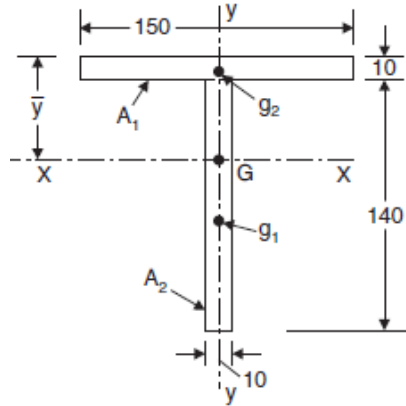


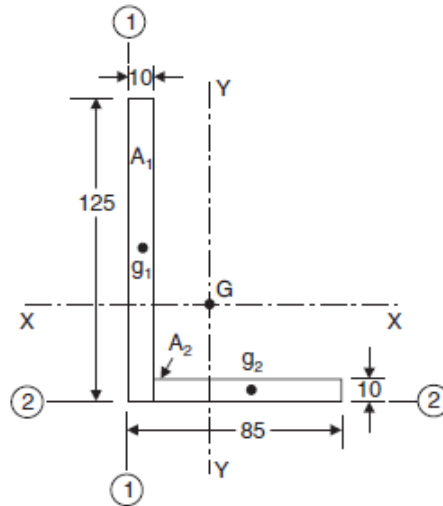
Numerical problems

1. Determine the moment of inertia of the section as shown in Figure about the horizontal centroidal axis XX. Also determine moment of inertia about the axis of symmetry.

[Ans. 6372442 mm^4 , 2824167 mm^4]

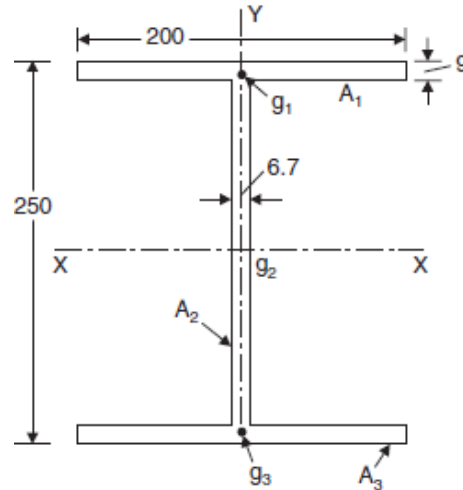


2. Determine the moment of inertia of the L-section as shown in Figure about the axes 1-1 and 2-2. Also find the M.I. about its centroidal axes parallel to the legs. [Ans. $I_{xx} = 3411299 \text{ mm}^4$, $I_{yy} = 1208659 \text{ mm}^4$]



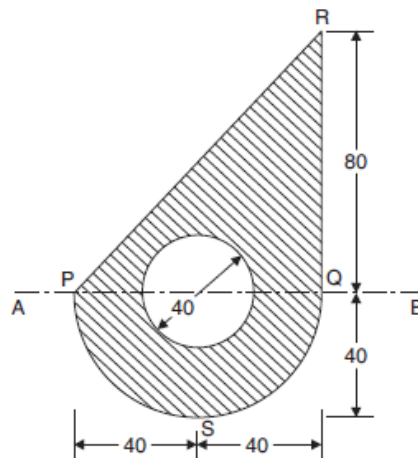
3. Determine the moment of inertia of the symmetric I-section as shown in Figure about its centroidal axis x-x and y-y.

