \times 9.8 \\
 \therefore \rho &= \text{kgm}^{-3}
 \end{aligned}$$

23. An object of mass 0.2kg sinks in cooking oil of density 0.92gcm^{-3} . When the object fully immersed in the oil, it has been apparent weight of 0.94N. Calculate its density.

$$\begin{aligned}
 M &= \text{kg} \\
 W_1 &= X \\
 &= N \\
 \rho_{\text{oil}} &= \text{gcm}^{-3} \\
 &= \text{gcm}^{-3} \times \frac{\text{kg}}{1000\text{g}} \times \frac{\text{m}^3}{1000000\text{cm}^3} \\
 &= \text{kgm}^{-3} \\
 W_2 &= N \\
 F_B &= W_1 - W_2 \\
 &= - \\
 &= - \\
 F_B &= \rho_{\text{oil}} \cdot V_{\text{oil}} \cdot g \\
 &= X \times \text{m}^3 \times 9.8 \\
 V_{\text{oil}} &= \text{m}^3 \\
 V_{\text{oil}} &= V_{\text{obj}} \\
 \rho_{\text{obj}} &= \frac{m}{V} = \frac{0.2}{V} = \text{kgm}^{-3}
 \end{aligned}$$

24. Figure shows the weight of block W in the air is 6N. The block is immersed in a beaker of water and its weight becomes X N. Given that the density of block is $2 \times 10^3 \text{kgm}^{-3}$. Find the value of X.

