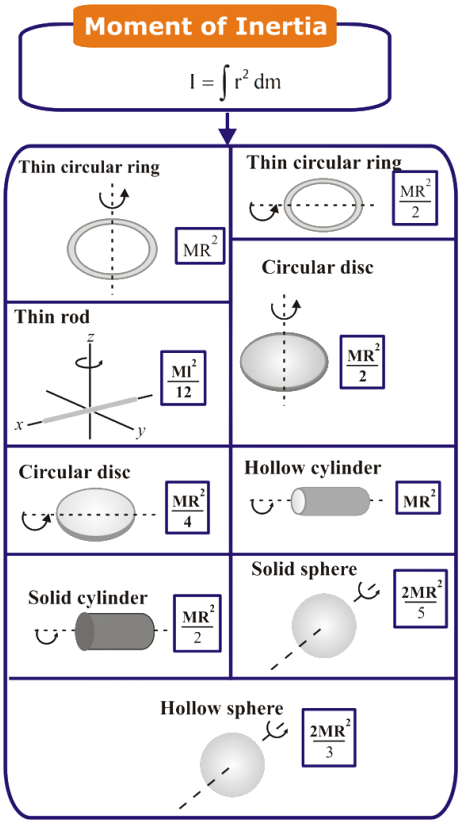
Rotational Motion - I

Rotational Motion

Rotational Motion

1. Moment of Inertia.
2. Calculation of Torque and Angular Momentum
3. Fixed Axis Rotation



Angular Momentum about a point

$$\vec{L} = \vec{r} \times \vec{P}$$

$$L = r_{\perp} \cdot P$$

$$L = r\,P_{\perp}$$

Torque about a point

$$\vec{\tau} = \vec{r} \times \vec{F}$$

$$\tau = r_{\perp} F$$

$$\tau = r\,F_{\perp}$$

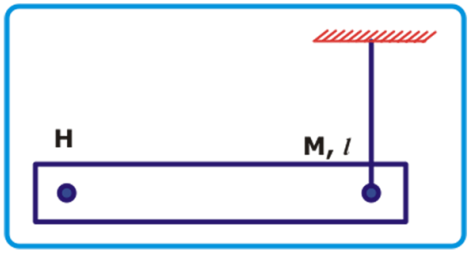
Torque about an axis

❖ Component of torque,about a point on the axis, along the axis.

❖ F_{axial} and F_{radial} will not give any torque about an axis.

Rotational Equilibrium

$$\sum \tau_{axis} = 0$$



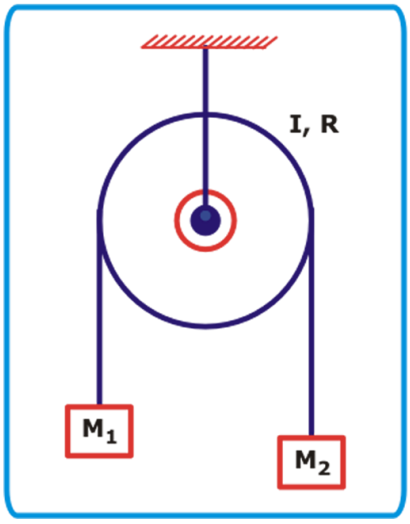
Fixed Axis Rotation

$$\tau_H = I_H \alpha$$

$$L_H = I_H \omega$$

$$R_{kE} = \frac{1}{2} I_H \omega^2$$

Fixed Axis Rotation



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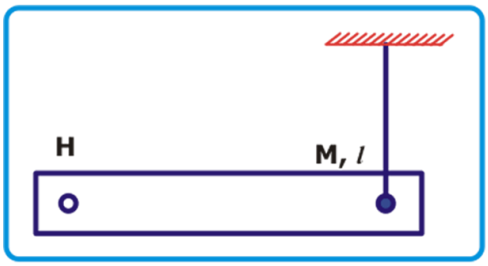

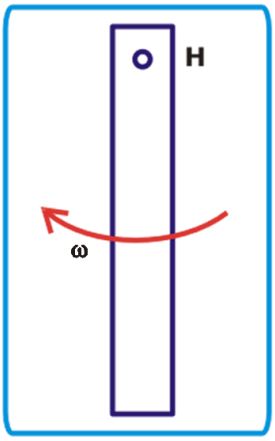

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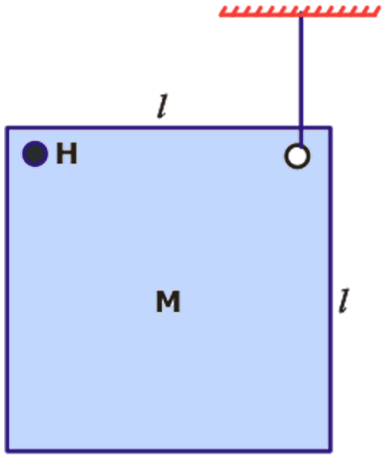

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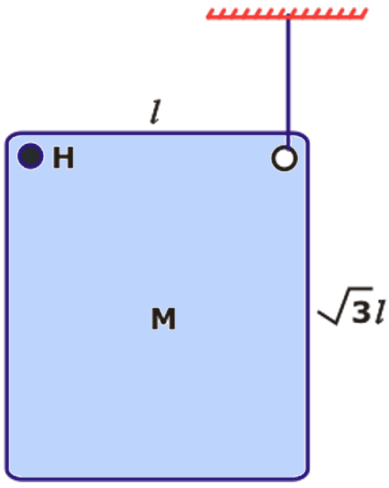
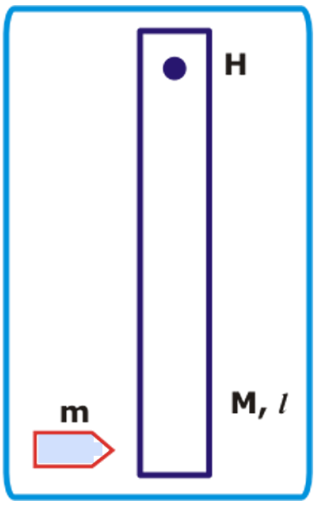


Conservation of Angular Momentum



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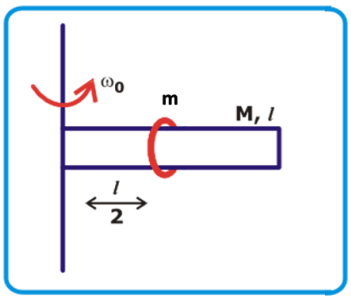

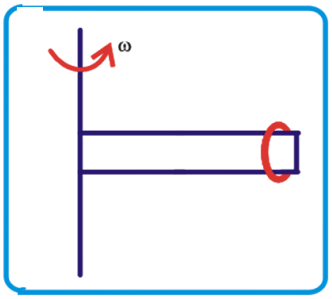
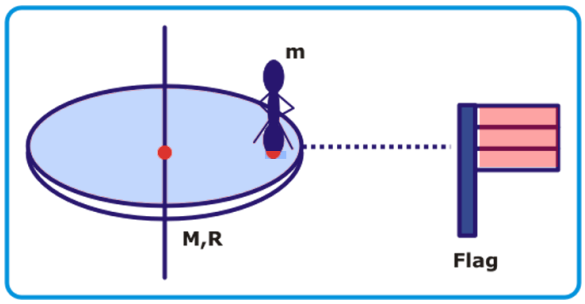
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