1. Base your answer to the following question on the force vs. distance graph below, which is for an object being pushed along a straight line, starting at rest.
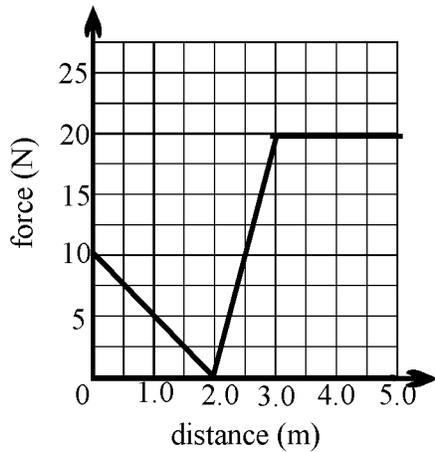

If the object has a mass of 1.4 kg, what is its velocity at 5.0 m?

1)   0.2 m/s

2)   2.0 m/s

3)   5.0 m/s

4)   9.25 m/s

5)   15 m/s

2. A particle is fired straight up out of a cannon. Which of the following graphs best represents its kinetic energy K as a function of time t?

1)

4)

2)

5)

3)
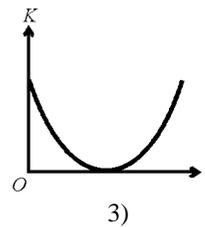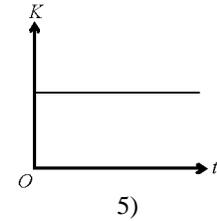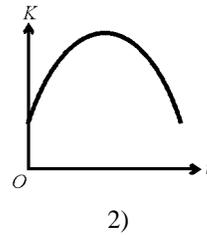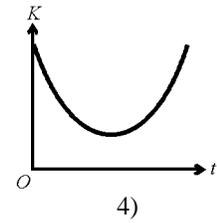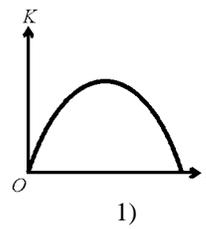
3. A block of mass m moving with initial velocity v_0 moves over a rough surface with coefficient of kinetic friction f. How long does it take for the block to come to a complete stop?

$$\frac{v_0^2}{2\mu g}$$
1)

$$\frac{v_0}{2\mu g}$$
4)

$$\frac{v_0^2}{2m\mu g}$$
2)

$$\frac{v_0}{\mu g}$$
5)

$$\frac{v_0^2}{\mu g}$$
3)

4. Base your answer to the following question on the picture below, which represents a plane 10 m in length with a coefficient of kinetic friction of 0.2, inclined at an angle of 53°. A block of weight 30 N is placed at the top of the plane and allowed to slide down.
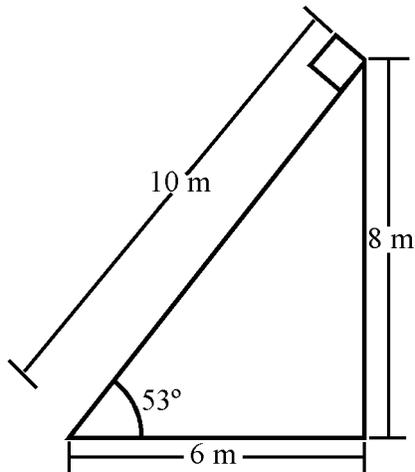
The velocity of the block after its 10 m slide down the plane is most nearly

1) 8.2 m/s

2) 8.6 m/s

3) 8.9 m/s

4) 9.7 m/s

5) 10.0 m/s

5. Base your answer to the following question on the following information. A proton weighing 1.67×10^{-27} kg is accelerated from rest for a time of 10^{-8} s by a uniform electric field that exerts a force of 6.4×10^{-14} N on the proton.

