

FAQ's

1. State perpendicular axis theorem.

It I_{xx} and I_{yy} are the moment of inertia of a plane section about two mutually perpendicular axis meeting at a point 'o', then the moment of inertia of the section I_{zz} about an axis zz perpendicular to xy plane and passing through the point 'o' is given by

$$I_{zz} = I_{xx} + I_{yy}$$

2. State parallel axis theorem.

If the moment of inertia of a plane section about an axis passing through its centre of gravity is ' I_G ' then the moment of inertia of the section about an axis parallel to the centroidal axis and at a distance of 'h' from the centroidal axis is given by

$$I_{AB} = I_G + ah^2$$

3. Mention the formula for moment of inertia for a rectangular and circular section.

Rectangular section:

$$I_{xx} = bd^3/12 \qquad I_{yy} = db^3/12$$

Where,

b- breadth of rectangular section

d- depth of rectangular section

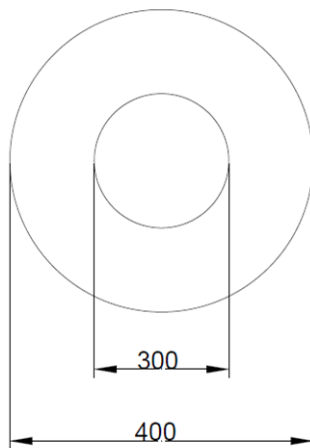
Circular section:

$$I_{xx} = I_{yy} = \pi D^4/64$$

Where,

D- diameter of circular section

4. Find the MI of hollow circular section having outer diameter 400mm and inner diameter 300mm.



Step1: centroidal distance $\bar{X}$ & $\bar{Y}$:

Given hollow circular section is a symmetrical section about x axis and y axis.

$$\bar{X} = \bar{Y} = D/2 = 400/2 = 200\text{mm}$$

Step 2: to find moment of inertia (I_{xx} & I_{yy})

$$\begin{aligned} I_{xx} &= \pi/64 (D^4 - d^4) \\ &= \pi/64 (400^4 - 300^4) \\ &= 8.5 \times 10^8 \text{ mm}^4 \end{aligned}$$

Result:

$$I_{xx} = I_{yy} = 8.5 \times 10^8 \text{ mm}^4$$