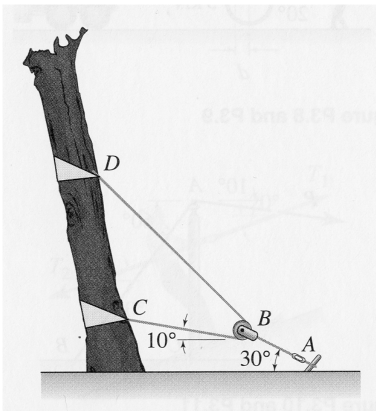
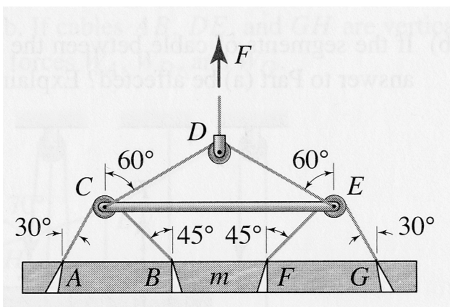
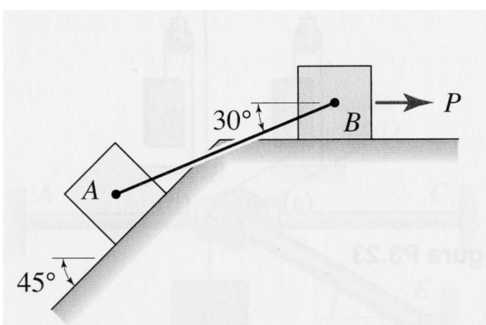
PHY 211 Statics HW 2



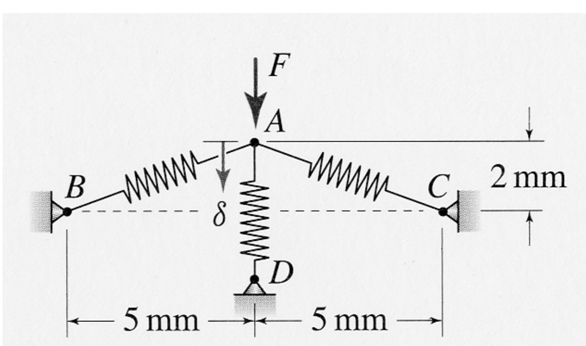
1. The leaning tree at left is being straightened by the cable and pulley system shown. If the force in cable AB is 450 N, what is the tension in cable CBD?



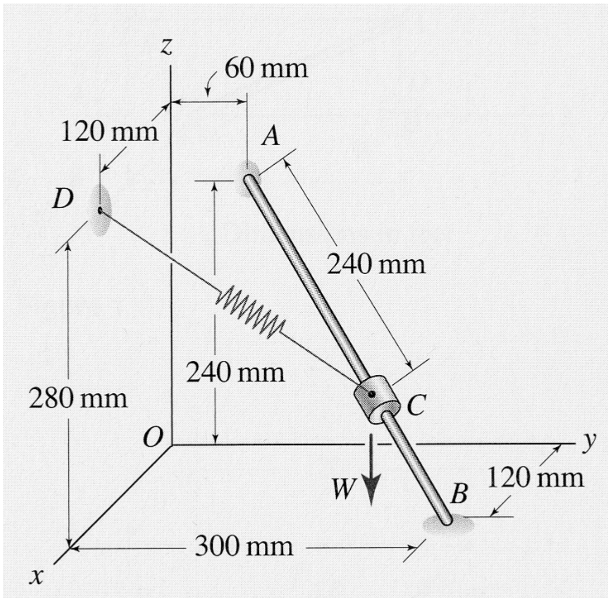
2. In the system lifting the beam shown at left, cables ACB and FEG can have a maximum tension of 3 kN. Cable CDE can support a maximum tension of 9 kN. The bar CE can support a maximum compressive force of 5 kN. What is the mass of the heaviest beam that this system can lift without failure? You may neglect the weight of the cables, pulleys, and bar CE.



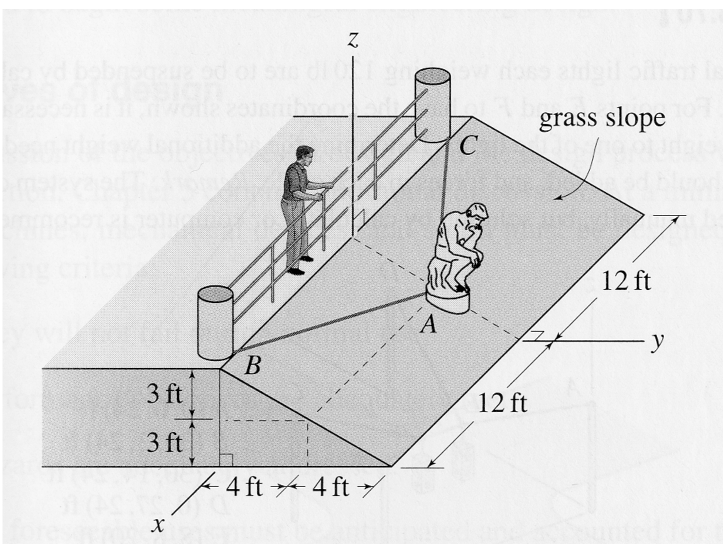
3. Each block at left weighs 100 lbs and rests on a frictionless surface. Determine the force P required to hold the system in equilibrium and the normal force between each block and the surface it rests on.



4. The system at left models a keyboard button, allowing a distinct "click" when the button is depressed some minimum distance, then a restoring force to bring the button back to its original position. Springs AB and AC have force constants 2 N/mm, and spring AD has force constant 0.3 N/mm. With F = 0 in the geometry shown, all springs are unstretched/uncompressed. Derive an expression for F as a function of δ, plot F vs. δ for $0 \le \delta \le 5$ mm, and determine the largest value of F for $0 \le \delta \le 2$ mm.



5. Spring CD has force constant 3 N/mm and an unstretched length of 200 mm. Assume no friction between rod AB and collar C. What weight W of collar C will produce the equilibrium position shown? What is the vector force exerted by rod AB onto collar C?



6. The statue (1000 lbs) is held in place by cables AB and AC on the frictionless slope. Find the tension in the cables and the normal force exerted by the surface on the statue.