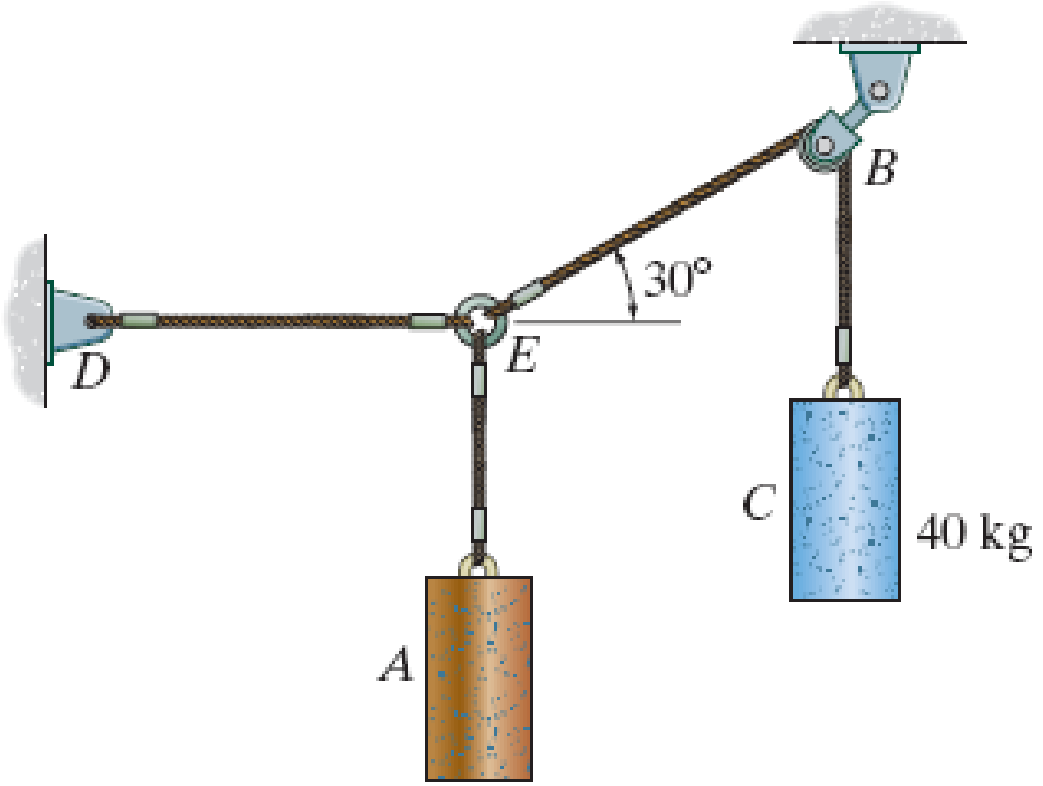
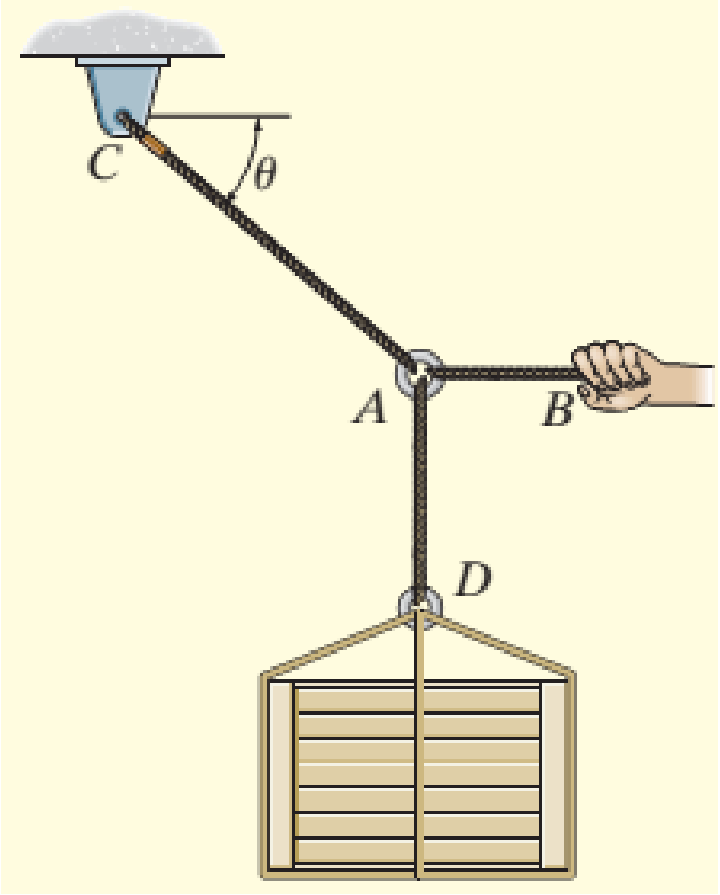
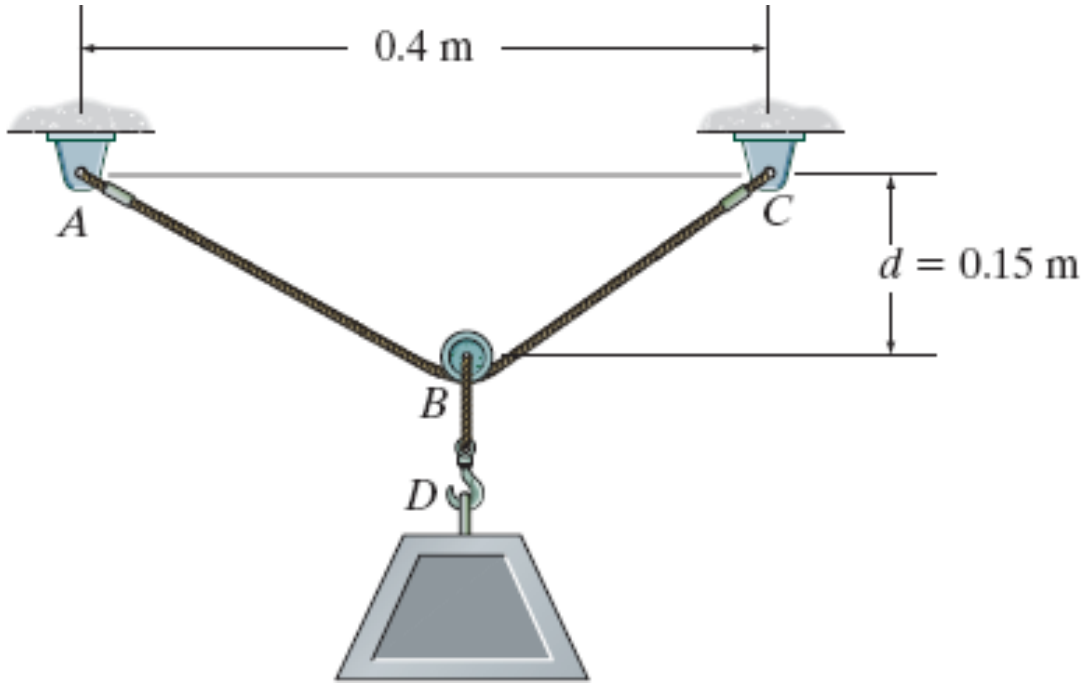
Ex.1. If the mass of cylinder C is 40 kg, determine the mass of cylinder A in order to hold the assembly in the position shown.

