

AP Physics

Mechanics Review Questions

Name: _____

Block: _____ Date: _____

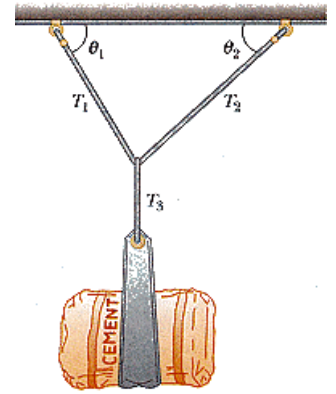
1. Al and Isaac are pulling horizontally on ropes attached to a post. The angle between the ropes is 45° . If Al exerts a force of 680 N and Isaac exerts a force of 500 N, find the magnitude of the resultant force and the angle it makes with respect to Al's pull. Of course, you should include a force diagram in your solution.

2. A student is pushing a crate up a 20° incline. The crate has a mass of 20 kg, and the coefficient of kinetic friction between the crate and the incline is 0.25.
 - A. Draw a force diagram of the crate.

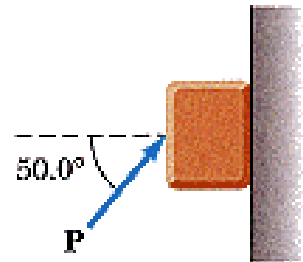
 - B. Calculate the magnitude of the normal (supporting) force between the crate and the incline.

 - C. Calculate the magnitude of the friction force between the crate and the floor.

3. A bag of cement weighing 325 N hangs from three ropes as shown in the illustration to the right. The ropes make angles $\theta_1 = 60.0^\circ$ and $\theta_2 = 30.0^\circ$ with the horizontal, and the system is in equilibrium. Find the tensions, T_1 and T_2 , in the ropes.

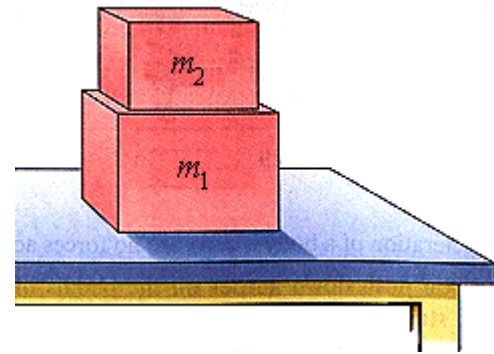


4. A block of mass 9.00 kg is pushed against a wall by a force P that makes a 50.0° angle with the horizontal as shown in the illustration. The coefficient of static friction between the block and the wall is 0.265. Determine the possible values for the magnitude of P that allow the block to remain stationary.



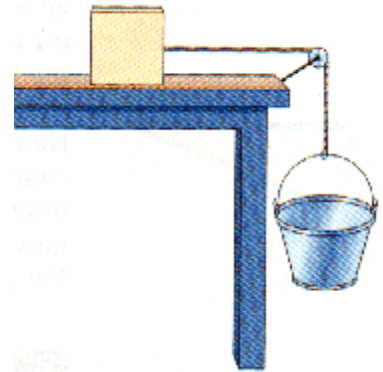
5. A 28.5 kg box (m_1) rests on a table. A 13.5 kg box (m_2) is placed on top of the 28.5 kg box, as shown.

A. Determine the normal (supporting) force that the table exerts on the 28.5 kg (m_1) box.



B. Determine the normal (supporting) force that the 28.5 kg box exerts on the 13.5 kg (m_2) box.

6. 26.0 kg block is connected to an empty 1.00 kg bucket by a massless cord running over a frictionless pulley*. The coefficient of static friction between the table and the block is 0.48 and the coefficient of kinetic friction between the table and the block is 0.30. Sand is gradually added to the bucket until the system just begins to move.



- A. Calculate the normal (supporting) force on the block by the table.
- B. Calculate the maximum friction force that can be applied by the table to the block.
- C. Calculate the mass of sand added to the bucket.
- D. What mass of sand in the bucket would cause the bucket to descend at a constant speed?

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