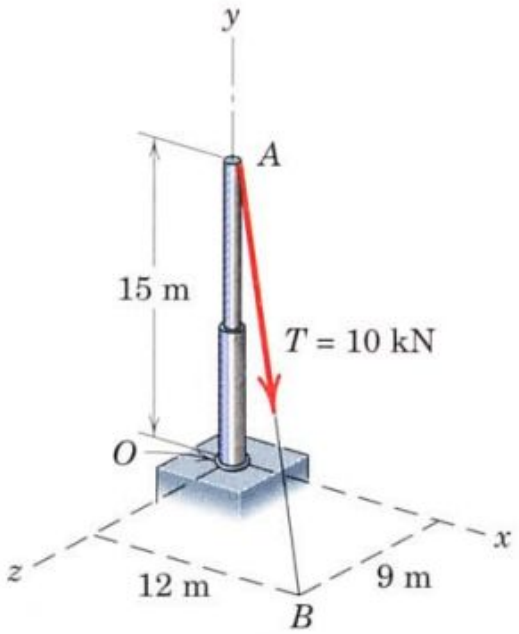
ROBT201
MECHANICS:
STATICS AND DYNAMICS

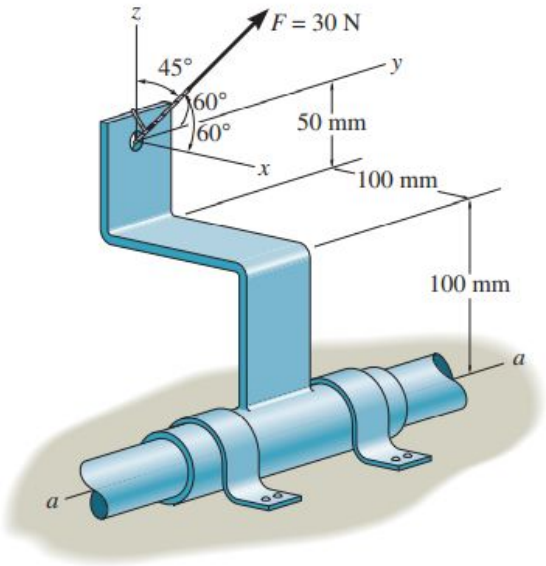
Midterm Sample Problems

NU, Astana, Fall 2022

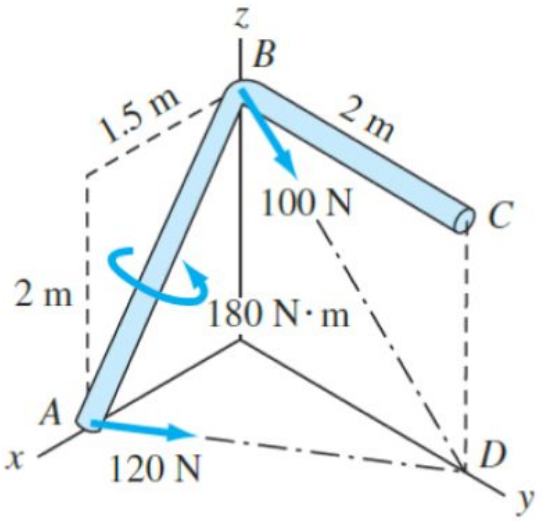
A force **T**, with magnitude $T = 10$ kN, is applied through a cable attached to the top (point A) of the rigid body represented in the figure. The cable is connected to the ground at point B. Determine the moment M_z generated by **T** about the z-axis. Use the vector formulation.



The force of $F = 30$ N acts on the bracket as shown. Determine the moment of the force about the $a - a$ axis of the pipe (the unit vector of the $a - a$ axis is the same of the y axis).



Replace the two forces and a couple acting on the bent rod ABC with an equivalent force-couple system acting at C.



Using the method of joints, determine the force in each member of the truss, and state if the members are in tension or compression.