[Ans. 59269202 mm^4 , 12005815 mm^4]

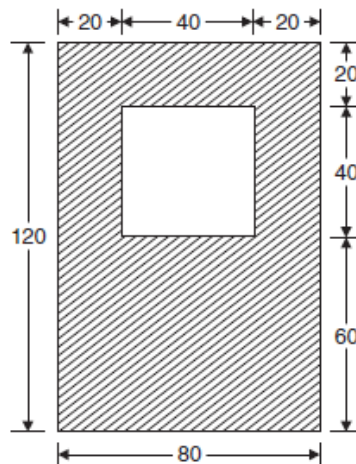


4. $ABCD$ is a square section. Determine the ratio of moment of inertia of the section about centroidal axis parallel to a side to that about diagonal AC . [Ans. 1]

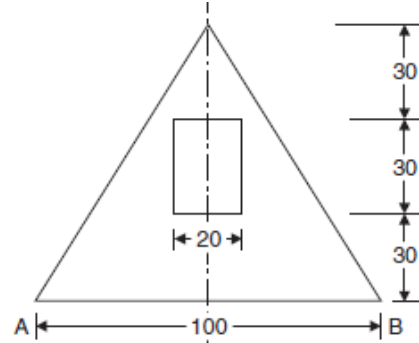
5. Find moment of inertia of the shaded area as shown in Figure about the axis AB . [Ans. 4292979 mm^4]



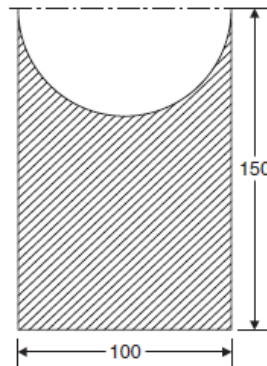
6. The cross-section of a rectangular hollow beam is shown in Figure. Determine the moment of inertia of the section about the centroidal axes. [Ans. 10538667 mm^4 , 4906667 mm^4]



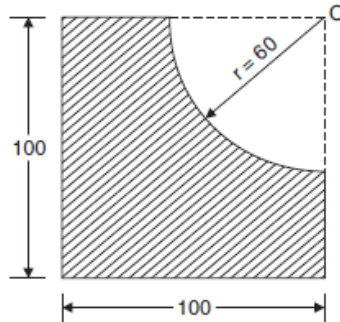
7. Determine the moment of inertia of the area as shown in Figure about the base $A-B$ and the centroidal axis parallel to AB . [Ans. 4815000 mm^4 , 1824231 mm^4]



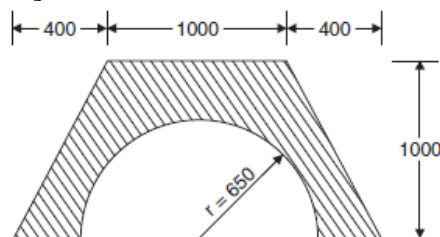
8. A semi-circular cut is made in rectangular wooden beam as shown in Figure. Determine the moment of inertia of the section about the centroidal axes. [Ans. 33581456 mm^4 , 10045631 mm^4]



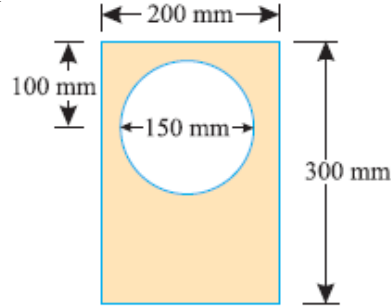
9. The cross-section of a machine part is shown in Figure. Determine its moment of inertia and radius of gyration about the horizontal centroidal axis. [Ans. 5249091 mm^4 , 27.05 mm]



10. The cross-section of a plain concrete culvert is shown in Figure. Determine the moment of inertia about the horizontal centroidal axes. [Ans. $5.45865 \times 10^{10} \text{ mm}^4$]



11. Find the moment of inertia of a hollow section as shown in Figure about an axis passing through its centre of gravity parallel X-X axis. [Ans. $362.54 \times 10^6 \text{ mm}^4$]



12. Figure shows the cross-section of a cast iron beam. Determine the M.I. of the section about horizontal and vertical axes passing through the centroid of the section. [Ans. $28.84 \times 10^6 \text{ mm}^4$, $8.4 \times 10^6 \text{ mm}^4$]