The distance over which the proton accelerated is most nearly

1) 2.0×10^{-7} m

2) 2.0×10^{-5} m

3) 2.0×10^{-3} m

4) 2.0×10^{-1} m

5) 2.0×10^{0} m

6. An object at rest weighs 100 N on earth. It gains 100 J of kinetic energy. What is its velocity?

1) ˋ**10** m/s

2) ˋ**15** m/s

3) ˋ**20** m/s

4) ˋ**25** m/s

5) ˋ**30** m/s

7. A car with kinetic energy 20,000 J travels along a horizontal road. How much work is required to stop the car in 5 s?

1) 0 J

2) 20,000 J

3) 4,000 J

4) 8,000 J

5) 16,000 J

8. How much energy is required to stop a car of mass 100 kg traveling at 25 m/s?

1) 1,150 J

2) 21,150 J

3) 31,250 J

4) 32,250 J

5) 42,250 J

9.
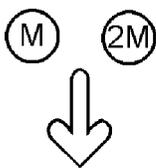
Two balls of equal size are dropped from the same height from the roof of a building. One ball has mass M and the other has a mass 2M. When the balls reach the ground, how do the kinetic energies of the two balls compare? (Neglect friction)

1) M has one-fourth the kinetic energy of 2M.

2) M has one-half the kinetic energy of 2M.

3) M has the same amount of kinetic energy as 2M.

4) M has twice the amount of kinetic energy as 2M.

5) M has four times the amount of kinetic energy as 2M.

10. A rail gun is able to accelerate a projectile with a mass of 4 kg from rest to 100 m/s in 5 s. Calculate the work done on the projectile by the force of the rail gun.

1) 1.0×10^2 J

2) 5.0×10^2 J

3) 2.0×10^4 J

4) 1.0×10^5 J

5) Cannot be determined from the information provided.

11. An object with a mass of 2 kg increases in speed from 4 m/s to 12 m/s in 3 s. The total work performed on the object during this time is

1) 16 J

2) 64 J

3) 128 J

4) 256 J

5) 512 J

12. A 100 W motor propels an object with a mass of 4 kg for 2 s from rest. Its final velocity will be

1) 5 m/s

2) 10 m/s

3) 20 m/s

4) 40 m/s

5) 100 m/s

13. Which of the following graphs best represents the kinetic energy K of a particle as a function of the momentum p of the particle?

1)

2)

3)

4)
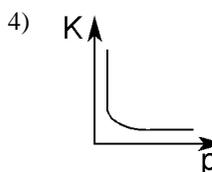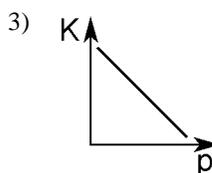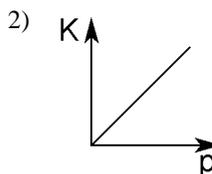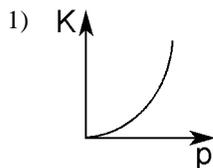
5) none of the above

14. A person does 100 joules of work in pulling back the string of a bow. What will be the initial speed of a 0.5-kilogram arrow when it is fired from the bow?

    1) 20 m/s

    2) 50 m/s

    3) 200 m/s

    4) 400 m/s

    5) 800 m/s

15. If an object sliding on a rough surface experiences an increase in kinetic energy of E while it is pushed by a constant force F through a distance d, what is the force to due to friction?

    1) $F\,d - E$

    2) $(Fd - E)/d$

    3) $(F - E)/d$

    4) Fd

    5) $E/d - F$

16. What happens to the energy of a bouncing ball as it hits the ground with a certain downward velocity?

    1) Gravitational Potential energy is converted into kinetic energy.

    2) Elastic Potential Energy is converted into gravitational potential energy

    3) Kinetic energy is converted into heat energy.

    4) Kinetic energy is converted into elastic potential energy and heat.

    5) Kinetic energy is converted into gravitational energy.

17. Which of the following is true of a 1 kg mass and a 5 kg mass that both fall from rest from the same height?

    1) the force felt due to gravity is the same on both masses

    2) their initial potential energies are equal

    3) they lose potential energy at the same rate

    4) they have the same kinetic energy upon hitting the ground

    5) their accelerations are equal

1. ___4___

2. ___3___

3. ___5___

4. ___1___

5. ___3___

6. ___3___

7. ___2___

8. ___3___

9. ___2___

10. ___3___

11. ___3___

12. ___2___

13. ___1___

14. ___1___

15. ___2___

16. ___4___

17. ___5___

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____