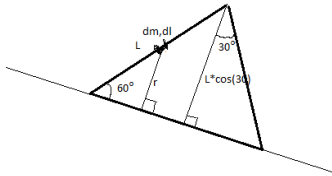**Problem:**

3 thin uniform rods each of length L & mass M are joined to form an equilateral triangle .find the moment of inertia of the system about an axis along 1 side of the triangle?

Solution:

According to the definition of momentum of inertia:

$$I = \sum_i m_i r_i^2$$

In this case:

$$I = 2 * \int_0^{L\frac{\sqrt{3}}{2}} r^2 \, dm = \int_0^{L\frac{\sqrt{3}}{2}} r^2 \frac{M}{L} \, dl = \int_0^{L\frac{\sqrt{3}}{2}} r^2 \frac{M}{L} \frac{dr}{\cos\frac{\pi}{6}} = \frac{2M}{\sqrt{3}L} \int_0^{L\frac{\sqrt{3}}{2}} r^2 \, dr$$

$$= \frac{1}{2} ML^2$$

Here integral gives the momentum of inertia of only one rod. Thus, it is multiplied by 2.

Answer: $I = \frac{1}{2} ML^2$.