

Questions from chapter 5

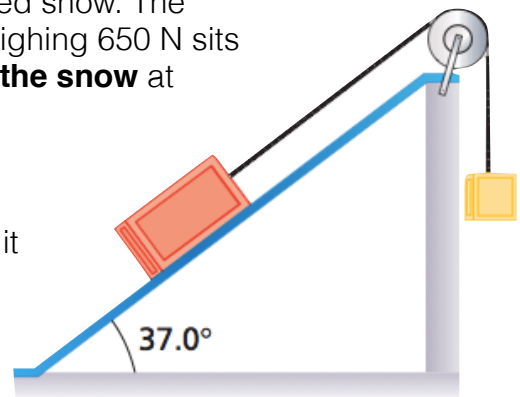
17. A girl exerts a 36 N horizontal force as she pulls a 52 N sled across a cement sidewalk at constant speed. **What is the coefficient of kinetic friction** between the sidewalk and the sled?

18. You need to move a 105 kg sofa to a different location in the room. It takes a force of 102 N to start it moving. **What is the coefficient of static friction** between the sofa and the carpet?

19. Mr. Ames is dragging a box full of books from his office to his car. The box and books together have a combined weight of 134 N. If the coefficient of static friction between the pavement and the box is 0.55, **how hard must Mr. Ames push the box** in order to start it moving?

20. Suppose that the sled in problem 17 is resting on packed snow. The coefficient of kinetic friction is now only 0.12. If a person weighing 650 N sits on the sled, **what force is needed to pull the sled across the snow** at constant speed?

22. A 1.4-kg block slides across a rough surface such that it slows down with an acceleration of 1.25 m/s^2 . **What is the coefficient of kinetic friction** between the block and the surface?



■ Figure 5-21

24. A shuffleboard disk is accelerated to a speed of 5.8 m/s and released. If the coefficient of kinetic friction between the disk and the concrete court is 0.31, **how far does the disk go** before it comes to a stop?

36. Fernando, who has a mass of 43.0 kg, slides down the banister at his grandparents' house. If the banister makes an angle of 35.0° with the horizontal, **what is the normal force** between Fernando and the banister?

90. If you use a horizontal force of 30.0 N to slide a 12.0-kg wooden crate across a floor at a constant velocity, **what is the coefficient of kinetic friction** between the crate and the floor?

91. A 225-kg crate is pushed horizontally with a force of 710 N. If the coefficient of friction is 0.20, **calculate the acceleration** of the crate.

92. A force of 40.0 N accelerates a 5.0-kg block at 6.0 m/s^2 along a horizontal surface.
a. How large is the frictional force?
b. What is the coefficient of friction?

99. A 215-N box is placed on an inclined plane that makes a 35.0° angle with the horizontal. Find the component of the **weight parallel** to the plane's surface.

101. Two blocks are connected by a string over a frictionless, massless pulley such that one is resting on an inclined plane and the other is hanging over the top edge of the plane, *as shown in Figure 5-21*. The hanging block has a mass of 16.0 kg, and the one on the plane has a mass of 8.0 kg. The coefficient of kinetic friction between the block and the inclined plane is 0.23. The blocks are released from rest.

What is the acceleration of the blocks?

What is the tension in the string connecting the blocks?

104. A sled with a mass of 50.0 kg is pulled along flat, snow-covered ground. The static friction coefficient is 0.30, and the kinetic friction coefficient is 0.10.

What does the sled weigh?

What force will be needed to start the sled moving?

What force is needed to keep the sled moving at a constant velocity?

Once moving, what total force must be applied to the sled to accelerate it at 3.0 m/s^2 ?