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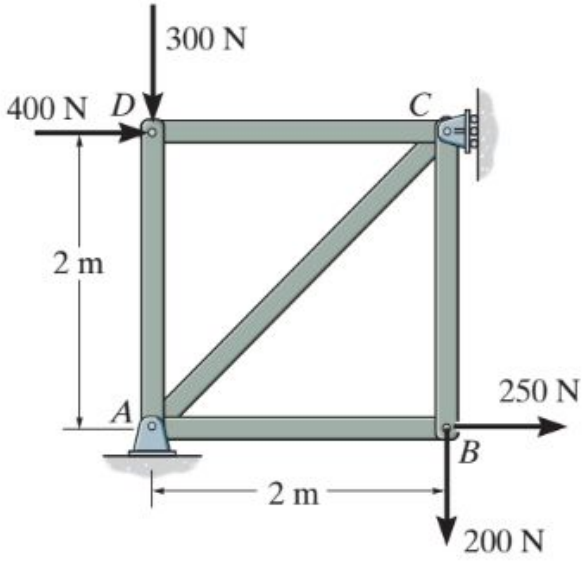
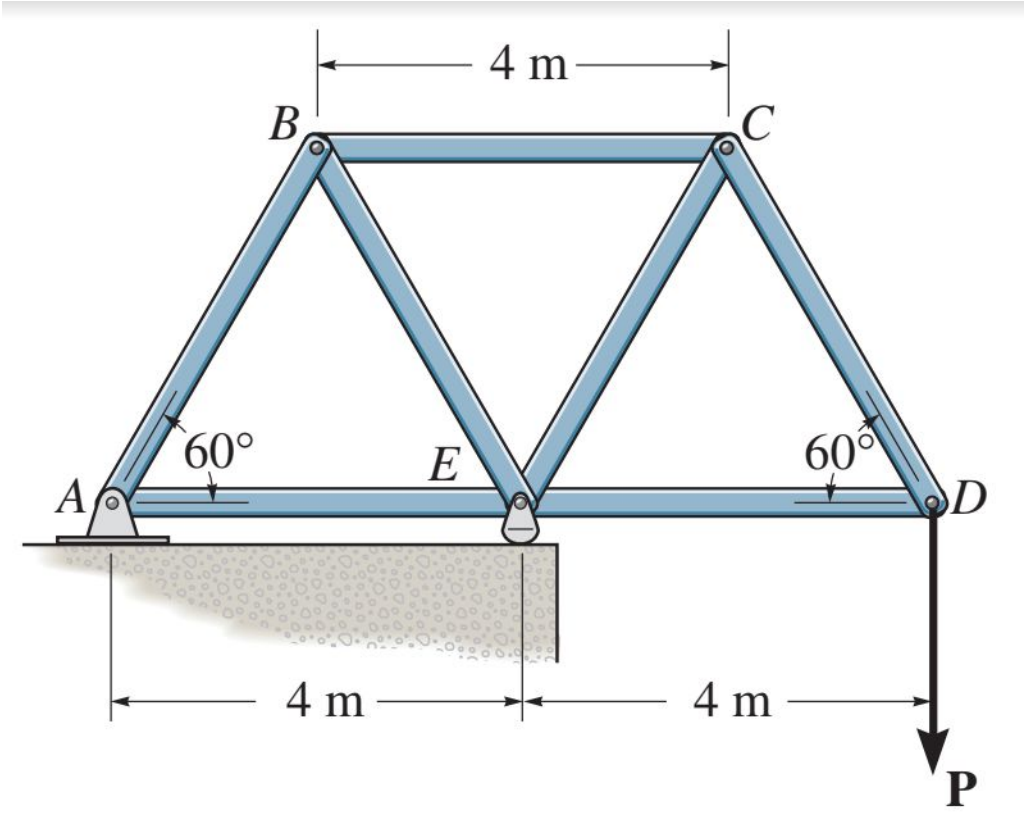
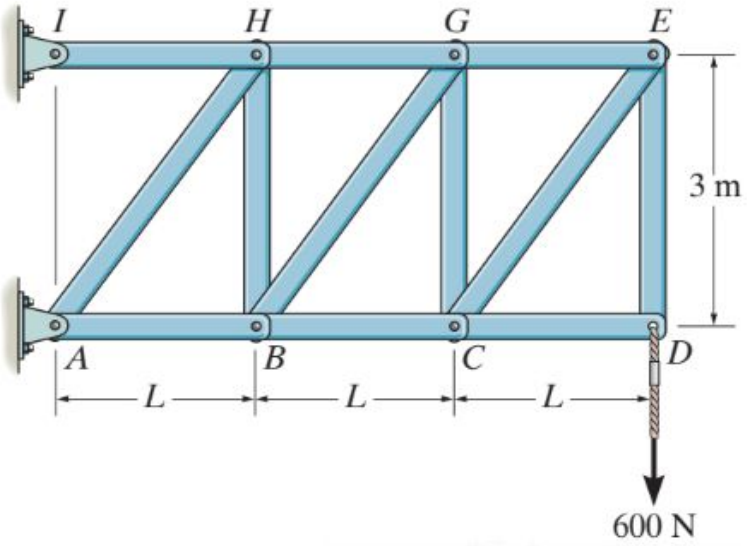
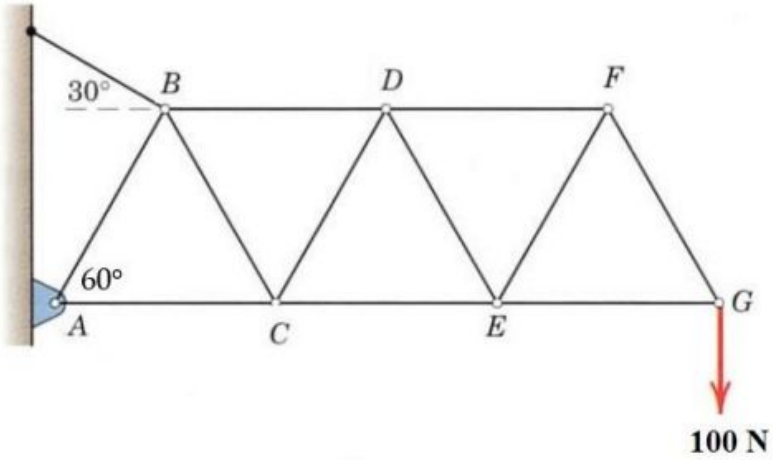



4 m
B
C
60°
60°
E
A
D
4 m
4 m
P

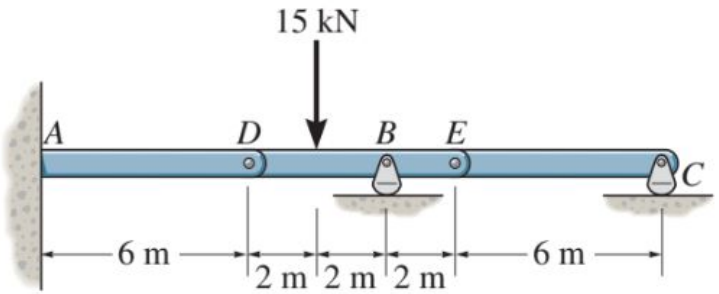
The truss supports the vertical load of 600 N. Given $L = 2$ m, determine (using the method of sections) the force on members HG and HB of the truss, and state if the members are in tension or compression.



Find the forces in members *DF* and *DE*. Specify tension or compression. All triangles in the truss are equilateral.



The compound beam is fixed at A (fixed support) and supported by a rocker at B and C. There are pins at D and E. Determine the reactions at the supports.



Questions?