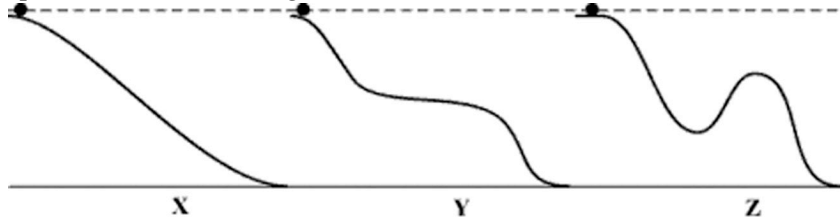


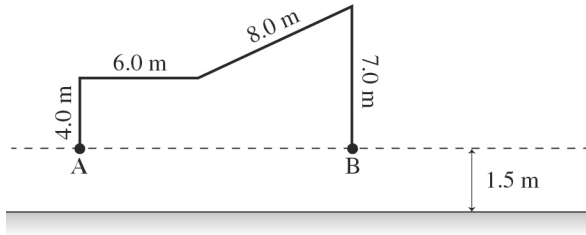
- 1) Person X pushes twice as hard against a stationary brick wall as person Y. Which one of the following statements is correct?
 - A) Both do the same amount of positive work.
 - B) Both do zero work.
 - C) Both do positive work, but person X does one-half the work of person Y.
 - D) Both do positive work, but person X does twice the work of person Y.
 - E) Both do positive work, but person X does four times the work of person Y.
- 2) If the force on an object is in the negative direction, the work it does on the object must be
 - A) positive.
 - B) negative.
 - C) The work could be either positive or negative, depending on the direction the object moves.
- 3) A 35-N bucket of water is lifted vertically 3.0 m and then returned to its original position. How much work did gravity do on the bucket during this process?
 - A) 0 J
 - B) 90 J
 - C) 45 J
 - D) 180 J
 - E) 900 J
- 4) Which one has larger kinetic energy: a 500-kg object moving at 40 m/s or a 1000-kg object moving at 20 m/s?
 - A) The 1000-kg object
 - B) The 500-kg object
 - C) Both have the same kinetic energy.
- 5) Three cars (car F, car G, and car H) are moving with the same speed and slam on their brakes. The most massive car is car F, and the least massive is car H. If the tires of all three cars have identical coefficients of kinetic friction with the road surface, which car travels the longest distance to skid to a stop?
 - A) They all travel the same distance in stopping.
 - B) Car G
 - C) Car F
 - D) Car H
- 6) 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 1.4 times farther.
 - B) It would have skidded 4 times farther.
 - C) It would have skidded twice as far.
 - D) It would have skidded one half as far.
 - E) It is impossible to tell from the information given.
- 7) Which requires more work, increasing a car's speed from 0 mph to 30 mph or from 50 mph to 60 mph?
 - A) 0 mph to 30 mph
 - B) 50 mph to 60 mph
 - C) It is the same in both cases.
- 8) When you throw a pebble straight up with initial speed V , it reaches a maximum height H with no air resistance. At what speed should you throw it up vertically so it will go twice as high?
 - A) $4V$
 - B) $16V$
 - C) $\sqrt{2}V$
 - D) $8V$
 - E) $2V$

- 9) A stone can slide down one of four different frictionless ramps, as shown in the figure. For which ramp will the speed of the ball be the greatest at the bottom?