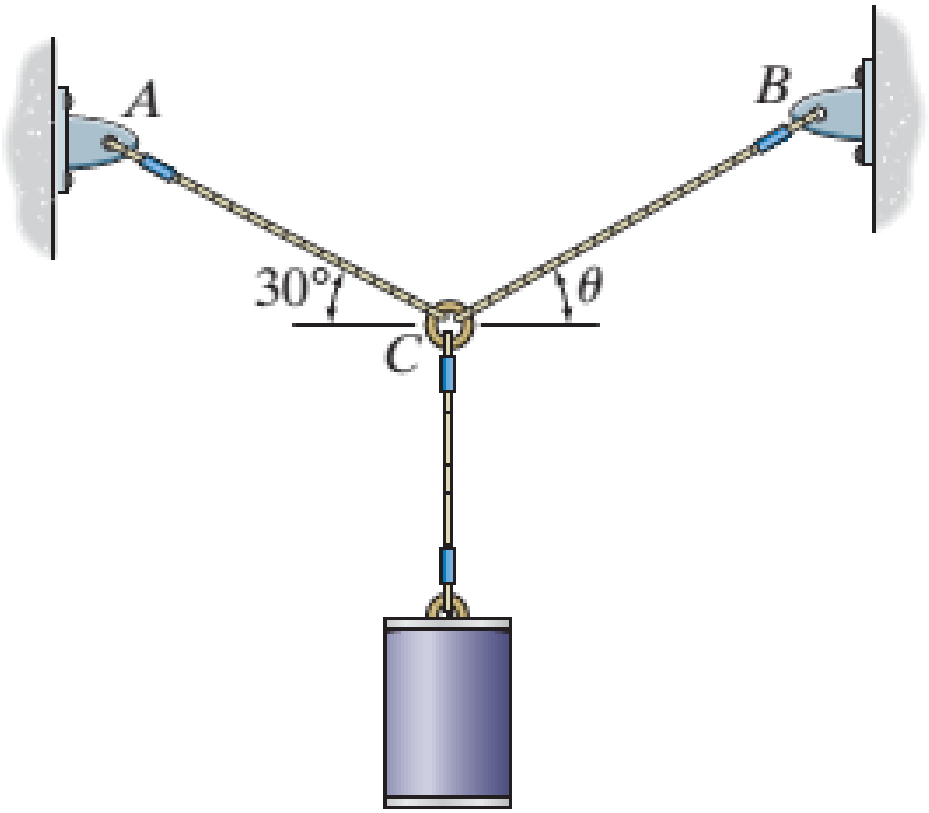




Ex.2. The 200-kg crate is suspended using the ropes AB, AC and AD. Each rope can withstand a maximum force of 10kN before it breaks. If AB remains horizontal, determine the smallest angle θ to which the crate can be suspended before one of the ropes breaks.

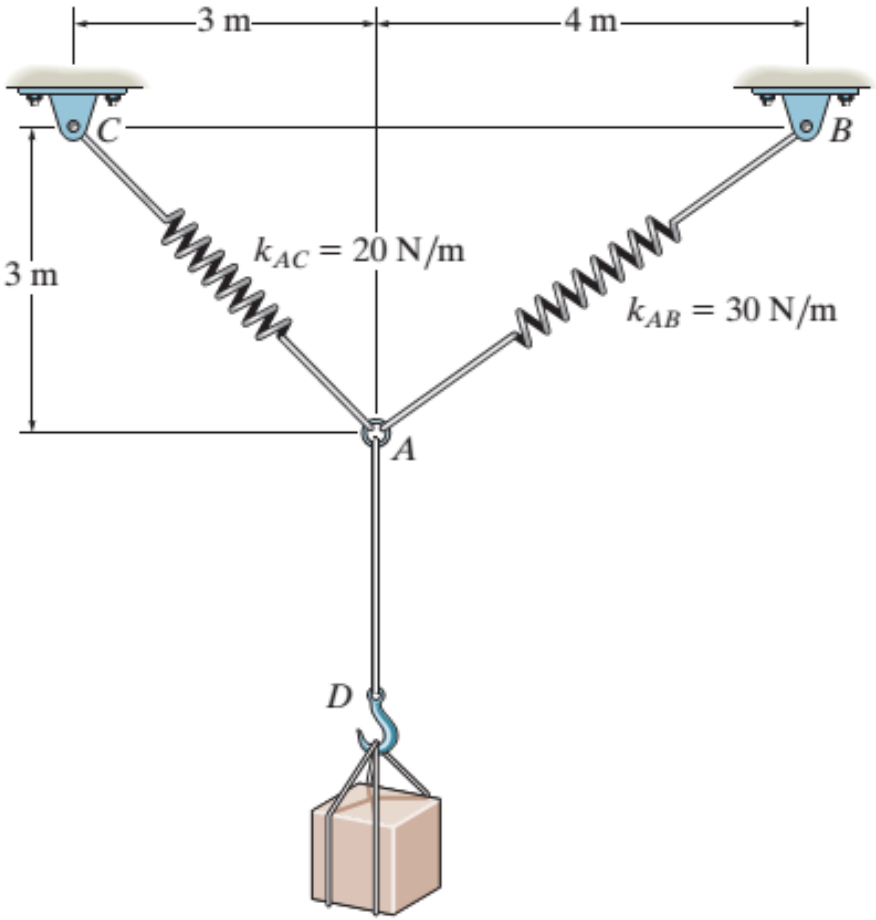
Ex.3. If the 5-kg block is suspended from the pulley *B* and the sag of the cord is $d = 0.15$ m, determine the force in cord *ABC*. Neglect the size of the pulley.

