Chapter 7 (Kinetic energy, work, and power)

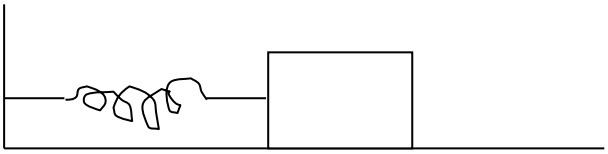
1- A force **F**= (4.0 **i** + 3.0 **j**) N acts on a particle as it moves in the x-y plane from the point (0,10 m) to (10 m,0). Calculate the work done on the article by this force. (A: 10 J)

2- The amount of work required to stop a moving object is equal to: (A: Its kinetic energy)

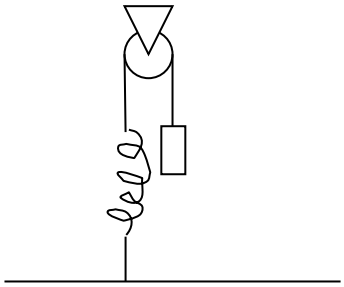
3- A box is moving with a speed of 9.10 m/s to the right. After it has moved a distance = d on a rough horizontal surface (μ_k = 0.6) its speed is reduced to 3.69 m/s. Find the value of d. (A: 5.88 m)

4- A particle moves 5 m in the positive x-direction while being acted upon by a constant force **F** = (4 **i** + 2 **j**) N, where i and j are unit vectors along the x-axis and the y-axis, respectively. What is the work done on the particle by this force? (A: +20 J)

5- A 3.0-kg is attached to a spring of force constant 20 N/m (see the figure) and rests on a frictionless surface. The block is pulled 2.0 m to the right and released from rest. What is its kinetic energy when it is 1.0 m from the equilibrium position? (A: 30 J)



6- A 20-kg mass is attached to a spring (k=380 N/m) that passes over a pulley as shown in the figure. The pulley is frictionless and massless. The mass is released from rest with the spring unstretched. What is the speed of the mass at the instant when it has dropped a vertical distance of 0.4 m? (A: 2.2 m/s)



7- A 6-kg block initially at rest is pulled to the right along a horizontal frictionless surface by a constant force of 12 N. Find the speed of the block after it has moved 3 m. (A: 3.5 m/s)

8- A 6-kg block initially at rest is pulled to the right along a horizontal rough surface (μ_k = 0.15) by a constant force of 12 N. Find the speed of the block after it has moved 3 m. (A: 1.8 m/s)

9- A net horizontal force of 50 N acts on a 2-kg block which starts from rest on a horizontal frictionless surface. The rate at which the work is being done by this force at t = 2 s is: (A: 2500 W)

10- A 1500 kg car accelerates uniformly from rest to 10 m/s in 3.0 s. The average power delivered by the engine of the car in the first 3.0 s is: (A: 25 kW)

Summary of Chapter 7 topics

1- Understanding the kinetic energy, work and their relationship
2- Understanding the work done by weight force
3- Understanding the spring and power