

Work, Energy, and Power Problem Set

- 1) The kinetic energy of a moving body at a given instant does **not** depend upon
 - a) the amount of work required to bring it to rest
 - b) its speed
 - c) the force acting on it
 - d) its mass
 - e) more than one of the above is a correct response

- 2) Which of the following is a correct statement of the work performed by the centripetal force upon an object undergoing uniform circular motion?
 - a) the centripetal force performs no work upon the object.
 - b) the amount of work performed by the centripetal force in one revolution equals the magnitude of the force times the circumference of the circle.
 - c) the amount of work performed by the centripetal force equals the change in the kinetic energy of the object.
 - d) more than one of the above is correct.
 - e) none of the above.

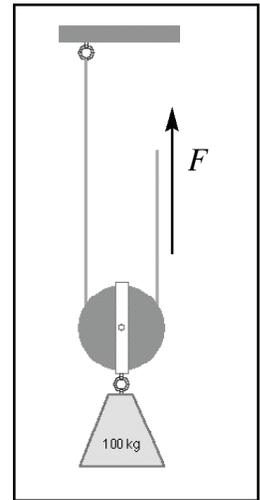
- 3) A crane lifts a 1000 kg automobile 10 meters off the ground and then turns its arm to move the car 5 meters horizontally. How much work is performed.
 - a) 10,000 J
 - b) 15,000 J
 - c) 150,000 J
 - d) 100,000 J
 - e) 50,000 J

- 4) A pilot should know that the amount of jet-fuel required to bring about an acceleration from 200 to 300 m/s is:
 - a) more than the amount required to accelerate from 100 to 200 m/s
 - b) less than the amount required to accelerate from 100 to 200 m/s
 - c) the same as the amount required to accelerate from 100 to 200 m/s
 - d) could be any of the above depending on the magnitude of the acceleration
 - e) none of the above

- 5) Which of the following is a consequence of the conservation of mechanical energy?
 - a) A gun recoils when fired.
 - b) In a vacuum chamber, the bob of a perfectly frictionless pendulum is released and returns to exactly the same point.
 - c) An iceberg floats with only one-tenth of its volume above water.
 - d) In sliding to a stop, the friction of an automobile's tires heat up the road.
 - e) more than one of the above is correct.

6) What is the minimum threshold of force which must be crossed to lift the 100 kg weight pictured at right?

- a) 500 N
- b) 1000 N
- c) 2000 N
- d) 100 N
- e) none of the above



7) All of the following statements are correct concerning work except:

- a) Work can be expressed as the product of the force times the component of displacement in the direction of the force.
- b) Work cannot be defined for frictional forces.
- c) If performed by conservative forces, the amount of work does not depend on the path taken to reach a certain state.
- d) The work performed equals the product of the power at which a mechanical system is operating and the duration of time.
- e) all are correct.

8) A 100 kg man in the desert falls over and slides down a rock face of height 10 meters. At the end of his slide, which lasts 4 seconds, the man's speed is 10 m/s. What is the average power delivered by the friction force of the rock face during his slide?

- a) 2000 W
- b) 2500 W
- c) 1250 W
- d) 4000 W
- e) none of the above