

PHY 166 Recitation 3

Chapters 6, 7, and 8.

April 4, 2019

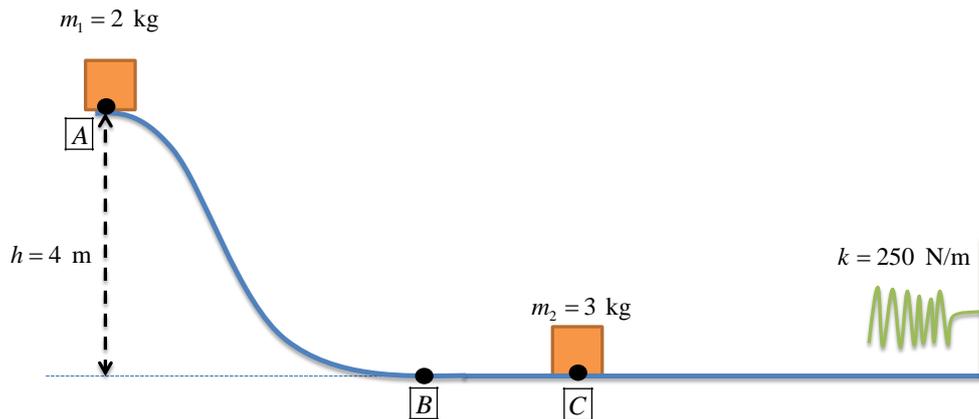


Figure 1: Figure for Problem 1.

- 1.) An object of mass $m_1 = 2 \text{ kg}$ slides down a hill. Its speed at the top of the hill (position 'A') is 5 m/s .
 - (a.) What is the speed of the object at the bottom of the hill at position 'B'? Assume there is no friction.
 - (b.) At point 'C', the object hits a second, stationary, object with mass $m_2 = 3 \text{ kg}$. The two objects stick together after the collision. Find their speed after the collision.
 - (c.) The combined objects hit the spring and compress it before they stop. How much does the spring compress? The spring constant is $k = 250 \text{ N/m}$.

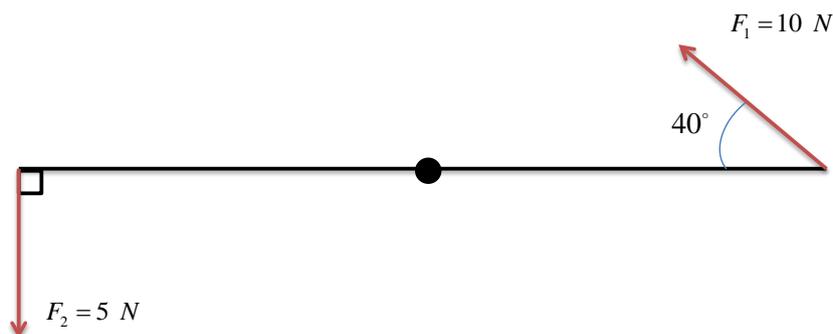


Figure 2: Figure for Problem 2.

- 2.) A 1-meter long rod rotates around a vertical axis passing through its center under the influence $F_1 = 10 \text{ N}$ and $F_2 = 5 \text{ N}$. The rod starts rotating from rest and reaches 50 rpm 10 seconds later.
 - (a.) Calculate the torque exerted on the rod.
 - (b.) Calculate the angular acceleration.
 - (c.) Calculate the number of revolutions it makes during this time interval.
 - (d.) Calculate the linear velocity, the centripetal acceleration, and the tangential acceleration of a point at the edge of the rod at $t = 5 \text{ s}$.
 - (e.) What is the moment of inertia of the rod?

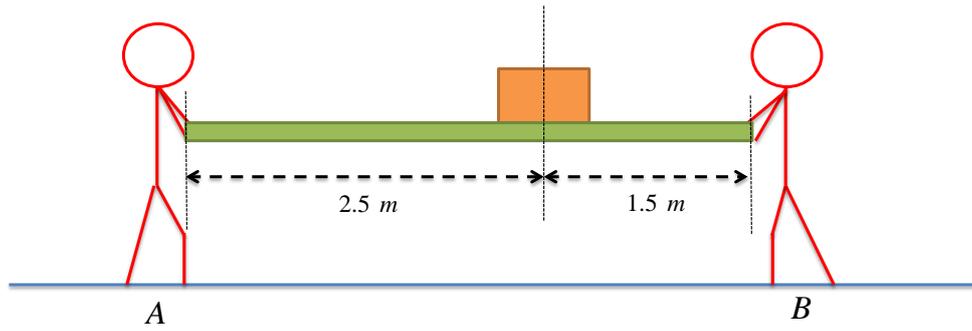


Figure 3: Figure for Problem 3.

3.) Two friends 'A' and 'B' are holding a 50 kg box on a 4 meter wooden board of mass 5 kg as shown above. The board is level and uniformly dense. Calculate the normal force each friend exerts on the board.