AP physics C web review chapter 5 work and energy

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

_____ 1. A horizontal force of 100 N is applied to move a 45-kg cart across a 9.0-m level surface. What work is done by the 100-N force?
   a. 405 J
   b. 500 J
   c. 900 J
   d. 4 500 J
   e. 5600 J

_____ 2. The work done by static friction can be:
   a. positive.
   b. negative.
   c. zero.
   d. nonnegative.
   e. Any of the above.

_____ 3. A satellite is held in orbit by a 2 000-N gravitational force. Each time the satellite completes an orbit of circumference 80 000 km, the work done on it by gravity is:
   a. 1.6×10^8 J.
   b. 1.6×10^{11} J.
   c. 6.4×10^{11} J.
   d. 0.
   e. None of the above.

_____ 4. What is the minimum amount of energy required for an 80-kg climber carrying a 20-kg pack to climb Mt. Everest, 8 850 m high?
   a. 8.67 MJ
   b. 4.16 MJ
   c. 2.47 MJ
   d. 1.00 MJ
   e. 0.872 MJ

_____ 5. As an object is lowered into a deep hole in the surface of the earth, which of the following must be assumed in regard to its potential energy?
   a. increase
   b. decrease
   c. remain constant
   d. cannot tell from the information given
   e. increases up to the maximum and then remains constant

_____ 6. A 15.0-kg crate, initially at rest, slides down a ramp 2.0 m long and inclined at an angle of 20° with the horizontal. If there is no friction between ramp surface and crate, what is the kinetic energy of the crate at the bottom of the ramp? ($g = 9.8$ m/s^2)
   a. 220 J
   b. 690 J
   c. 10 J
   d. 100 J
   e. 140 J

_____ 7. A simple pendulum, 2.0 m in length, is released with a push when the support string is at an angle of 25° from the vertical. If the initial speed of the suspended mass is 1.2 m/s when at the release point, what is its speed at the bottom of the swing? ($g = 9.8$ m/s²)
   a.   2.3 m/s
   b.   2.6 m/s
   c.   2.0 m/s
   d.   1.8 m/s
   e.   0.5 m/s

_____ 8. A hill is 100 m long and makes an angle of 12° with the horizontal. As a 50-kg jogger runs up the hill, how much work does gravity do on the jogger?
   a.   49 000 J
   b.   10 000 J
   c.   −10 000 J
   d.   zero
   e.   −49 000 J

_____ 9. Old Faithful geyser in Yellowstone Park shoots water hourly to a height of 40 m. With what velocity does the water leave the ground?
   a.   7.0 m/s
   b.   14 m/s
   c.   20 m/s
   d.   28 m/s
   e.   34 m/s

_____ 10. A Hooke's law spring is compressed 12.0 cm from equilibrium, and the potential energy stored is 72.0 J. What compression (as measured from equilibrium) would result in 100 J being stored in this case?
   a.   16.7 cm
   b.   14.1 cm
   c.   13.6 cm
   d.   12.8 cm
   e.   No answer is correct.

_____ 11. A Hooke's law spring is mounted horizontally over a frictionless surface. The spring is then compressed a distance d and is used to launch a mass m along the frictionless surface. What compression of the spring would result in the mass attaining double the speed received in the above situation?
   a.   1.41 d
   b.   1.73 d
   c.   2.00 d
   d.   4.00 d
   e.   5.35 d

_____ 12. A 20-N crate starting at rest slides down a rough 5.0-m long ramp, inclined at 25° with the horizontal. 20 J of energy is lost to friction. What will be the speed of the crate at the bottom of the incline?
   a.   0.98 m/s
   b.   1.9 m/s
   c.   3.2 m/s
   d.   4.7 m/s
   e.   5.6 m/s

_____ 13. A girl and her bicycle have a total mass of 40.0 kg. At the top of the hill her speed is 5.0 m/s, and her speed doubles as she rides down the hill. The hill is 10.0 m high and 100 m long. How much kinetic energy and potential energy is lost to friction?
   a.   2 420 J
   b.   1 500 J
   c.   2 000 J
   d.   3 920 J
   e.   4 280 J

_____ 14. An automobile delivers 30.0 hp to its wheels when moving at a constant speed of 22.0 m/s. What is the resistance force on the automobile at this speed? (1 hp = 746 watts)
   a.   18 600 N
   b.   410 000 N
   c.   1 020 N
   d.   848 N
   e.   763 N

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Answer Section

MULTIPLE CHOICE

    1. C
    2. E
    3. D
    4. A
    5. B
    6. D
    7. A
    8. C
    9. D
  10. B
  11. C
  12. D
  13. A
  14. C