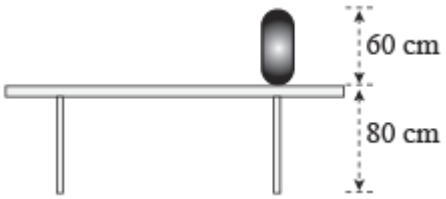
Name: _____ Practice Ph12 2-1

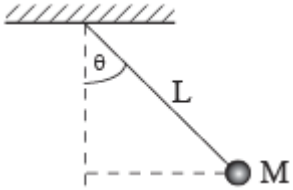
1. 

The 5.0 kg block shown above is lifted from the floor to the top of the table. What is the potential energy of the block relative to the floor?

A. 39 J
B. 29 J
C. 69 J
D. 49 J

The following information is to be used to answer questions 2 & 2.

A pendulum of length L with a bob of mass M is released from a position where the string makes an angle of ø with the vertical as shown below.

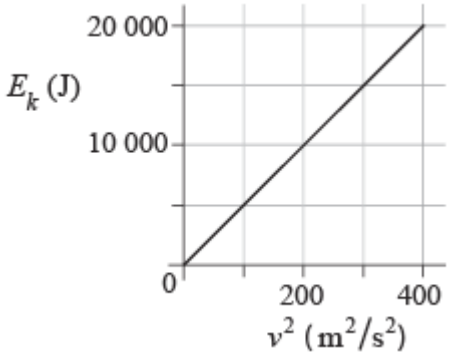


2. How much potential energy has the bob lost by the time it reaches its lowest point?
   A. mgL cos ø
   B. MgL/2
   C. MgL
   D. MgL (1 - cos ø)

3. Which of the following is **not** a vector?
   A. force
   B. energy
   C. momentum
   D. impulse

4. What is the kinetic energy of a 0.850 kg sea gull flying at 18 m/s and 20 m above the ocean?
   A. 300 J
   B. 8.3 J
   C. 140 J
   D. 170 J

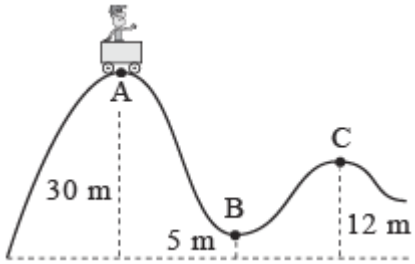
A student plots the graph below, showing the kinetic energy E_k of a motorbike versus the square of its velocity v^2.



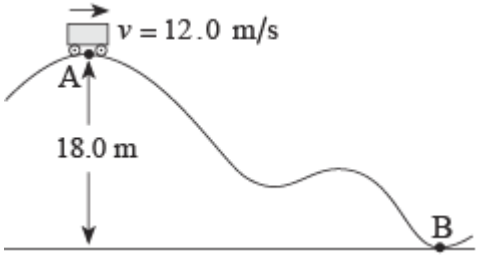
5. What is the slope of this graph?

6. What does the slope represent?

7. The roller coaster shown below passes point A with a speed of 2.1 m/s. If the average force of friction is 20% of its weight, with what speed will it reach point C.
   The distance travelled is 70 m.

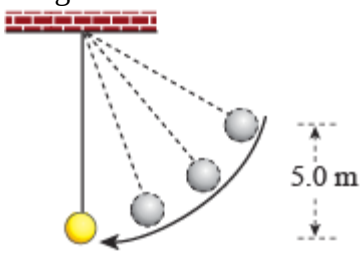


8. A 250 kg roller coaster passes point A at 12.0 m/s.



   What is the speed of the roller coaster at point B at the bottom of the hill if 8 500 J of energy is transformed to heat during the journey?

9. What is the maximum speed that the 10 kg ball on the pendulum in the diagram shown below will achieve if it is released from a height of 5.0 m above its lowest point?



   A. 100 m/s
   B. 1.0 m/s
   C. 5.0 m/s
   D. 10 m/s

10. Relative to the ground, what is the total energy of a 0.225 kg baseball if its speed is 12 m/s when its height is 15 m above the ground?

