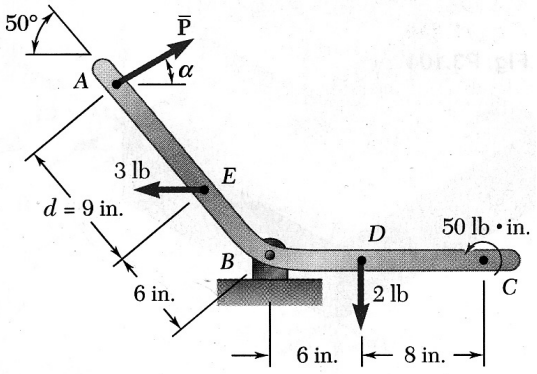
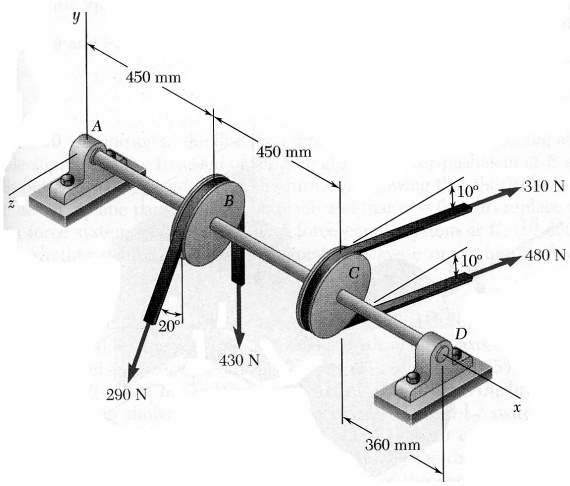
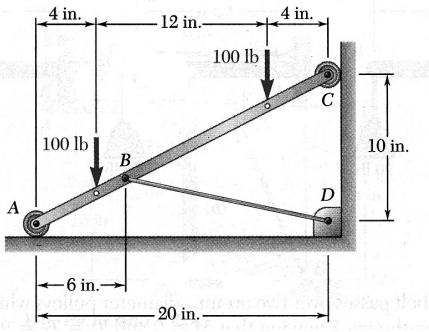
ES201 Problem set #3



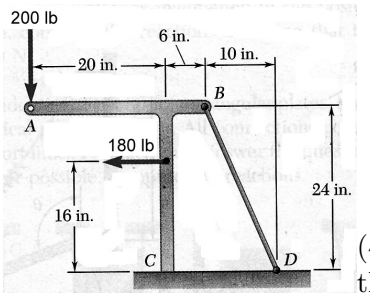
(1) Three forces and a couple act on the crank ABC. For P=5.00 lb and α=40°, (a) determine the resultant of the given system of forces, (b) locate the the point where the line of action of the resultant intersects a line drawn through points B and C, (c) locate the the point where the line of action of the resultant intersects a line drawn through points A and B.



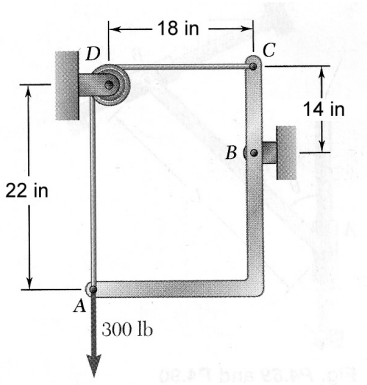
(2) Two 300 mm diameter pulleys are mounted on the shaft AD. The belts B and C lie in the yz plane. Replace the belt forces shown with an equivalent force-moment system at A.



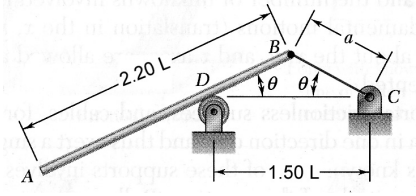
(3) Bar AC supports two 100 lb loads as shown. Rollers A and C rest against frictionless surfaces and a cable BD is attached at B. Determine (a) the tension in cable BD; (b) the reaction at A, (c) the reaction at C.



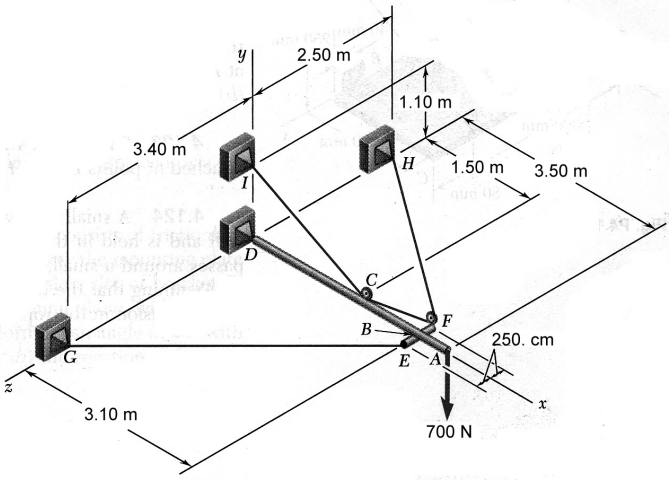
(4) Knowing that the tension in wire BD is 300 lb, determine the reaction at the fixed support C for the frame shown.



(5) Member ABC is supported by a pin and bracket at B and by an inextensible cord attached at A and C and passing over a frictionless pulley at D. The tension is the same throughout the cord. For the loading shown, *neglecting the size of the pulley*, determine the tension in the cord and the reaction at B.



(6) A uniform slender rod is held in equilibrium as shown by a cord of length a. If L = 100 mm, determine (a) the angle θ, (b) the length a.



(7) The two pipes ABCD and EBD are welded together at B to form the structure shown. It is held by a ball-and-socket joint at D and by two cables EG and ICFH; cable ICFH passes around frictionless pulleys at C and F. For the loading shown, determine the tension in each cable and the reaction forces at D.