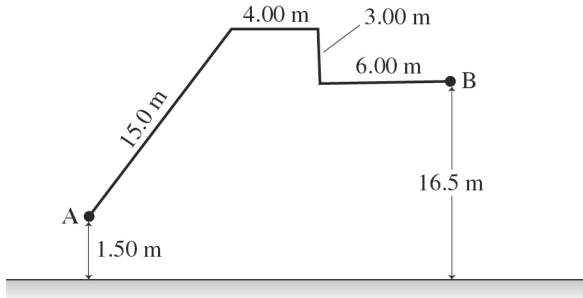


- A) Ramp X
B) Ramp Y
C) Ramp Z
D) The speed of the ball will be the same for all ramps.
- 10) If the units of your answer are $\text{kg} \cdot \text{m}^2/\text{s}^3$, which of the following types of quantities could your answer be? (There could be more than one correct choice.)
A) kinetic energy
B) power
C) force
D) potential energy
E) work
- 11) Jill does twice as much work as Jack does and in half the time. Jill's power output is
A) one-fourth as much as Jack's power output.
B) four times Jack's power output.
C) the same as Jack's power output.
D) one-half as much as Jack's power output.
E) twice Jack's power output.
- 12) An ornament of mass 40.0 g is attached to a vertical ideal spring with a force constant (spring constant) of 20.0 N/m. The ornament is then lowered very slowly until the spring stops stretching. How much does the spring stretch?
- 13) A very light ideal spring having a spring constant (force constant) of 8.2 N/cm is used to lift a 2.2-kg tool with an upward acceleration of 3.25 m/s^2 . If the spring has negligible length when it is not stretched, how long is it while it is pulling the tool upward?
- 14) How much work would a child do while pulling a 12-kg wagon a distance of 4.3 m with a 22 N force?
- 15) Matthew pulls his little sister Sarah along the horizontal ground in a wagon. He exerts a force on the wagon of 60.0 N at an angle of 37.0° above the horizontal. If he pulls her a distance of 12.0 m, how much work does Matthew do?

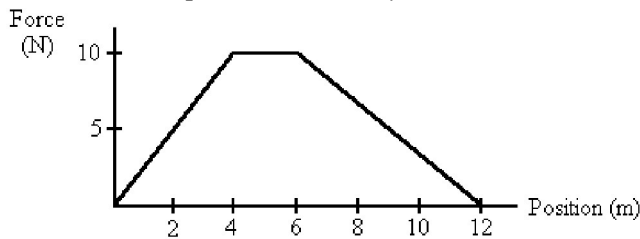
- 16) A person carries a 25.0-N rock through the path shown in the figure, starting at point A and ending at point B. The total time from A to B is 1.50 min. How much work did gravity do on the rock between A and B?



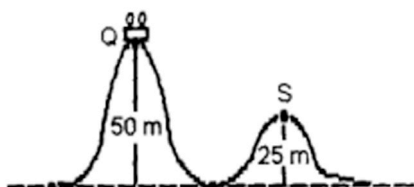
- 17) A person carries a 2.00-N pebble through the path shown in the figure, starting at point A and ending at point B. The total time from A to B is 6.75 min. How much work did gravity do on the rock between A and B?



- 18) A force acts on an object, causing it to move parallel to the force. The graph in the figure shows this force as a function of the position of the object. How much work does the force do as the object moves from 4 m to 6 m?

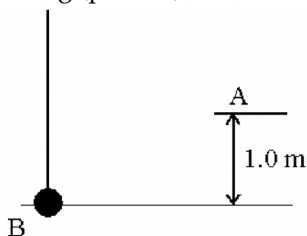


- 19) How large a net force is required to accelerate a 1600-kg SUV from rest to a speed of 25 m/s in a distance of 200 m?
- 20) A stone initially moving at 8.0 m/s on a level surface comes to rest due to friction after it travels 11 m. What is the coefficient of kinetic friction between the stone and the surface?
- 21) In a ballistics test, a 28-g bullet pierces a sand bag that is 30 cm thick. If the initial bullet velocity was 55 m/s and it emerged from the sandbag moving at 18 m/s, what was the magnitude of the friction force (assuming it to be constant) that the bullet experienced while it traveled through the bag?
- 22) The figure shows a famous roller coaster ride. You can ignore friction. If the roller coaster leaves point Q from rest, what is its speed at the top of the 25-m peak (point S)?

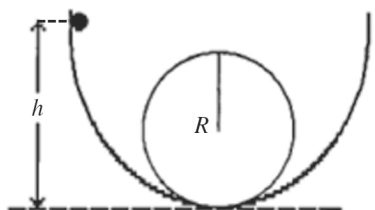


- 23) A 5.0-N projectile leaves the ground with a kinetic energy of 220 J. At the highest point in its trajectory, its kinetic energy is 120 J. To what vertical height, relative to its launch point, did it rise if there was no air resistance?

