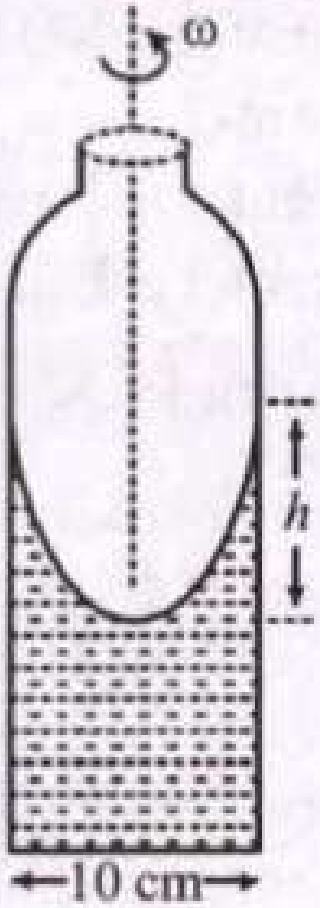
A cylindrical vessel containing a liquid is rotated about its axis so that the liquid rises at its sides as shown in the figure. The radius of vessel is 5 cm and the angular speed of rotation is $\omega$ rad $s^{-1}$. The difference in the height, $h$ (in cm) of liquid at the centre of vessel and at the side will be :

**[Main Sep. 02, 2020 (I)]**




(a) $\frac{2\omega^2}{25g}$

(b) $\frac{5\omega^2}{2g}$

(c) $\frac{25\omega^2}{2g}$

(d) $\frac{2\omega^2}{5g}$

(c) Here, $\rho dr\omega^2 r = \rho g dh$

$$\Rightarrow \omega^2 \int_0^R r dr = g \int_0^h dh$$

$$\Rightarrow \frac{\omega^2 R^2}{2} = gh$$

(Given $R = 5$ cm)

$$\therefore h = \frac{\omega^2 R^2}{2g} = \frac{25\omega^2}{2g}$$