

Q1W5-Ph.-Test1-Work and Energy

Multiple Choice

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

- ___ 1. A more powerful motor can do
- more work in a longer time interval.
 - the same work in a shorter time interval.
 - less work in a longer time interval.
 - the same work in a longer time interval.
- ___ 2. 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 | c. 560 W |
| b. 240 W | d. 670 W |
- ___ 3. Which of the following are examples of conserved quantities?
- | | |
|---------------------------------|-------------------------------|
| a. potential energy and length | c. mechanical energy and mass |
| b. mechanical energy and length | d. kinetic energy and mass |
- ___ 4. Which of the following energy forms is associated with an object in motion?
- | | |
|-----------------------------|-------------------------|
| a. potential energy | c. nonmechanical energy |
| b. elastic potential energy | d. kinetic energy |
- ___ 5. In which of the following scenarios is work done?
- A weightlifter holds a barbell overhead for 2.5 s.
 - A construction worker carries a heavy beam while walking at constant speed along a flat surface.
 - A car decelerates while traveling on a flat stretch of road.
 - A student holds a spring in a compressed position.
- ___ 6. What is the kinetic energy of a 0.135 kg baseball thrown at 40.0 m/s?
- | | |
|-----------|----------|
| a. 54.0 J | c. 108 J |
| b. 87.0 J | d. 216 J |
- ___ 7. Which of the following has the greatest power output?
- a weightlifter who lifts a 250 N weight 2.1 m in 3.0 s
 - a mechanic's lift that raises a 1.2×10^3 N car 2.1 m in 12 s
 - a car engine that does 1.2×10^4 J of work in 5.0 s
 - a crane that lifts a 2.5×10^3 N beam at a speed of 1.2 m/s
- ___ 8. A construction worker pushes a wheelbarrow 5.0 m with a horizontal force of 50.0 N. How much work is done by the worker on the wheelbarrow?
- | | |
|---------|-----------|
| a. 10 J | c. 250 J |
| b. 55 J | d. 1250 J |
- ___ 9. In which of the following scenarios is no net work done?
- A car accelerates down a hill.
 - A car travels at constant speed on a flat road.
 - A car decelerates on a flat road.
 - A car decelerates as it travels up a hill.
- ___ 10. Which of the following energy forms is associated with an object due to its position?
- | | |
|----------------------|-------------------|
| a. potential energy | c. total energy |
| b. positional energy | d. kinetic energy |
- ___ 11. 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
- ___ 12. The equation for determining gravitational potential energy is $PE_g = mgh$. Which factor(s) in this equation is (are) *not* intrinsic to an object?
a. m
b. g
c. h
d. both g and h
- ___ 13. Which form of energy is involved in weighing fruit on a spring scale?
a. kinetic energy
b. nonmechanical energy
c. gravitational potential energy
d. elastic potential energy
- ___ 14. Which of the following is the rate at which work is done?
a. potential energy
b. kinetic energy
c. mechanical energy
d. power
- ___ 15. What is the potential energy of a 1.0 kg mass 1.0 m above the ground?
a. 1.0 J
b. 9.8 J
c. 10 J
d. 96 J
- ___ 16. Work is done when
a. the displacement is not zero.
b. the displacement is zero.
c. the force is zero.
d. the force and displacement are perpendicular.
- ___ 17. What are the units for a spring constant?
a. N
b. m
c. N•m
d. N/m
- ___ 18. How much power is required to lift a 2.0 kg mass at a speed of 2.0 m/s?
a. 2.0 J
b. 4.0 J
c. 9.8 J
d. 39 J
- ___ 19. Which of the following is the rate at which energy is transferred?
a. potential energy
b. kinetic energy
c. mechanical energy
d. power
- ___ 20. 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

Problem

21. How much work is done on a bookshelf being pulled 4.00 m at an angle of 35.0° from the horizontal? The magnitude of the component of the force that does the work is 87.0 N.
- A. 338 J
 - B. 348 J
 - C. 358 J
 - D. 368 J
22. A skier with a mass of 84 kg hits a ramp of snow at 32 m/s and becomes airborne. At the highest point of flight, the skier is 4.7 m above the ground. What is the skier's gravitational potential energy at this point?
- A. 3.7×10^3 J
 - B. 3.9×10^3 J
 - C. 4.1×10^3 J
 - D. 4.5×10^3 J
23. A flight attendant pulls a 60.0 N flight bag a distance of 239.0 m along a level airport floor at a constant speed. A 21.0 N force is exerted on the bag at an angle of 66.0° above the horizontal. How much work is done on the flight bag?
- A. 2020 J
 - B. 2030 J
 - C. 2040 J
 - D. 2050 J
24. Water flows over a section of Niagara Falls at a rate of 1.30×10^6 kg/s and falls 49.5 m. What is the power of the waterfall?
- A. 631 MW
 - B. 651 MW
 - C. 671 MW
 - D. 691 MW
25. On a given occasion, Old Faithful geyser in Yellowstone National Park shoots water to a height of 47.1 m. With what velocity does the water leave the ground during this eruption? (Assume no air resistance and that $g = 9.81 \text{ m/s}^2$.)
- A. 00.4 m/s
 - B. 10.4 m/s
 - C. 20.4 m/s
 - D. 30.4 m/s

6. A 1.71×10^3 kg sports car accelerates from rest to 25.8 m/s in 7.41 s. What is the average power output of the automobile engine?
- A. 46.8 kW
 - B. 56.8 kW
 - C. 66.8 kW
 - D. 76.8 kW
7. A 2.74 g coin, which has zero potential energy at the surface, is dropped into a 12.2 m well. After the coin comes to a stop in the mud, what is its potential energy with respect to the surface?
- A. -0.228 J
 - B. -0.328 J
 - C. -0.428 J
 - D. -0.528 J
28. A 3.62×10^2 N crate is pushed to the top of a 2.53 m ramp, which is inclined at 15.0° with the horizontal. What is the potential energy of the crate?
- A. 237 J
 - B. 247 J
 - C. 257 J
 - D. 267 J
29. A 31.0 kg crate, initially at rest, slides down a ramp 2.6 m long and inclined at an angle of 14.0° with the horizontal. Using the work-kinetic energy theorem and disregarding friction, find the velocity of the crate at the bottom of the ramp. ($g = 9.81 \text{ m/s}^2$)
- A. 0.5 m/s
 - B. 1.5 m/s
 - C. 2.5 m/s
 - D. 3.5 m/s
30. A hill is 132 m long and makes an angle of 12.0° with the horizontal. As a 54 kg jogger runs up the hill, how much work does the jogger do against gravity?
- A. 1.5×10^4 J
 - B. 2.5×10^4 J
 - C. 3.5×10^4 J
 - D. 4.5×10^4 J

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