

Class XI, Rotational Motion

Friday, November 12, 2021 7:58 PM

Angular Momentum of a Rotating Rigid Body

When a rigid body rotates about a given axis, the sum of moments of the linear momentum of all the particles about the given axis is called the "angular momentum" of the body about the axis.

$$L = L_1 + L_2 + \dots + L_n \quad \text{--- (1)}$$

Angular Momentum of Rigid ^{Body} and its M.I.:

$$v_i = r_i \omega \quad \text{--- (2)}$$

$$p_i = m_i v_i = m_i r_i \omega \quad \text{--- (3)}$$

$$L_i = r_i p_i \sin 90^\circ = r_i p_i$$

$$L_i = r_i (m_i r_i \omega) = m_i r_i^2 \omega \quad \text{--- (4)}$$

$$L = L_1 + L_2 + \dots + L_n$$

$$L = m_1 r_1^2 \omega + m_2 r_2^2 \omega + \dots + m_n r_n^2 \omega$$

$$L = (m_1 r_1^2 + m_2 r_2^2 + \dots + m_n r_n^2) \omega$$