   A. 49 J
   B. 33 J
   C. 17 J
   D. 16 J

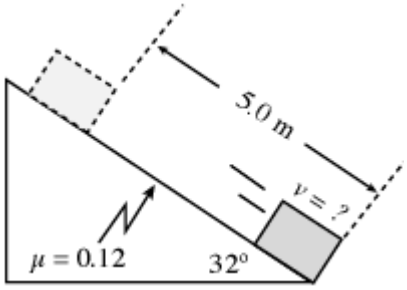
11. A 5.0 kg object was dropped from a height of 35 m. The object struck the ground with an impact speed of 12 m/s. How much heat energy was produced due to friction while falling?

   A. 2.1×10^3 J
   B. 1.7×10^3 J
   C. 1.4×10^3 J
   D. 3.6×10^2 J

12. You drop an orange ball near the surface of the moon. Which of the following is true for the ball as it falls? (The moon has no atmosphere.)

   A. $E_p - E_k = constant$
   B. $E_p = constant$
   C. $E_k = constant$
   D. $E_p + E_k = constant$

13. A 15 kg block initially at rest at the top of the incline as shown.



What is the speed of the block at the bottom of the inlcine if the coefficient of friction between the block and the incline is 0.12?

A. 7.2 m/s
B. 6.5 m/s
C. 9.9 m/s
D. 9.3 m/s

14. If a machine capable of producing 5000 W of power raises a crate 50.0 m in 10.0 s, what is the mass of the crate?

A. 1.0×10^3 kg
B. 1.0×10^2 kg
C. 2.5×10^3 kg
D. 1.0×10^1 kg

15. What is the minimum power output of a small electric motor that lifts a 0.050 kg mass through 2.0 m in 30 s?

A. 0.017 W
B. 0.0017 W
C. 15 W
D. 0.033 W

16. Which of the following is a definition of power?

A. Power is the rate of change of displacement.
B. Power is the rate of change of momentum.
C. Power is the rate of change of energy.
D. Power is the rate of change of flux.

17. A motor using 1 500 W takes 52 s to raise a 250 kg load vertically 24 m. What is the efficiency of this motor?

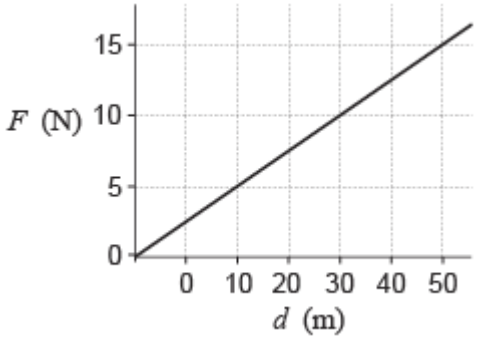
A. 75%
B. 7.7 %
C. 12 %
D. 25 %

18. A 10 kg object is being pushed up an incline at 30° by a force of 55 N exerted in the direction of the motion. If the object is pushed a distance of 3.0 m, how much work is done by the force?

A. 147 J
B. 82.5 J
C. 294 J
D. 165 J

19. A 200 N force acts on a 10.0 kg block and moves it 5.0 m in 2.5 seconds. How much work is being done?
    A. 1490 J
    B. 40 J
    C. 510 J
    D. 1000 J

20. The graph below shows how the force acting on an object varies with distance.

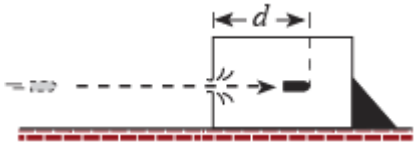


What is the work done in moving the object from 10 m to 50 m?
    A. 100 J
    B. 50 J
    C. 900 J
    D. 400 J

21. A 230 kg load is lifted 18.0 m vertically with an acceleration of 1.47 m/s^2 by a cable. Determine the final speed of the load assuming it started from rest.

22. A car moving at 80 km/h skids 50 m with locked brakes. How far will the car skid with locked brakes if it is travelling at 160 km/h?
    A. 100 m
    B. 50 m
    C. 71 m
    D. 200 m

23. A 0.055 kg bullet was fired at 250 m/s into a block of wood as shown in the diagram below.



Assuming an average force of 9 500 N brings the bullet to rest in the wood, what distance **d** did the bullet penetrate the block?
    A. 1.4 x10^{-2} m
    B. 1.4 x10^{-3} m
    C. 3.6 x10^{-1} m
    D. 1.8 x10^{-1} m

24. Which of the following best represents the work-energy theorem?

A. $E_p = P \cdot t$

B. $W = \Delta E$

C. $E_k = E_p$

D. $W = F_f \cdot d$