

Question 1

For the truss shown, with $\theta = 35^\circ$:

- Determine the support reactions
- Determine the forces in members EJ and DE
- Determine the forces in members GH, CH, and BC

Be sure to clearly indicate whether the member forces are compressive or tensile and include Free Body Diagrams where required.

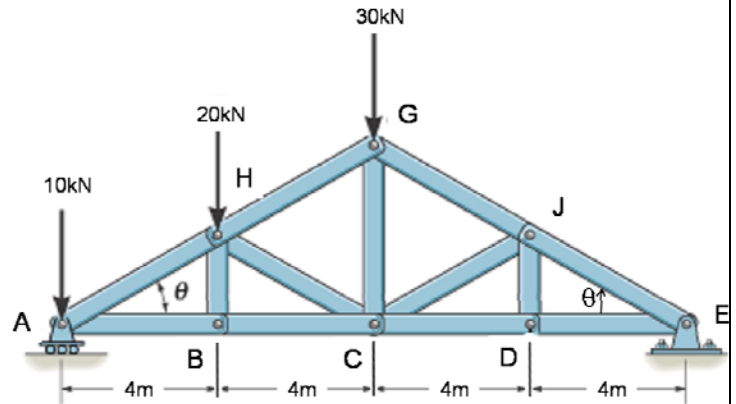


Figure 1

Question 2

For the beam shown in Figure 2, which has a pin support at A and a rocker support at B:

- Solve for the support reactions at A and B.
- Draw the SHEAR force diagram for the beam. LABEL the numerical values for V at points A, B, C, D, E and F.
- Draw the BENDING moment diagram for the beam. LABEL the numerical values for M at points A, B, C, D, E and F.
- On the Shear Force Diagram, INDICATE (label) the SLOPE of the shear force diagram just to the right of pt.E and just to the left of pt. F.

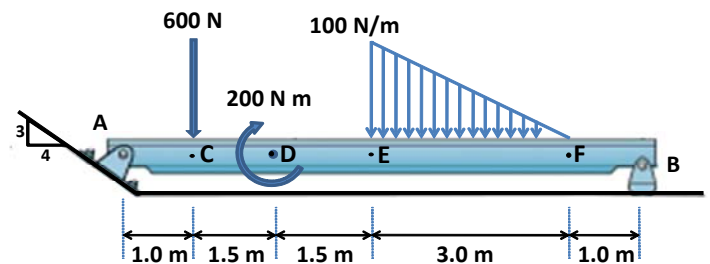


Figure 2

Question 3

The horizontal beam AB in Figure 3 has a negligible mass and thickness and is subjected to a triangular distributed loading with maximum magnitude of 800 N/m. Beam AB is supported at A by a pin, and at B by a vertical friction-post having a mass of 50 kg and negligible thickness. A force (P) is applied to the post such that when it reaches a magnitude of 150 N, the post slips at both B and C simultaneously.

Determine the coefficients of static friction at B and C. (Show all work and appropriate figures).

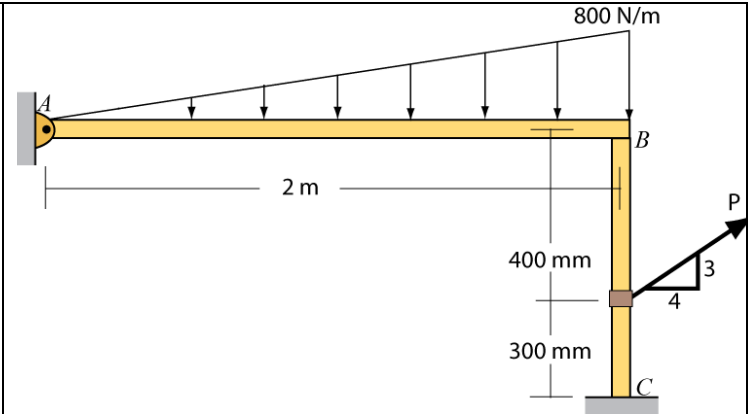


Figure 3

Question 4

A part used in the landing gear system of an airplane will be machined from 5086 Aluminum alloy. The cross-section of the part is shown in Figure 4. The density of the Aluminum alloy is 2657 kg/m^3 .

Determine the following:

- The x & y coordinates of the centroid according to the axis system shown, expressed as (\bar{x}, \bar{y}) .
- The moment of inertia of the cross section about the y-axis, I_y .
- The product of inertia of the cross section about the centroid of the shape, $I_{\bar{x}\bar{y}}$.

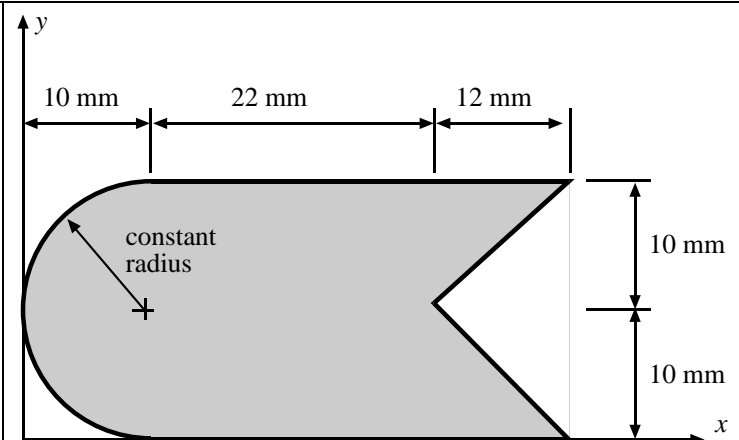


Figure 4