

$$\boxed{L = I \omega} \quad \text{--- (5)}$$

$$p = m v$$

**Example:** A sphere of mass 25kg and diameter 0.4m is revolving about its geometrical axis at the rate of revolution 2100 rev. per min. Calculate its : (i) Moment of Inertia (ii) Angular Momentum.

[Ans: (i)  $0.4 \text{ kg}\cdot\text{m}^2$  (ii)  $88 \text{ kg}\cdot\text{m}^2/\text{s}$ ] ✓

$$(i) \quad I = \frac{2}{5} MR^2 \Rightarrow I = \frac{2}{5} \times 25 \times 0.04 \Rightarrow I = 0.4 \text{ kg}\cdot\text{m}^2$$

$$(ii) \quad \omega = 2\pi \nu = 2 \times \frac{22}{7} \times \frac{5}{35} = 220 \text{ rad/s}$$

$$L = I \omega = 0.4 \times 220 = 88 \text{ kg}\cdot\text{m}^2/\text{s}$$

$$M = 25 \text{ kg}, \quad R = 0.2 \text{ m}$$



$$\nu = 2100 \text{ rev/min}$$

$$\nu = \frac{2100}{60} \text{ rev/sec}$$

$$\nu = 35 \text{ rev/sec}$$

**Example:** Calculate the angular momentum of a disc whose rotational kinetic energy is 10kJ and moment of inertia about its axis is  $4.5 \times 10^{-4} \text{ kg}\cdot\text{m}^2$ . [Ans:  $3.0 \text{ kg}\cdot\text{m}^2/\text{s}$ ]

$$K_{\text{rot}} = 10 \times 10^3 \text{ J} = 10^4 \text{ J}$$

$$I = 4.5 \times 10^{-4} \text{ kg}\cdot\text{m}^2$$

$$L = ?$$