A solid uniform sphere has a mass of 10 kg and radius of 70 cm. The angular speed of revolution of the sphere around an axis through its center is 20 rad/s. What is the angular momentum of the sphere?

Given:

Mass of the sphere: m= 10 kg

Radius of the sphere: r = 70 cm = 0.7 m

Angular speed of sphere: $\omega = 20$ rad / s

Determine: Angular Momentum: L

Use formula:

$L = I\omega$ ----------(1)

Moment of inertia, I, of the solid sphere around an axis through its center is $(⅖)mr^2$.

$$I = (⅖)mr^2 = (⅖) \times 10 \times (0.7)^2 = 1.96 \text{ kg m}^2$$

Substituting for I and ω in (1):

$L = 1.96 \times 20 = 39$ kg m^2 / s