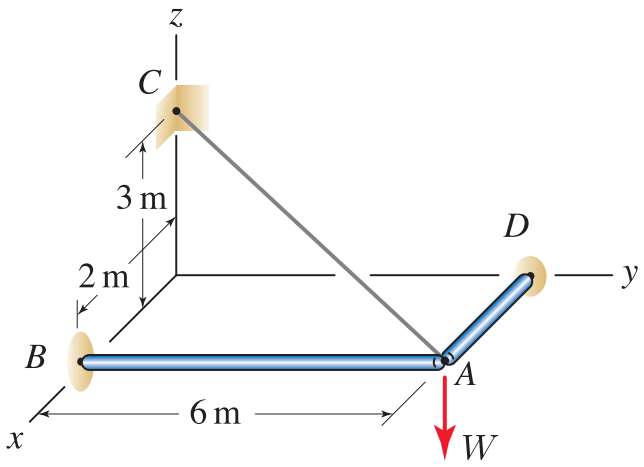
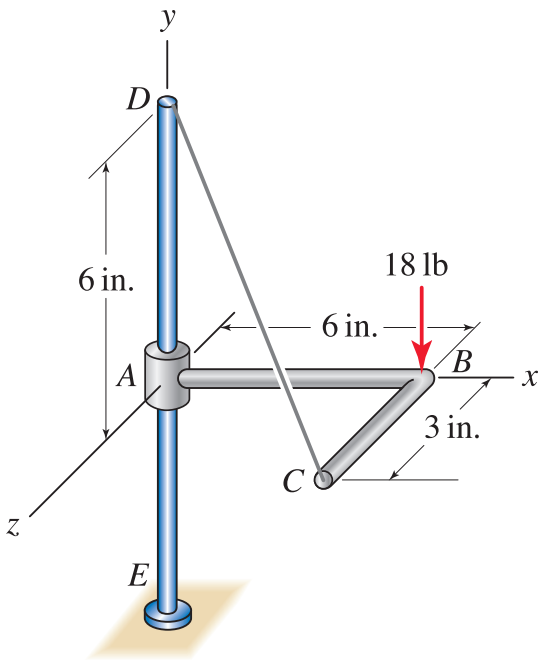
ME 212, Engineering Mechanics: Statics Final Exam, Fall 2009

Read each problem carefully and make sure you answering the question that is being asked. Closed book, closed notes. Test books will be provided.

Problems are 10 points each.

1. In the figure on the left, a weight W is supported at A by bars AB and AD and by cable AC. Bars AB and AD are parallel to the y and x axes respectively. If $W = 1000$N, determine the forces in each bar and the cable.



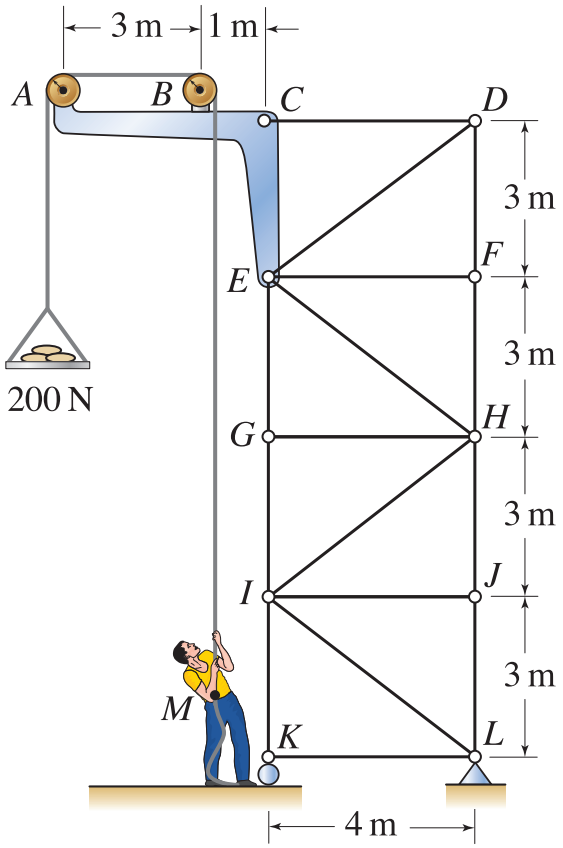


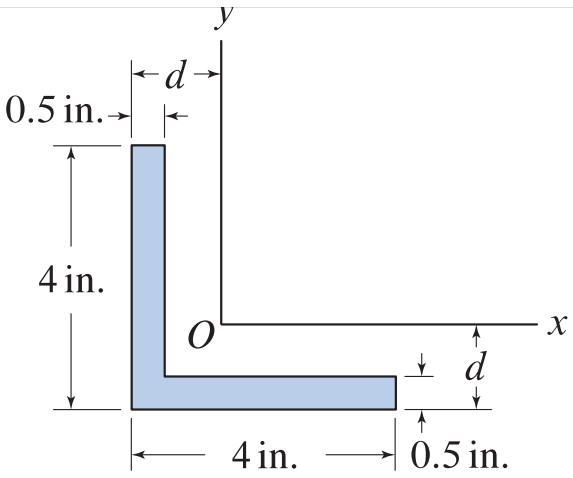
2. In the figure on the right, vertical bar ED has circular cross section and is built in at E. Member ABC is a single member that lies in a horizontal plane, with portion BC parallel to the z axis and with cable CD attached to point C. The collar at A can freely slide in the y direction and can freely rotate about the y axis.

   When point B is subjected to a downward vertical force of 18 lb, determine the force supported by the cable and all support reactions at A.

3. In the figure on the left, a hoist for lifting building materials is attached to a scaffold. The hoist has frictionless pulleys at points A and B, and both pulleys have 300 mm radius.

   - Determine the force supported by member DE.
   - Determine the force supported by member EH.





4. In the figure on the right, determine:

   (a) d so that the origin of the coordinate system, point O, is positioned at the centroid of the area.

   (b) the area moment of inertia about the x axis.

$I_{x'x'} = \frac{1}{12}bh^3$,
$I_{y'y'} = \frac{1}{12}b^3h$,
$I_{xx} = I_{x'x'} + A\bar{x}^2$,
$I_{yy} = I_{y'y'} + A\bar{y}^2$

Rate your project partners. List their names, including your own, and divide 100 points amongst them.