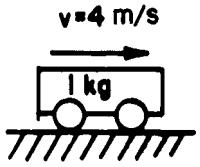
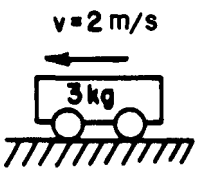
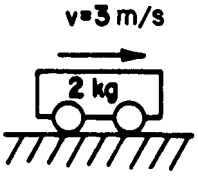
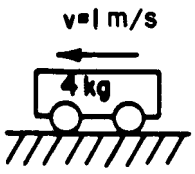
Work and Energy

1. If the velocity of a moving object is doubled, the object's kinetic energy is
   (1) unchanged (3) doubled
   (2) halved (4) quadrupled

2. Which cart shown below has the greatest kinetic energy?
   (1) 

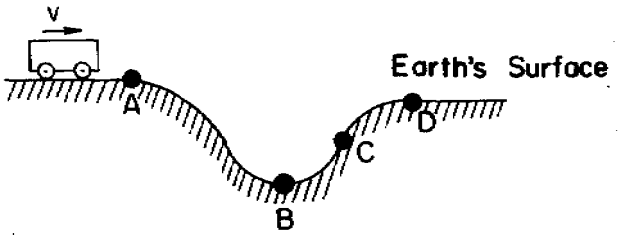
   (3) 

   (2) 

   (4) 

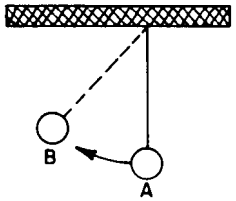
3. As a block is accelerated from rest along a horizontal surface, its gravitational potential energy
   (1) decreases (3) remains the same
   (2) increases

4. The diagram below represents a cart traveling from left to right along a frictionless surface with an initial speed of *v*. At which point is the gravitational potential energy of the cart *least*?



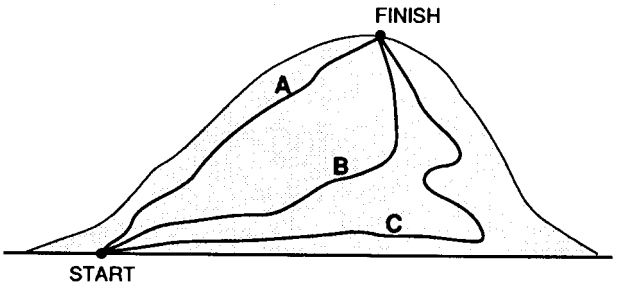
   (1) *A* (3) *C*
   (2) *B* (4) *D*

5. As the pendulum swings freely from *A* to *B* as shown in the diagram to the right, the gravitational potential energy of the ball



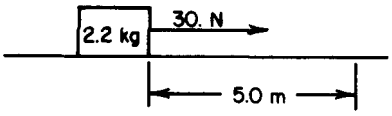
   (1) decreases (3) remains the same
   (2) increases

6. Three people of equal mass climb a mountain using paths *A*, *B*, and *C* shown in the diagram below.



   Along which path(s) does a person gain the greatest amount of gravitational potential energy from start to finish?
   (1) *A*, only
   (2) *B* , only
   (3) *C*, only
   (4) The gain is the same along all paths.

7. A 2.2-kilogram mass is pulled by a 30.-newton force through a distance of 5.0 meters as shown in the diagram below. What amount of work is done?



   (1) 11 J (3) 150 J
   (2) 66 J (4) 330 J

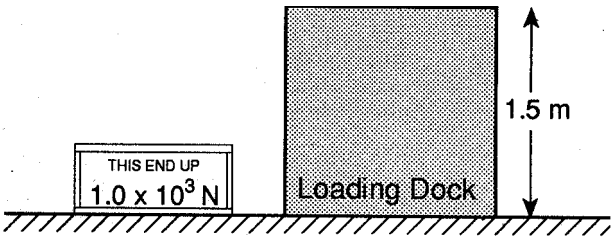
8. Which action would require no work to be done on an object?
   (1) lifting the object from the floor to the ceiling
   (2) pushing the object along a horizontal floor against a frictional force
   (3) decreasing the speed of the object until it comes to rest
   (4) holding the object stationary above the ground

9. A box is dragged up an incline a distance of 8 meters with a force of 50 Newtons. If the increase in potential energy of the box is 300 joules, the work done against friction is
   (1) 100 J (3) 300 J
   (2) 200 J (4) 400 J

10. An electrical heater raises the temperature of a measured quantity of water. The water absorbs 6,000 joules of energy from the heater in 30.0 seconds. What is the minimum power supplied to the heater?
   (1) 5.00×10^2 W (3) 1.80×10^5 W
   (2) 2.00×10^2 W (4) 2.00×10^3 W

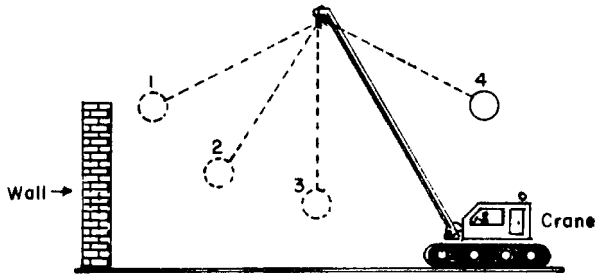
11. How long would it take a machine to do 5,000 joules of work if the power rating of the machine is 100 watts?
   (1) 5,000 sec (3) 10 sec
   (2) 50 sec (4) 0.2 sec

12. The diagram below shows a 1.0×10^3-Newton crate to be lifted at constant speed from the ground to a loading dock 1.5 meters high in 5.0 seconds.



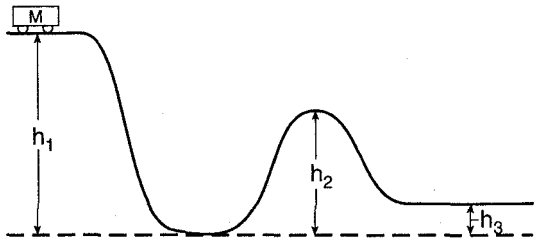
What power is required to lift the crate?
   (1) 1.5×10^3 W (3) 3.0×10^2 W
   (2) 2.0×10^2 W (4) 7.5×10^3 W

13. The wrecking crane shown below is moving toward a brick wall which is to be torn down.



At what point in the swing of the wrecking ball should the ball make contact with the wall to make a collision with the greatest kinetic energy?
   (1) 1 (3) 3
   (2) 2 (4) 4

14. A cart of mass *M* on a frictionless track starts from rest at the top of a hill having height h_1, as shown in the diagram below.



What is the kinetic energy of the cart when it reaches the top of the next hill, having height h_2?
   (1) mgh_1 (3) $Mg(h_2-h_3)$
   (2) $Mg(h_1-h_2)$ (4) 0

15. The work done in accelerating an object along a frictionless horizontal surface is equal to the object's change in
   (1) momentum (3) potential energy
   (2) velocity (4) kinetic energy

Work and Energy

Answer Key

1. 4
2. 2
3. 3
4. 2
5. 2
6. 4
7. 3
8. 4
9. 1
10. 2
11. 2
12. 3
13. 3
14. 2
15. 4