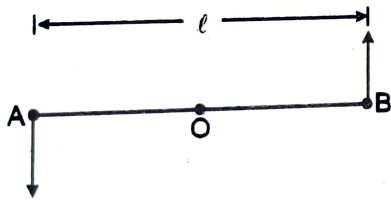


Two particles balls A and B, each of mass m , are attached rigidly to the ends of a light rod of length ℓ . The system rotates about the perpendicular bisector of the rod at an angular speed ω . Calculate the angular momentum of the individual particles and of the system about the axis of rotation.

Solution :



Consider the situation shown in figure. The velocity of the particle A with respect to the centre O is

$v = \frac{\omega \ell}{2}$. The angular momentum of the particle with respect to the axis is

$L_1 = mvr = m \left(\frac{\omega \ell}{2} \right) \left(\frac{\ell}{2} \right) = \frac{1}{4} m\omega \ell^2$. The same the angular momentum L_2 of the second particle.

The angular momentum of the system is equal to sum of these two angular momentum i.e., $L = 1/2 m\omega \ell^2$.