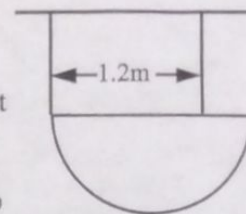
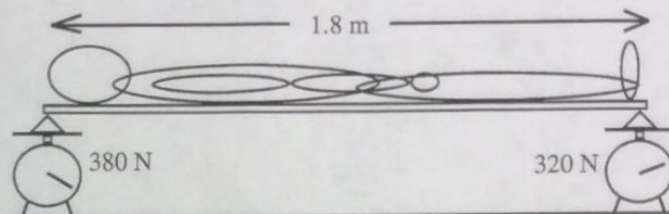


Physics Practice Problems — Equilibrium of Rigid Bodies

1. A 40-kg uniform semicircular sign 1.6 m in diameter is supported by two wires as shown. What is the tension in each of the wires supporting the sign?

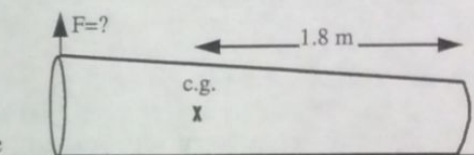


2. A 300-kg horizontal uniform steel beam is supported at each end. A 60-kg person stands on top of the beam one third of the way from one end. What are the vertical forces on each of the supports?

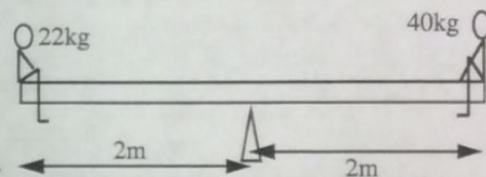


3. Neglecting the weight of the supporting plank (fig. on the right), a) how far from the person's feet is his center of mass? b) How much does this person weigh? (The scale on the left reads 380N and the scale on the right reads 320N.)

4. Two men are carrying a uniform ladder 6 m long with a mass of 40 kg. If one of the men lifts with 150 N at one end of the ladder, a) where (in terms of distance to the end where the first man lifts), and b) how much force must the second man lift?

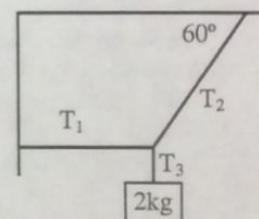


5. A 3-m long 200-kg log lays on a level ground as shown on the right. The center of gravity of the log is 1.8 m from one end. Find the minimum force required to lift this log from the other end.



6. A seesaw is made of a 4-meter-long uniform beam with a fulcrum at the center. Two kids are already sitting on either end of the seesaw. The kid sitting on the right end has a mass of 40 kg; and the one sitting on the left end has a mass of 22 kg. Where should the third kid, whose mass is 28 kg, sit in order to balance the seesaw?

7. Find the tension in the three cords shown on the right.



8. A uniform sign of weight 80 N and width 2 m hangs from a very light horizontal beam hinged at the wall and supported by a cable as shown to the right. The total length of the beam is 3 m. Determine a) the tension in the cable, and b) the vertical and horizontal components of the force exerted by the wall on the beam.

