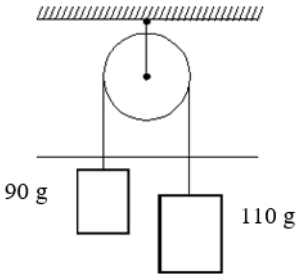
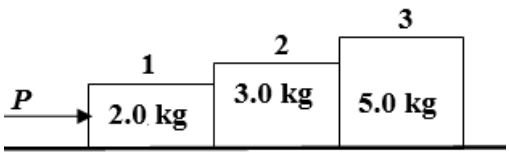
Chapters 5 and 6 (Force and motion I and II)



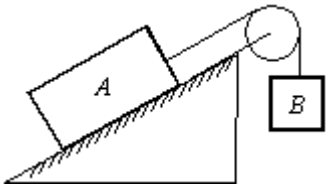
1- Two blocks are connected by a string and pulley as shown. Assuming that the string and pulley are massless, the magnitude of the acceleration of each block is: (A: 0.98 m/s^2)



2- If P = 6 N, what is the magnitude of the force exerted on block 1 by block 2? (A: 4.8 N)

3- A 70-kg man stands on a spring scale in an elevator that has a downward acceleration of 2.8 m/s^2. The scale will read: (A: 490 N)

4- A 5.0-kg mass sits on the floor of an elevator that has a downward acceleration of 1 m/s^2. On top of the 5-kg mass is an object of unknown mass. The force of the elevator on the 5-kg mass is 80 N up. Determine the unknown mass? (A: 4.1 kg)



5- Block A, with a mass of 10 kg, rests on a 35° incline. The coefficient of static friction is 0.40. An attached string is parallel to the incline and passes over a massless, frictionless pulley at the top. What is the smallest mass m_B, attached to the dangling end, for which A remains at rest? (A: 2.5 kg)

6- A person pulls a 50-kg box horizontally with a constant horizontal force of 200 N. If the coefficient of kinetic friction μ_k is 0.2 and the coefficient of static friction (μ_s) is 0.3. Find the acceleration of the box. (A: 2 m/s^2)

7- A block of mass M = 10 kg is pushed up along a 30° inclined plane with a force F parallel to the inclined plane. If the velocity of the block is constant and the coefficient of kinetic friction μ_k is 0.2, find the magnitude of the force. (A: 66 N)

8- One end of a 1.0-m string is fixed; the other end is attached to a 2.0-kg stone. The stone swings in a vertical circle, and has a speed of 4.0 m/s at the top of the circle. The tension in the string at this point is approximately: (A: 12 N)

9- A 3.5-kg block is pulled at constant velocity along a horizontal floor by a force F = 15 N that makes an angle of 40 degrees with the horizontal. Find the magnitude of the force of friction between the block and the floor. (A: 11 N)

10- Find the minimum coefficient of static friction between the tires of a car and a level road if the car is to make a circular turn of radius 90 m at a speed of 60 km/h. (A: 0.315)

Summary of Chapters 5 and 6 topics

1- Understanding the Newton's laws of motion
2- Understanding the friction forces (static and dynamic)
3- Understanding the force of the uniform circular motion