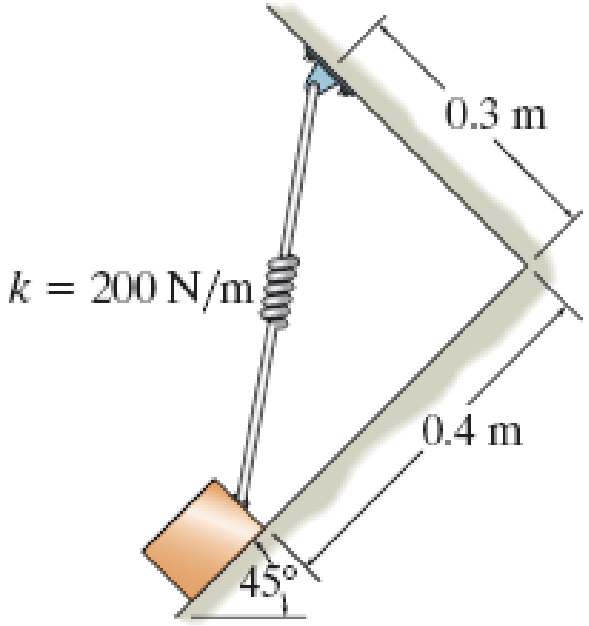




Ex.4. If cable CB is subjected to a tension that is twice that of cable CA , determine the angle for equilibrium of the 10-kg cylinder. Also, what are the tensions in wires CA and CB ?

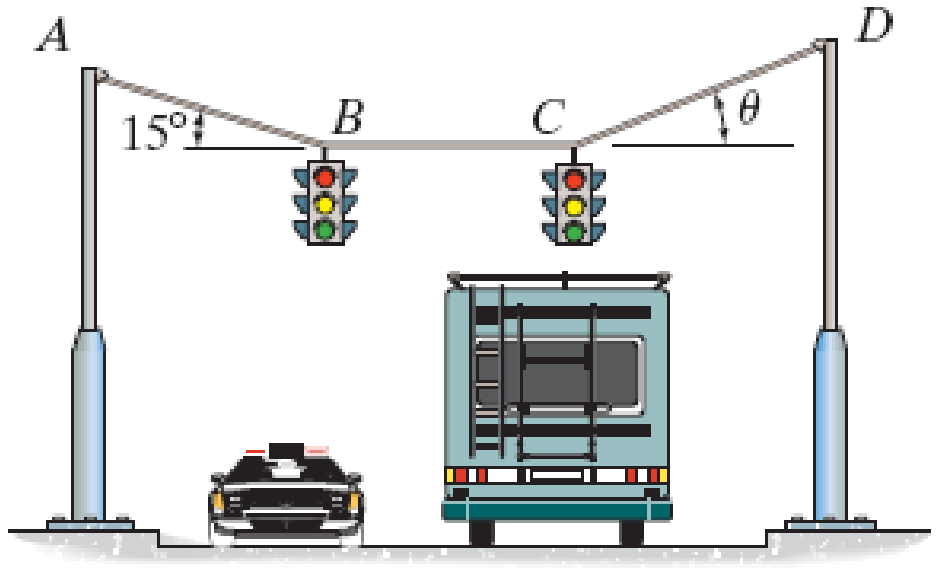
Ex.5. The unstretched length of spring AB is 3 m. If the block is held in the equilibrium position shown, determine the mass of the block at D and the unstretched length of spring AC.

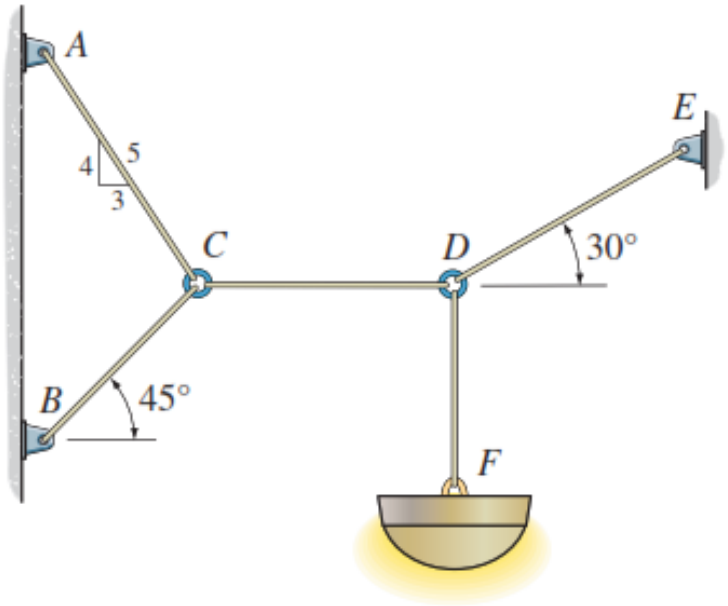




Ex.6. The block has a mass of 5 kg and rests on the smooth plane. Determine the unstretched length of the spring.

