Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Cp physics Web review ch 5 work and energy

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. In which of the following scenarios is no net work done?
a. A car accelerates down a hill.
b. A car travels at constant speed on a flat road.
c. A car decelerates on a flat road.
d. A car decelerates as it travels up a hill.

____ 2. A child moving at constant velocity carries a 2 N ice-cream cone 1 m across a level surface. What is the net work done on the ice-cream cone?
a. 0 J
b. 0.5 J
c. 2 J
d. 20 J

____ 3. A worker does 25 J of work lifting a bucket, then sets the bucket back down in the same place. What is the total net work done on the bucket?
a. –25 J
b. 0 J
c. 25 J
d. 50 J

____ 4. Ball A has triple the mass and speed of ball B. What is the ratio of the kinetic energy of ball A to ball B.
a. 3
b. 6
c. 9
d. 27

____ 5. What is the kinetic energy of a 0.135 kg baseball thrown at 40.0 m/s?
a. 54.0 J
b. 87.0 J
c. 108 J
d. 216 J

____ 6. What is the average power supplied by a 60.0 kg person running up a flight of stairs a vertical distance of 4.0 m in 4.2 s?
a. 57 W
b. 240 W
c. 560 W
d. 670 W

____ 7. If Nellie Newton pushes an object with twice the force for twice the distance, she does
a. twice the work.
b. the same work.
c. four times the work.
d. eight times the work.

____ 8. When a car's speed triples, its kinetic energy
a. remains the same.
b. triples.
c. increases by four times.
d. increases by nine times.
e. none of the above

____ 9. How much work is done on a 20-N crate that you lift 2 m?
a. 0 J
b. 1 J
c. 2 J
d. 20 J
e. 40 J

____ 10. Suppose a moving car has 3000 J of kinetic energy. If the car's speed doubles, how much kinetic energy will it then have?
a. 1000 J
b. 1500 J
c. 3000 J
d. 6000 J
e. 12,000 J

Problem

11. A worker pushes a box with a horizontal force of 50.0 N over a level distance of 5.0 m. If a frictional force of 43 N acts on the box in a direction opposite to that of the worker, what net work is done on the box?

12. A flight attendant pulls a 50.0 N flight bag a distance of 250.0 m along a level airport floor at a constant speed. A 30.0 N force is exerted on the bag at an angle of 50.0° above the horizontal. How much work is done on the flight bag?

13. A hill is 100 m long and makes an angle of 12° with the horizontal. As a 50 kg jogger runs up the hill, how much work does the jogger do against gravity?

14. A 40.0 N crate is pulled up a 5.0 m inclined plane at a constant velocity. If the plane is inclined at an angle of 37° to the horizontal and there is a constant force of friction of 10.0 N between the crate and the surface, what is the net gain in potential energy by the crate?

15. A pole vaulter clears 6.00 m. With what velocity does the vaulter strike the mat in the landing area?

    (Assume no air resistance and that $g = 9.81\ \text{m/s}^2$.)

16. A bobsled zips down an ice track, starting from rest at the top of a hill with a vertical height of 150 m.

    Disregarding friction, what is the velocity of the bobsled at the bottom of the hill? ($g = 9.81\ \text{m/s}^2$)

17. What amount of work is done on a chair that is pushed 9 m across a floor by a horizontal 30-N net force?

18. A car traveling at 50 km/h will skid 20 m when its brakes are locked. If the same car is traveling at 150 km/h, what will be its skidding distance?

19. A student lifts a 1.2-kg bag from her desk, which is 0.59-m high, to a locker that is 2.9-m high. What is the gravitational potential energy of the bag relative to the desk?

Cp physics Web review ch 5 work and energy
Answer Section

MULTIPLE CHOICE

1. B
2. A
3. B
4. D
5. C
6. C
7. C
8. D
9. E
10. E

PROBLEM

11. 35 J

Given
$F_w = 50.0\,\text{N}$

$F_k = -43\,\text{N}$

$d = 5.0\,\text{m}$

Solution
$W_{net} = F_{net}d = \left(F_w + F_k\right)d = \left[\,(50.0\,\text{N}) + (-43\,\text{N})\,\right](5.0\,\text{m}) = 35\,\text{J}$

12. 4820 J

Given
$F = 30.0\,\text{N}$

$d = 250.0\,\text{m}$

$\theta = 50.0°$

Solution
$W = Fd\cos\theta = (30.0\,\text{N})\,(250.0\,\text{m})\,(\cos 50.0°) = 4.83 \times 10^3\,\text{J}$

13. 1×10^4 J

Given
$m = 50\,\text{kg}$

$d = 100\,\text{m}$

$\theta = 12°$

$g = 9.81\,\text{m/s}^2$

Solution
$W = \Delta PE_g = mgh$

$h = d\sin\theta$

$W = mgd\sin\theta = \left(50\,\text{kg}\right)\left(9.81\,\text{m/s}^2\right)(100\,\text{m})(\sin 12°) = 1.0 \times 10^4\,\text{J}$

14. 120 J

Given
$mg = 40.0\,\text{N}$

$d = 5.0\,\text{m}$

$\theta = 37°$

$h_i = 0\,\text{m}$

Solution
$h_f = d\sin\theta = (5.0\,\text{m})(\sin 37°) = 3.0\,\text{m}$

$\Delta PE = PE_f - PE_i = mg\left(h_f - h_i\right) = (40.0\,\text{N})(3.0\,\text{m} - 0\,\text{m}) = 120\,\text{J}$

15. 10.8 m/s

Given
$h = 6.00\,\text{m}$

$g = 9.81\,\text{m/s}^2$

Solution
$KE_f = PE_{g,i}$

$\frac{1}{2}mv_f^{\,2} = mgh$

$v_f = \sqrt{2gh} = \sqrt{(2)\left(9.81\,\text{m/s}^2\right)(6.00\,\text{m})} = 10.8\,\text{m/s}$

16. 54 m/s

    Given
    $h = 150\text{ m}$

    $g = 9.81\text{ m/s}^2$

    Solution
    $KE_f = PE_{g,i}$

    $\frac{1}{2}mv_f^{\ 2} = mgh$

    $v_f = \sqrt{2gh} = \sqrt{(2)\left(9.81\text{ m/s}^2\right)(150\text{ m})} = 54\text{ m/s}$

17. 270 J
18. 180 m
19. 27 J