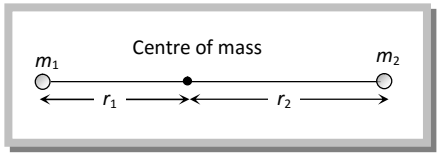
Moment of Inertia of Two Point Masses about Their Center of Mass.

Let m_1 and m_2 be two masses distant r from each-other and r_1 and r_2 be the distances of their center of mass from m_1 and m_2 respectively, then



(1) $r_1 + r_2 = r$

(2) $m_1 r_1 = m_2 r_2$

(3) $r_1 = \dfrac{m_2}{m_1 + m_2} r$ and $r_2 = \dfrac{m_1}{m_1 + m_2} r$

(4) $I = m_1 r_1^2 + m_2 r_2^2$

(5) $I = \left[\dfrac{m_1 m_2}{m_1 + m_2}\right] r^2 = \mu r^2$ [where $\mu = \dfrac{m_1 m_2}{m_1 + m_2}$ is known as reduced mass $\mu < m_1$ and $\mu < m_2$.]

(6) In diatomic molecules like H_2, HCl etc. moment of inertia about their center of mass is derived from above formula.