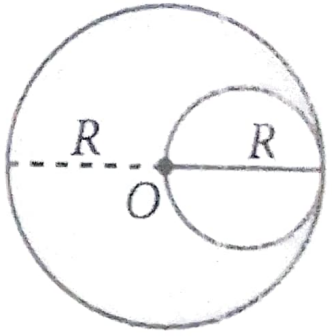
. **(b)** : Mass of removed part

$$m = \frac{M}{nR^2} \cdot \pi\left(\frac{R}{2}\right)^2 = \frac{M}{4}$$



MI of disc about centre O, $\text{MI}_1 = \frac{mR^2}{2}$

MI of cut portion about O,

$$\text{MI}_2 = \frac{\frac{M}{4}\left(\frac{R}{2}\right)^2}{2} + \frac{M}{4} \cdot \left(\frac{R}{2}\right)^2 \text{ (By parallel axes theorem)}$$

$$\text{So, } I = \text{MI}_1 - \text{MI}_2 = \frac{MR^2}{2} - \frac{3MR^2}{32} = \frac{13}{32}MR^2$$