- 24) In the figure, a ball hangs by a very light string. 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?

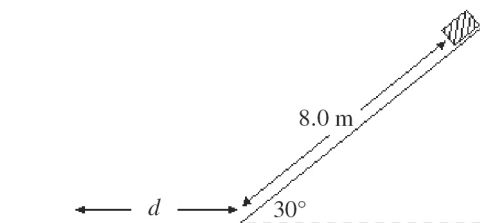


- 25) A roller coaster starts from rest at a height h at the left side of a loop-the-loop, as shown in the figure. It is not attached to the track in anyway, and there is no friction from the track or from air resistance. If the radius of the loop is $R = 6.0$ m, what is the minimum height h for which the roller coaster will not fall off the track at the top of the loop?

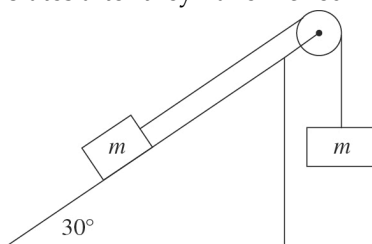


- 26) A 30-N stone is dropped from a height of 10 m and strikes the ground with a speed of 13 m/s. What average force of air friction acted on the stone as it fell?

- 27) An object with a mass of 10 kg is initially at rest at the top of a frictionless inclined plane that rises at 30° above the horizontal. At the top, the object is initially 8.0 m from the bottom of the incline, as shown in the figure. When the object is released from this position, it eventually stops at a distance d from the bottom of the inclined plane along a horizontal surface, as shown. The coefficient of kinetic friction between the horizontal surface and the object is 0.20, and air resistance is negligible. Find the distance d .



- 28) The figure shows two crates, each of mass $m = 24 \text{ kg}$, that are connected by a very light wire. The coefficient of kinetic friction between the crate on the inclined surface and the surface itself is 0.31. Find the speed of the crates after they have moved 1.6 m starting from rest.



- 29) How many joules of energy are used by a 1.0-hp motor that runs for 1.0 hour? ($1 \text{ hp} = 746 \text{ W}$)
- 30) If electricity costs $7.06\text{¢} / \text{kW}\cdot\text{h}$, how much would it cost you to run a 120-W stereo system 4.0 hours per day for 4.0 weeks?
- 31) A 1321-kg car climbs a 5.0° slope at a constant speed of 80.0 km/h . Assuming that air resistance may be neglected, at what rate (in kW) must the engine deliver energy to the drive wheels of the car?
- 32) A family goes on vacation for one week but forgets to turn off an electric fan that consumes electricity at the rate of 200 W. If the cost of electricity is $12.0\text{¢} / \text{kW}\cdot\text{h}$ how much does it cost (to the nearest penny) to run the fan for the week?
- 33) A sand mover at a quarry lifts 2,000 kg of sand per minute a vertical distance of 12 m. The sand is initially at rest and is discharged at the top of the sand mover with speed 5.0 m/s into a loading chute. What minimum power must be supplied to this machine?

Answer Key

Testname: HW_CH06_CONSRVATION_OF_ENERGY

- 1) B
- 2) C
- 3) A
- 4) B
- 5) A
- 6) B
- 7) B
- 8) C
- 9) D
- 10) B
- 11) B
- 12) 0.0196 m
- 13) 3.5 cm
- 14) 95 J
- 15) 575 J
- 16) 0 J
- 17) -30.0 J
- 18) 20 J
- 19) 2500 N
- 20) 0.30
- 21) 130 N
- 22) 22 m/s
- 23) 20 m
- 24) 4.4 m/s
- 25) 15 m
- 26) 4.1 N
- 27) 20 m
- 28) 1.9 m/s
- 29) 2.7 MJ
- 30) \$0.95
- 31) 25 kW
- 32) \$4.03
- 33) 4.3 kW