Ex.7. Determine the tension in cables AB, BC, and CD, necessary to support the 10-kg and 15-kg traffic lights at B and C, respectively. Also, find the angle θ.

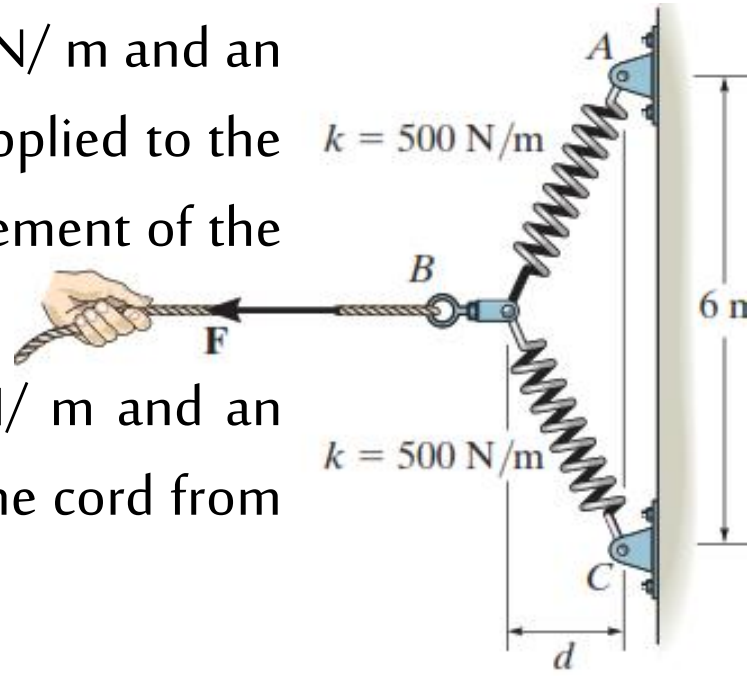




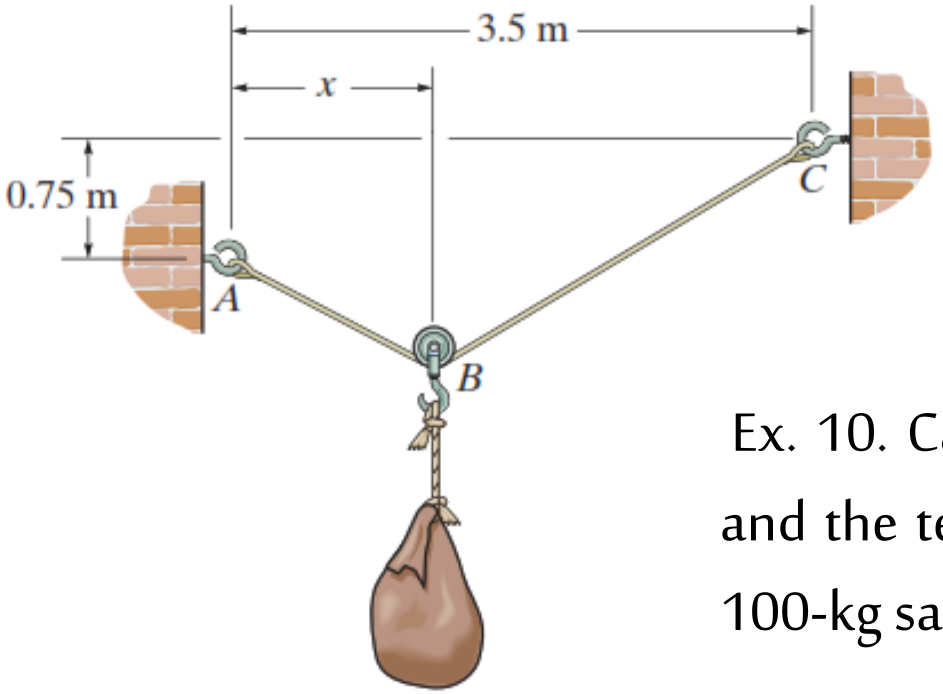
Ex.8. (1) Determine the tension developed in each cord required for equilibrium of the 20-kg lamp.

