$$\Delta L = I \Delta \omega$$

$$\tau = I\alpha = I\frac{\Delta \omega}{\Delta t} = \frac{\Delta L}{\Delta t} \Rightarrow \boxed{\tau = \frac{\Delta L}{\Delta t}}$$

* If the large torque acts on a particle for a small time, then the angular impulse of is

$$\boxed{J = \tau \Delta t = \Delta L = (L_f - L_o)}$$

Conservation of angular momentum

* States that when the resultant of external torque on the system is zero, the angular momentum of the system remains constant.

$$\sum \tau = 0 \Rightarrow \frac{\Delta L}{\Delta t} = 0 \Rightarrow \Delta L = \text{constant}$$

$$L_i = L_f$$

$$I_1 \omega_{o1} + I_2 \omega_{o2} = I_1 \omega_1 + I_2 \omega_2$$