Home Work
Ch7 & Ch8

1- A block of mass 2.50 kg is pushed 2.20 m along a frictionless horizontal table by a constant 16.0-N force directed 25.0° below the horizontal. Determine the work done on the block by
(a) the applied force,
(b) the normal force exerted by the table, and
(c) the gravitational force.
(d) Determine the total work done on the block.

2- A shopper in a supermarket pushes a cart with a force of 35.0 N directed at an angle of 25.0° downward from the horizontal. Find the work done by the shopper on the cart as he moves down an aisle 50.0 m long.

7- force $\mathbf{F} = (6\hat{\mathbf{i}} - 2\hat{\mathbf{j}})$ N acts on a particle that undergoes a displacement $\Delta\mathbf{r} = (3\hat{\mathbf{i}} + \hat{\mathbf{j}})$ m. Find
(a) the work done by the force on the particle and
(b) the angle between $\mathbf{F}$ and $\Delta\mathbf{r}$.

14 - A force $\mathbf{F} = (4x\hat{\mathbf{i}} + 3y\hat{\mathbf{j}})$ N acts on an object as the object moves in the x direction from the origin to $x = 5.00$ m.
Find the work $w = \int F \,.\, dr$ done on the object by the force

24 - A 0.600-kg particle has a speed of 2.00 m/s at point A and kinetic energy of 7.50 J at point B. What is
(a) its kinetic energy at A?
(b) its speed at B?
(c) the total work done on the particle as it moves from A to B?

25 - A 0.300-kg ball has a speed of 15.0 m/s.
(a) What is its kinetic energy?
(b) What If? If its speed were doubled, what would be its kinetic energy?

26 - A 3.00-kg object has a velocity (6.00ˆi - 2.00ˆj) m/s.
(a) What is its kinetic energy at this time?
(b) Find the total work done on the object if its velocity changes to (8.00ˆi + 4.00ˆj) m/s.
(*Note:* From the definition of the dot product, $v^2 = \mathbf{v} \cdot \mathbf{v}$)

31 - A 40.0-kg box initially at rest is pushed 5.00 m along a rough, horizontal floor with a constant applied horizontal force of 130 N. If the coefficient of friction between box and floor is 0.300, find
(a) the work done by the applied force,
(b) the increase in internal energy in the box-floor system due to friction,
(c) the work done by the normal force,
(d) the work done by the gravitational force,
(e) the change in kinetic energy of the box, and
(f) the final speed of the box.

Chapter 8

2- A 400-N child is in a swing that is attached to ropes 2.00 m long. Find the gravitational potential energy of the child–Earth system relative to the child's lowest position when
(a) the ropes are horizontal,
(b) the ropes make a 30.0° angle with the vertical, and
(c) the child is at the bottom of the circular arc.

6 - Dave Johnson, the bronze medalist at the 1992 Olympic decathlon in Barcelona, leaves the ground at the high jump with vertical velocity component 6.00 m/s. How far does his center of mass move up as he makes the jump?

13 - Two objects are connected by a light string passing over a light frictionless pulley as shown in Figure P8.13. The object of mass 5.00 kg is released from rest. Using the principle of conservation of energy,
(a) determine the speed of the 3.00-kg object just as the 5.00-kg object hits the ground.
(b) Find the maximum height to which the 3.00-kg object rises.