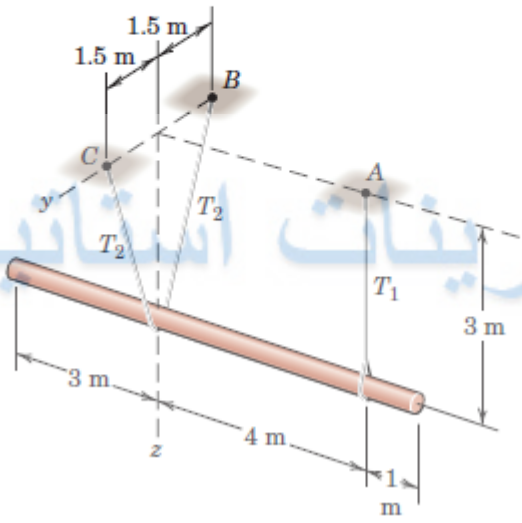
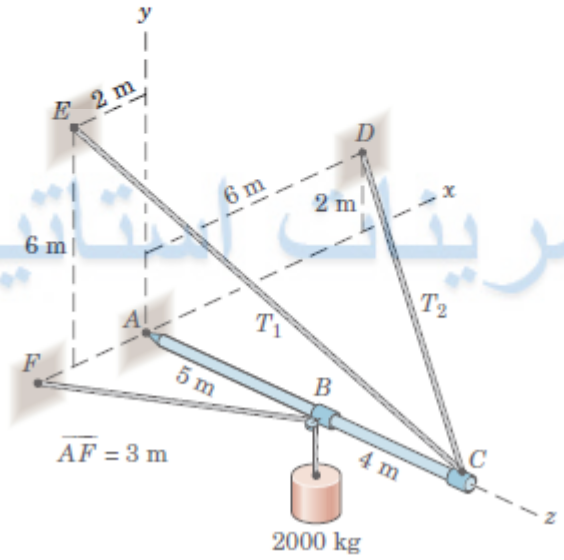
1

The horizontal steel shaft has a mass of 480 kg and is suspended by a vertical cable from A and by a second cable BC which lies in a vertical transverse plane and loops underneath the shaft. Calculate the tensions T_1 and T_2 in the cables.



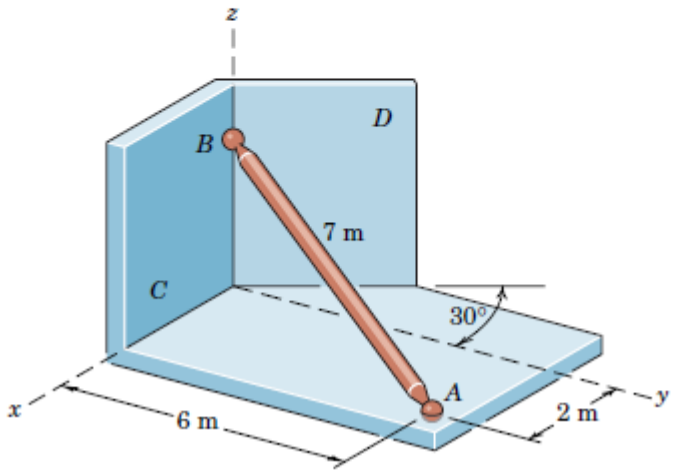
2

The 9-m steel boom has a mass of 600 kg with center of mass at midlength. It is supported by a ball-and-socket joint at A and the two cables under tensions T_1 and T_2. The cable which supports the 2000-kg load leads through a sheave (pulley) at B and is secured to the vertical x-y plane at F. Calculate the magnitude of the tension T_1. (*Hint:* Write a moment equation which eliminates all unknowns except T_1.)

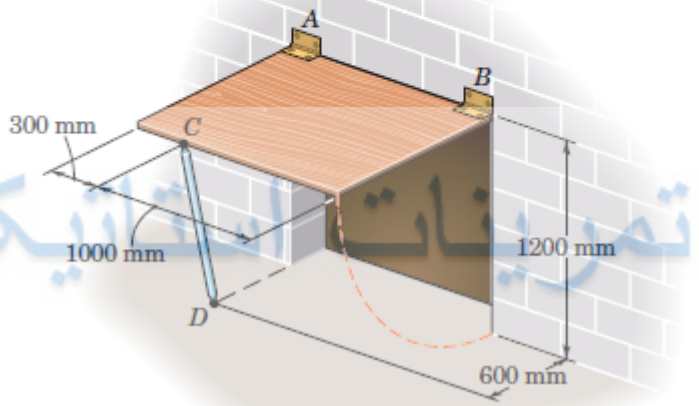


3

One of the vertical walls supporting end B of the 200-kg uniform shaft of Sample Problem 3/5 is turned through a 30° angle as shown here. End A is still supported by the ball-and-socket connection in the horizontal x-y plane. Calculate the magnitudes of the forces $\mathbf{P}$ and $\mathbf{R}$ exerted on the ball end B of the shaft by the vertical walls C and D, respectively.

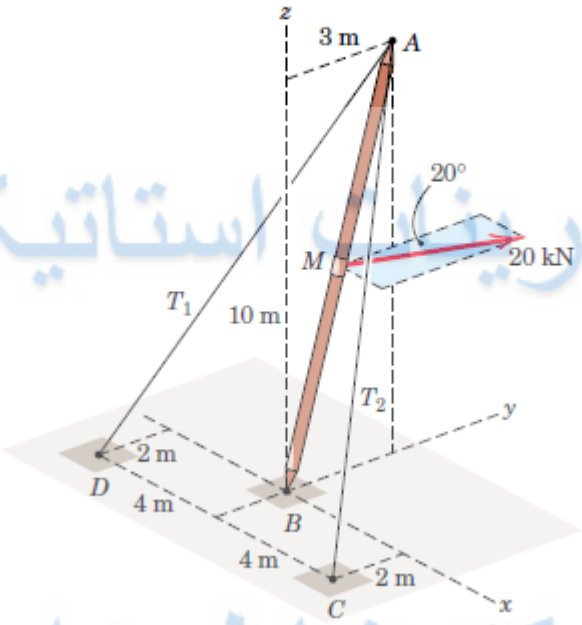


The 25-kg rectangular access door is held in the 90° open position by the single prop CD. Determine the force F in the prop and the magnitude of the force normal to the hinge axis AB in each of the small hinges A and B.



5

The boom AB lies in the vertical y-z plane and is supported by a ball-and-socket joint at B and by the two cables at A. Calculate the tension in each cable resulting from the 20-kN force acting in the horizontal plane and applied at the midpoint M of the boom. Neglect the weight of the boom.



The rigid pole and cross-arms of Prob. 2/105 are shown again here. Determine the tensions T_{AE} and T_{GF} in the two supporting cables resulting from the 1.2-kN tension in cable CD. Assume the absence of any resisting moments on the base of the pole at O about the x- and y-axes, but not about the z-axis.