(2) Determine the maximum mass of the lamp that the cord system can support so that no single cord develops a tension exceeding 600 N.

Ex.9. (1) The springs BA and BC each have a stiffness of 500 N/ m and an unstretched length of 3 m. Determine the horizontal force F applied to the cord which is attached to the small ring B so that the displacement of the ring from the wall is $d = 1.5$ m.

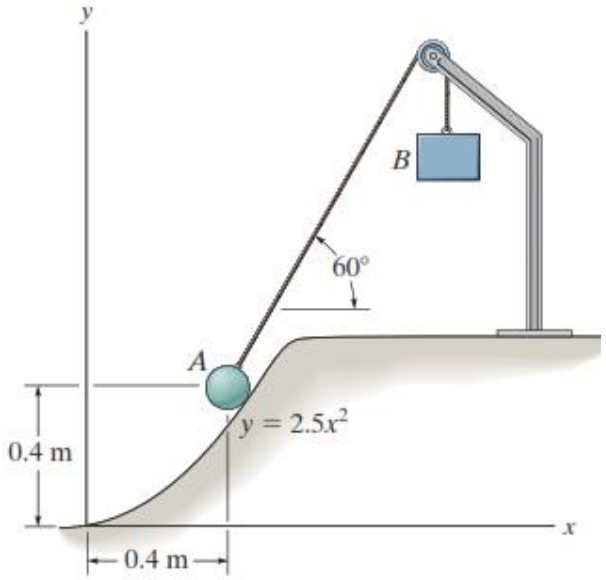


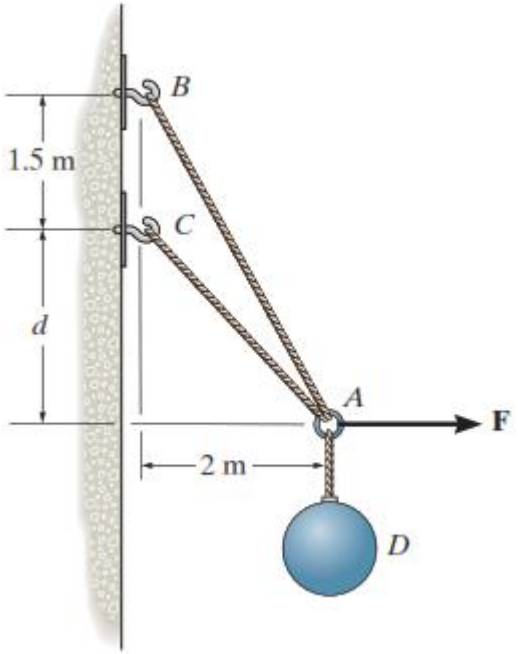
(2) The springs BA and BC each have a stiffness of 500 N/ m and an unstretched length of 3 m. Determine the displacement d of the cord from the wall when a force $F = 175$ N is applied to the cord.



Ex. 10. Cable ABC has a length of 5 m. Determine the position x and the tension developed in ABC required for equilibrium of the 100-kg sack. Neglect the size of the pulley at B.

Ex. 11. A 4-kg sphere rests on the smooth parabolic surface. Determin the normal force it exerts on the surface and the mass m_B of block needed to hold it in the equilibrium position shown.



