UCONN Physics / 70
Pre-test Copy # _____
Unit 6: Work, Energy, Power:

Directions: Use provided formula and conversion sheets provided. Do NOT write on this Pre-test if you wish to do your best on the actual test. I will not collect this pre-test, but writing on it will put you at a disadvantage for studying. Each question is worth 2 pts. You will have one class period to complete the actual test, therefore time yourself appropriately and don't spend too much time on any one question.

1) What is the correct unit of work expressed in SI units?
A) kg m/s^2
B) kg m^2/s
C) kg m^2/s^2
D) kg^2 m/s^2

2) A container of water is lifted vertically 3.0 m then returned to its original position. If the total weight is 30 N, how much work was done?
A) 45 J
B) 90 J
C) 180 J
D) No work was done.

3) You throw a ball straight up. Compare the sign of the work done by gravity while the ball goes up with the sign of the work done by gravity while it goes down.
A) Work is + on the way up and + on the way down.
B) Work is + on the way up and - on the way down.
C) Work is - on the way up and + on the way down.
D) Work is - on the way up and - on the way down.

4) The area under the curve, on a Force versus position (F vs. x) graph, represents
A) work.
B) kinetic energy.
C) power.
D) potential energy.

5) If the net work done on an object is negative, then the object's kinetic energy
A) decreases.
B) remains the same.
C) increases.
D) is zero.

6) A truck weighs twice as much as a car, and is moving at twice the speed of the car. Which statement is true about the truck's kinetic energy compared to that of the car?
A) All that can be said is that the truck has more kinetic energy.
B) The truck has twice the kinetic energy of the car.
C) The truck has 4 times the kinetic energy of the car.
D) The truck has 8 times the kinetic energy of the car.

7) A brick is moving at a speed of 3 m/s and a pebble is moving at a speed of 5 m/s. If both objects have the same kinetic energy, what is the ratio of the brick's mass to the pebble's mass?
A) 25 to 9
B) 5 to 3
C) 9 to 25
D) 3 to 5

8) You slam on the brakes of your car in a panic, and skid a certain distance on a straight, level road. If you had been traveling twice as fast, what distance would the car have skidded, under the same conditions?
A) It would have skidded 4 times farther.
B) It would have skidded twice as far.
C) It would have skidded 1.4 times farther.
D) It is impossible to tell from the information given.

9) The quantity $1/2\ kx^2$ is
A) the kinetic energy of the object.
B) the elastic potential energy of the object.
C) the work done on the object by the force.
D) the power supplied to the object by the force.

10) A 0.200-kg mass attached to the end of a spring causes it to stretch 5.0 cm. If another 0.200-kg mass is added to the spring, the potential energy of the spring will be
A) the same.
B) twice as much.
C) 3 times as much.
D) 4 times as much.

11) A ball drops some distance and gains 30 J of kinetic energy. Do not ignore air resistance. How much gravitational potential energy did the ball lose?
A) more than 30 J
B) exactly 30 J
C) less than 30 J
D) cannot be determined from the information given

12) The quantity Fd/t is
A) the kinetic energy of the object.
B) the potential energy of the object.
C) the work done on the object by the force.
D) the power supplied to the object by the force.

13) Compared to yesterday, you did 3 times the work in one-third the time. To do so, your power output must have been
A) the same as yesterday's power output.
B) one-third of yesterday's power output.
C) 3 times yesterday's power output.
D) 9 times yesterday's power output.

14) A 500-kg elevator is pulled upward with a constant force of 5500 N for a distance of 50.0 m. What is the work done by the weight of the elevator?
A) 2.75×10^5 J
B) -2.45×10^5 J
C) 3.00×10^4 J
D) -5.20×10^5 J

15) A 500-kg elevator is pulled upward with a constant force of 5500 N for a distance of 50.0 m. What is the net work done on the elevator?
A) 2.75×10^5 J
B) -2.45×10^5 J
C) 3.00×10^4 J
D) -5.20×10^5 J

16) A 30-N box is pulled 6.0 m up along a 37° inclined plane. What is the work done by the weight (gravitational force) of the box?
A) - 11 J
B) - 1.1 $\times 10^2$J
C) - 1.4 $\times 10^2$ J
D) - 1.8 $\times 10^2$ J

17) Matthew pulls his little sister Sarah in a sled on an icy surface (assume no friction), with a force of 60.0 N at an angle of 37.0° upward from the horizontal. If he pulls her a distance of 12.0 m, what is the work done by Matthew?
A) 185 J
B) 433 J
C) 575 J
D) 720 J

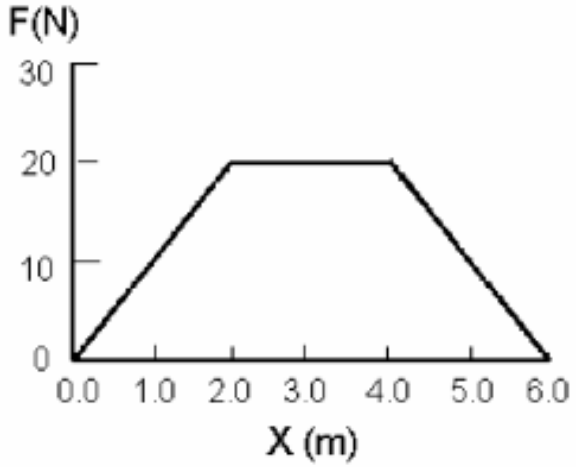

FIGURE 6-1

18) A force moves an object in the direction of the force. The graph in Fig. 6-1 shows the force versus the object's position. Find the work done when the object moves from 0 to 2.0 m.
A) 20 J
B) 40 J
C) 60 J
D) 80 J

