$\therefore$ Increase in pressure $= h\rho g = \dfrac{0.3}{\pi r^2}(1{,}250)g$

$\therefore$ Increase in thrust $= P \times A$

$= \dfrac{0.3}{\pi r^2}(1{,}250)g(\pi r^2)$

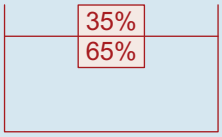
$= 3{,}675 \text{ N} = 3.675 \text{ kN}$

Exercise 9C

Q. 1. Bouyancy $= 12 - 8 = 4$

$B = \dfrac{W}{S} \Rightarrow 4 = \dfrac{12}{S} \Rightarrow S = 3$

Q. 2.



$W = V\rho g$

$B = \left(\dfrac{65}{100}V\right)(1{,}000)g = 650Vg$

But $B = W \Rightarrow \rho = 650 \Rightarrow S = 0.65$

Q. 3. 0.9, as in the last question

Q. 4. $B = 18 - 15 = 3$

$B = \dfrac{W}{S} \Rightarrow 3 = \dfrac{18}{S} \Rightarrow S = 6$

$B_L = 18 - 16 = 2$

$B_L = S_L B_w$

$\Rightarrow 2 = S_L(3) \Rightarrow S_L = \dfrac{2}{3}$

Q. 5. (i) $B = \dfrac{W}{S} = \dfrac{30}{6} = 5$

$\therefore$ Apparent weight $= 30 - 5 = 25$ N

(ii) $B_L = S_L B_W = (0.9)(5) = 4.5$

$\therefore$ Apparent weight $= 30 - 4.5 = 25.5$ N

Q. 6. $B_L = S_L B_W = S_L\left(\dfrac{W}{S}\right) = 13.6\left(\dfrac{200}{17}\right) = 160$

$\therefore$ Apparent weight $= 200 - 160 = 40$ N

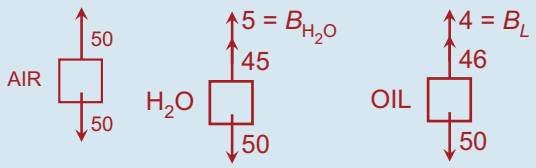
Q. 7. **Note:** B_{H_2O} = Bouyancy in water

B_L = Bouyancy in liquid

W_I = Immersed weight

S = Specific gravity of object

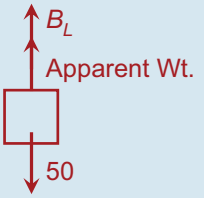
S_L = Specific gravity of liquid



(i) $B_{H_2O} = \dfrac{W_I}{S} \Rightarrow 5 = \dfrac{50}{S} \Rightarrow S = 10$

(ii) $B_L = S_L\dfrac{W_I}{S} \Rightarrow 4 = S_L\dfrac{(50)}{S} \Rightarrow S_L = 0.8$

(iii) In liquid, $S_L = 0.75$



Apparent Wt. $= 50 - B_L$

$\Rightarrow$ Apparent Wt. $= 50 - S_L\dfrac{W_I}{S}$

$\Rightarrow$ Apparent Wt. $= 50 - 0.75\dfrac{(50)}{S}$

$= 46.25$ N

Q. 8. Bouyancy in water, $B_W = 80 - 60 = 20$

Bouyancy in oil, $B_L = 80 - 64 = 16$

$B_L = S_L B_W \Rightarrow 16 = S_L(20) \Rightarrow S_L = 0.8$

Q. 9. (i) $V = \dfrac{4}{3}\pi r^3$

$= \dfrac{4}{3}\pi(0.3)^3$

$= 0.036\pi \text{ m}^3$ **OR** $\dfrac{9\pi}{250}\text{ m}^3$

(ii) $W = \rho Vg$

$= 2{,}500\left(\dfrac{9\pi}{250}\right)g$

$= 90\pi g$ N

(iii) App. Wt. = Weight – Bouyancy,

$B = \dfrac{W_I}{S}$

$= 90\pi g - \dfrac{90\pi g}{2.5}$

$= 54\pi g$ N

Q. 10. $V = \dfrac{\pi r^2 h}{3}$

$r = 0.3, h = 0.7$

(i) $\Rightarrow V = \dfrac{22}{7}\dfrac{(0.3)^2}{3}(0.7)$

$\Rightarrow V = \dfrac{33}{500}\text{ m}^3$ **OR** $V = 0.066 \text{ m}^3$

(ii) $W = \rho Vg$

$= 8{,}000\left(\dfrac{33}{500}\right)9.8$

$= 5{,}174.4$ N