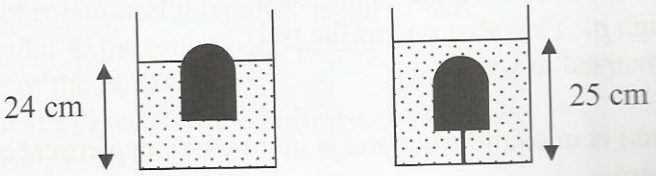
9 **(b)** A cylinder contains water to a height of 20 cm. A solid body of mass 0.06 kg is placed in the cylinder. It floats and the water level rises to 24 cm.



The body is then completely submerged and tied by a string to the bottom of the cylinder. The water level rises to 25 cm.

Find **(i)** the relative density of the body

(ii) the tension in the string

(iii) the radius of the cylinder.

(*i*) Let cross - sectional : area of cylinder = A

$$B = W$$
$$(0.04)A(1000)g = (0.05)A(1000s)g$$
$$s = 0.8$$

(*ii*)
$$B = T + W$$
$$\frac{0.06g}{0.8} = T + 0.06g$$
$$T = 0.015g \quad \text{or} \quad 0.147\ \text{N}$$

(*iii*)
$$W = 0.06g$$
$$\rho Vg = 0.06g$$
$$800(0.05)Ag = 0.06g$$
$$A = 0.0015$$

$$\pi r^2 = 0.0015$$
$$r = 0.0218\ \text{m} \quad \text{or} \quad 2.18\ \text{cm}.$$

5 5 5 5 5 30