19) A force moves an object in the direction of the force. The graph in Fig. 6-1 shows the force versus the object's position. Find the work done when the object moves from 2.0 to 4.0 m.
A) 20 J
B) 40 J
C) 60 J
D) 80 J

20) A force moves an object in the direction of the force. The graph in Fig. 6-1 shows the force versus the object's position. Find the work done when the object moves from 4.0 to 6.0 m.
A) 20 J
B) 40 J
C) 60 J
D) 80 J

21) A force moves an object in the direction of the force. The graph in Fig. 6-1 shows the force versus the object's position. Find the work done when the object moves from 0 to 6.0 m.
A) 20 J
B) 40 J
C) 60 J
D) 80 J

22) A horizontal force of 200 N is applied to move a 55-kg cart (initially at rest) across a 10 m level surface. What is the final kinetic energy of the cart?
A) 1.0×10^3 J
B) 2.0×10^3 J
C) 2.7×10^3 J
D) 4.0×10^3 J

23) A 10-kg mass is moving with a speed of 5.0 m/s. How much work is required to stop the mass?
A) 50 J
B) 75 J
C) 100 J
D) 125 J

24) A spring-driven dart gun propels a 10-g dart. It is cocked by exerting an average force of 20 N over a distance of 5.0 cm. With what speed will the dart leave the gun, assuming the spring has negligible mass?
A) 10 m/s
B) 14 m/s
C) 17 m/s
D) 20 m/s

25) A 10-kg mass, hung onto a spring, causes the spring to stretch 2.0 cm. What is the spring constant?
A) 4.9×10^3 N/m
B) 5.0×10^3 N/m
C) 20 N/m
D) 2.0 N/m

26) A spring with a spring constant of 15 N/m is initially compressed by 3.0 cm. How much work is required to compress the spring an additional 4.0 cm?
A) 0.0068 J
B) 0.012 J
C) 0.024 J
D) 0.030 J

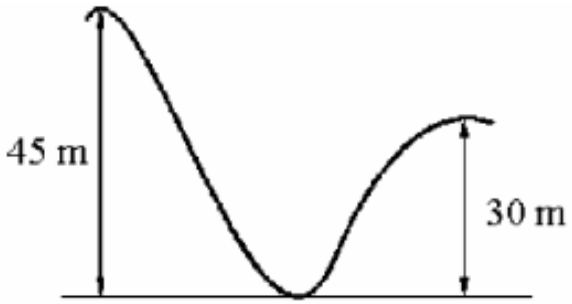

FIGURE 6-2

27) A roller coaster starts from rest at a point 45 m above the bottom of a dip (See Fig. 6-2). Neglect friction, what will be the speed of the roller coaster at the top of the next slope, which is 30 m above the bottom of the dip?
A) 14 m/s
B) 17 m/s
C) 24 m/s
D) 30 m/s

28) A roller coaster starts with a speed of 5.0 m/s at a point 45 m above the bottom of a dip (See Fig. 6-2). Neglect friction, what will be the speed of the roller coaster at the top of the next slope, which is 30 m above the bottom of the dip?
A) 12 m/s
B) 14 m/s
C) 16 m/s
D) 18 m/s

29) A roller coaster starts at a point 30 m above the bottom of a dip with a speed of 25 m/s (See Fig. 6-2). Neglect friction, what will be the speed of the roller coaster at the top of the next slope, which is 45 m above the bottom of the dip?
A) 14 m/s
B) 16 m/s
C) 18 m/s
D) 20 m/s

30) What is the minimum speed of the ball at the bottom of its swing (point B) in order for it to reach point A, which is 1.0-m above the bottom of the swing?

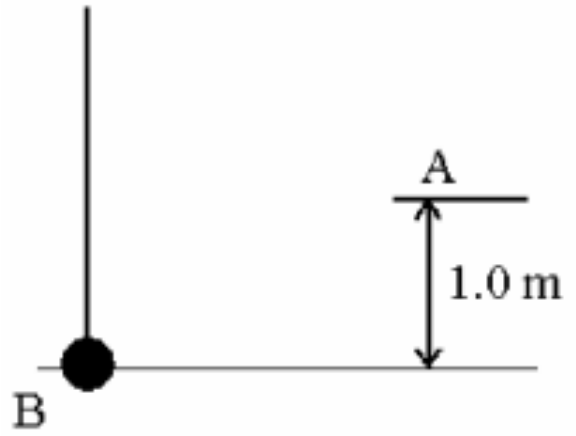

FIGURE 6-3

A) 2.2 m/s
B) 3.1 m/s
C) 4.4 m/s
D) 4.9 m/s

31) A pendulum of length 50 cm is pulled 30 cm away from the vertical axis and released from rest. What will be its speed at the bottom of its swing?
A) 0.50 m/s
B) 0.79 m/s
C) 1.2 m/s
D) 1.4 m/s

32) A 1500-kg car moving at 25 m/s hits an initially uncompressed horizontal spring with spring constant of 2.0×10^6 N/m. What is the maximum compression of the spring? (Neglect the mass of the spring.)
A) 0.17 m
B) 0.34 m
C) 0.51 m
D) 0.68 m

33) A 10-N force is needed to move an object with a constant velocity of 5.0 m/s. What power must be delivered to the object by the force?
A) 0.50 W
B) 1.0 W
C) 50 W
D) 100 W

34) How many joules of energy are used by a 1.0 hp motor that runs for 1.0 hr? (1 hp = 746 W)
A) 3.6×10^3 J
B) 2.7×10^6 J
C) 4.5×10^4 J
D) 4.8 J

35) A 1500-kg car accelerates from 0 to 25 m/s in 7.0 s. What is the average power delivered by the engine? (1 hp = 746 W)
A) 60 hp
B) 70 hp
C) 80 hp
D) 90 hp