Chapter 5: Work and Energy

Work 1

Solve the following problems.

1. (Serway, p 162 #1) A tugboat pulls a ship with a constant net horizontal force of 5.00×10^3 N and causes the ship to move through the harbor. How much work is done on the ship if it moves a distance of 3.00 km?

2. (Serway, p 162 #2) A weight lifter lifts a set of weights a vertical distance of 2.00m. If a constant net force of 350 N is exerted on the weights, what is the net work done on the weights?

3. (Serway, p 162 #3) A shopper in a supermarket pushes a cart with a force of 35N directed at an angle of 25° downward from the horizontal. Find the work done by the shopper on the cart as the shopper moves along a 50.0 m length of aisle?

4. (Serway, p 162 #4) If 2.0 J of work is done to raise a 180g apple at a constant rate, how far is the apple lifted?

5. A person pushes a box with a force of 300N. If the force is exerted downward a some angle, what must the angle be if the displacement is 15m and the work done is 3200J.

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6. (Walker, p 193 #1) A farmhand pushes a 23-kg bale of hay 3.0 m across the floor of a barn. If she exerts a horizontal force of 80.0 N on the hay, how much work has she done?

7. (Walker, p 193 #2) Children in a tree house lift a small dog in a basket 4.70 m up to their house at a constant rate. If it takes 201 J of work to do this, what is the combined mass of the dog and basket?

8. (Walker, p 193 #3) Early one October, you go to a pumpkin patch to select your Halloween pumpkin. You lift the 3.2-kg pumpkin to a height of 1.2 m, and then carry it 50.0 m (on level ground at a constant rate) to the check-out stand. (a) Calculate the work you do on the pumpkin as you lift it from the ground. (b) How much work do you do on the pumpkin as you carry it from the field?

9. (Giancoli, p 174 #1) A 75 kg firefighter climbs a flight of stairs 10.0m high. How much word is required?

10. (Giancoli, p 174 #2) A 900N crate rests on the floor. How much work is required to move it at a constant speed 6.0m along the floor against a friction force of 180N? How about the lift the crate vertically 6.0m?