

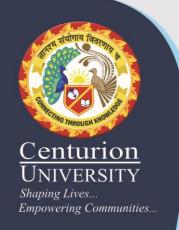
MIECHANICS SUB. CODE-BSPH1102

For B.Sc.(Physics & Chemistry)

(Rotational Dynamics)

Principle of conservation of angular momentum

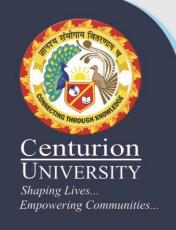
By
Mr. G. K. Sahu
Assistant Professor,
CENTURION UNIVERSITY OF TECHNOLOGY AND MANAGEMENT,
ODISHA



Principle of conservation of angular momentum

"When the external torque acting on a system of particles is zero, the total angular momentum of the system remains constant.

Since,
$$\vec{\tau} = \vec{r} \times \vec{F} = \frac{d\vec{J}}{dt}$$
,
If, $\vec{\tau} = 0$, then $\frac{d\vec{J}}{dt} = 0$
 $\Rightarrow \vec{J} = constant$



in case of rigid body, $\vec{J} = I\vec{\omega}$, then if $\vec{\tau} = 0$

Then, $I\vec{\omega} = Constant$

$$\Rightarrow I_1 \overrightarrow{\omega_1} = I_2 \overrightarrow{\omega_2}$$

Example:

- The angular velocity of a planet around the sun increases when it comes near the sun.
- The destructive effect of a tornado is greater near the centre of disturbance than near the edges.
- A ball dancer can vary her angular speed by out stretching her legs and arms increasing moment of inertia decreasing angular velocity.



Reference

Shaping Lives... Mechanics by D. S. Mathur, S. Chand, chp-6.14