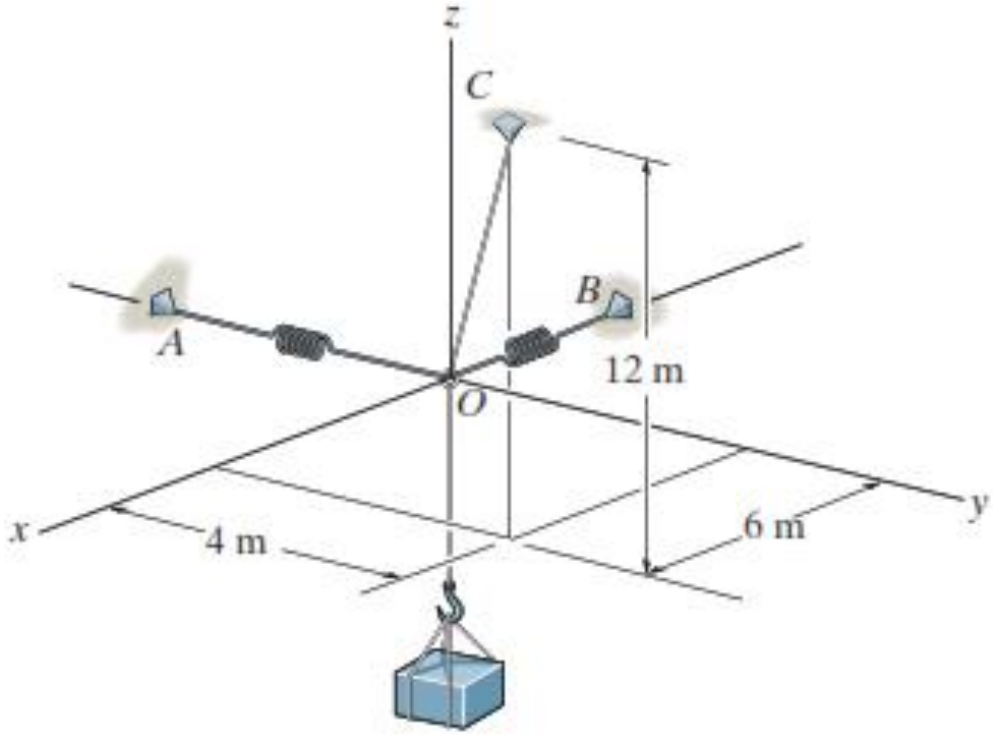


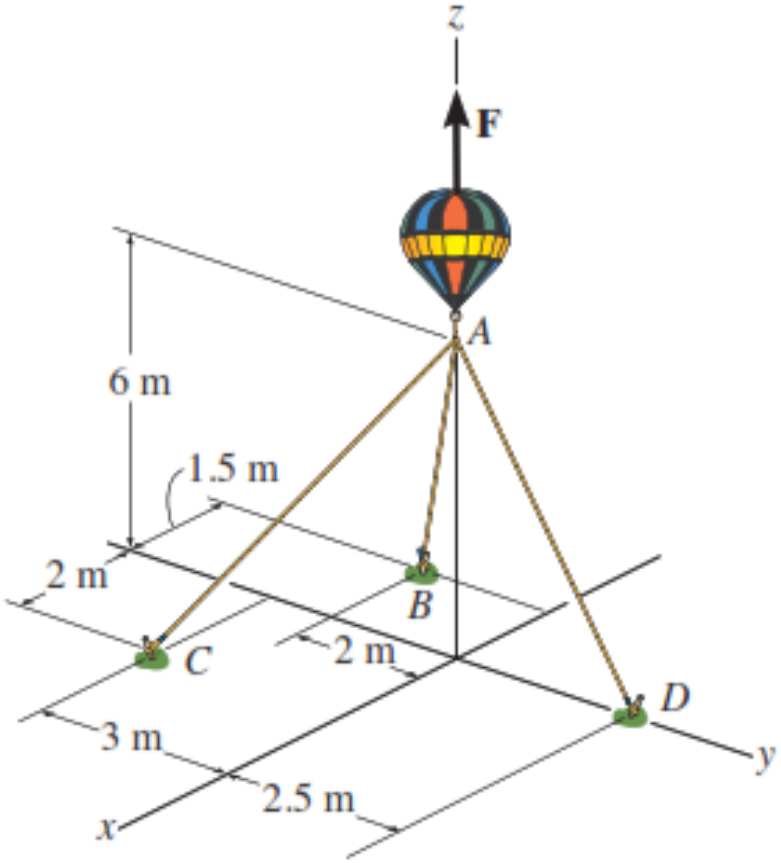
Ex. 12.

(1) Determine the forces in cables AC and AB needed to hold the 20-kg ball D in equilibrium. Take F = 300 N and d = 1 m.

(2) The ball D has a mass of 20 kg. If a force of F = 100 N is applied horizontally to the ring at A, determine the dimension d so that the force in cable AC is zero.

Ex. 11. Determine the stretch in each of the two springs required to hold the 20-kg crate in the equilibrium position shown. Each spring has an unstretched length of 2 m and a stiffness of k = 300 N/ m.





Ex. 12. (1) If the balloon is subjected to a net uplift force of F = 800 N, determine the tension developed in ropes AB , AC , AD .

(2) If each one of the ropes will break when it is subjected to a tensile force of 450 N, determine the maximum uplift force F the balloon can have before one of the ropes breaks.