

Energy, Work and Power

Directions: Read each statement carefully, then choose the best answer for that statements.

C 1. How much power is expended if you lift a 50-N rock 10 meters in 5 second?

- a) 500 watts
- b) 250 watts
- c) 100 watts
- d) 50 watts

$$\frac{50 \cdot 10^2}{5}$$

B 2. If you lift two loads up one story, how much work do you do in comparison to lifting just one load up one story?

- a) four times as much
- b) twice as much
- c) the same amount
- d) one half as much

A 3. The amount of potential energy possessed by an elevated object is equal to ...

- a) the work needed to lift it
- b) the distance it is lifted
- c) the power used to lift it
- d) the value of the acceleration due to gravity

A 4. Energy is changed from one form to another with no **net loss** or gain.

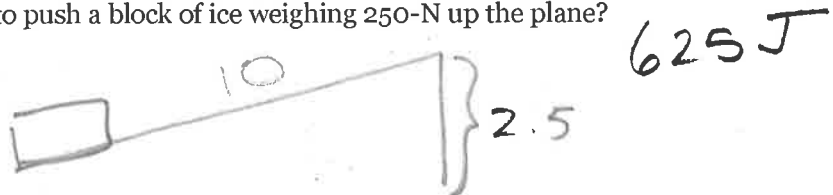
- a) always true
- b) sometimes true
- c) always false
- d) sometimes false

D 5. As pendulum swings, back and forth ...

- a) potential energy is converted into kinetic energy
- b) kinetic energy is converted into potential energy
- c) at the lowest point of its swing, its energy is all kinetic
- d) all the above

D 6. A frictionless inclined plane is 10 meters long and rest on a wall that is 2.5 meters high. How much force is needed to push a block of ice weighing 250-N up the plane?

- a) 650 N
- b) 250 N
- c) 100 N
- d) 62.5 N



- A 7. Suppose a moving car has 2000 J of kinetic energy. If the car's speed doubles, how much kinetic energy would it then have?
- a) 8000 J
 - b) 6000 J
 - c) 12000 J
 - d) 16000 J

- B 8. Kinetic energy is equal to ...
- a) one half the product of the mass and the speed
 - b) one half the product of the mass and the speed squared
 - c) the mass times the acceleration squared
 - d) one half the product of the mass and the momentum squared

- A 9. Which reaches the bottom of a hill sooner, an empty car tire or the same tire mounted on a rim?
- a) The mounted tire
 - b) the empty tire
 - c) neither, it's a tie
 - d) flat tire

- B 10. A job is done slowly, and an identical job is done quickly. Both jobs require the same amount of work but different amounts of ...
- a) energy
 - b) power
 - c) inertia
 - d) neither of the above

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Directions: Solve and show your work.

$$\frac{1.10 \times 10^7 \text{ J}}{9.2 \times 10^4 \text{ watts}}$$

Austin's crane lifted a $45,000 \text{ kg}$ block 25.0 meters in 120 seconds with a constant velocity.

- a) How much work does the crane do?
- b) What is the average power consumption?

$$W = (45,000)(9.81)(25)$$

$$\frac{4390 \text{ J}}{366 \text{ watts}}$$


A constant force of 362 N was applied at an angle of 36° to the horizontal was to move a 22.0 kg block 15.0 meters in 12.0 seconds .

- a) Find the amount of work.
- b) Determine the average power consumption.

$$W = (362 \cos 36)(15)$$

$$F_x = 362 \cos 36$$

$$P = \frac{W}{12.5}$$

"A great leader's courage to fulfill his vision comes from passion, not position." -- John Maxwell