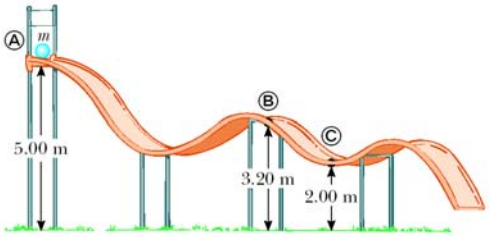
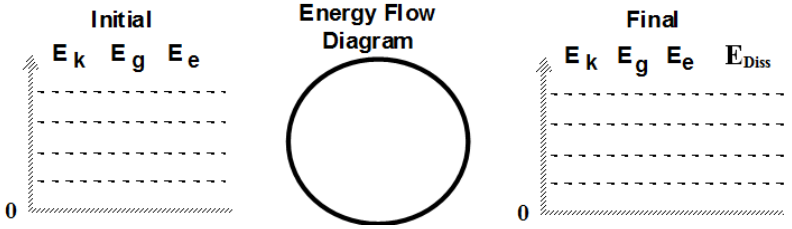
Name _____ Date _____ Period ___

Unit 6 Energy: Worksheet 6

1) A 100 g ball is at rest at point A as shown to the right. (A) How fast is the ball moving at point B assuming friction is negligible?



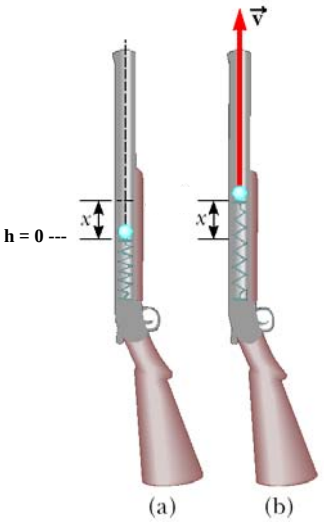
(B) Make a quantitative energy bar graph for (A)



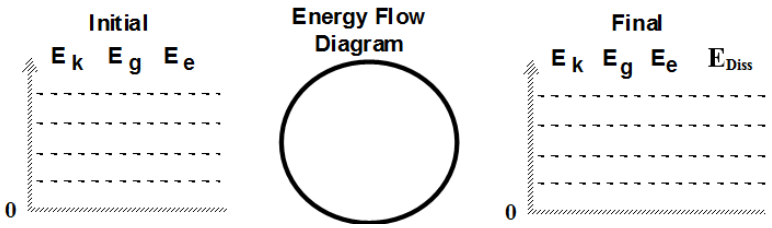
(C) Now assuming there is friction on the track, how much energy is dissipated assuming the ball starts from rest at point A and is moving at a speed of 5.0 m/s at point C?

(D) Using the same information from (C), what is the frictional force acting on the ball assuming the length of the track is 12.0 m?

2) Use the diagram to the right for this problem. A 0.5 kg ball is placed in a spring loaded toy gun as shown in (a). (A) What velocity will it have in diagram (b) if *x*, shown in the diagram, is 10.0 cm and the spring constant is 500 N/m? Assume friction is negligible.

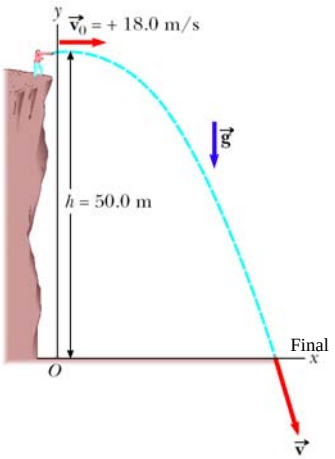


(B) Construct a quantitative energy bar graph for the question above.

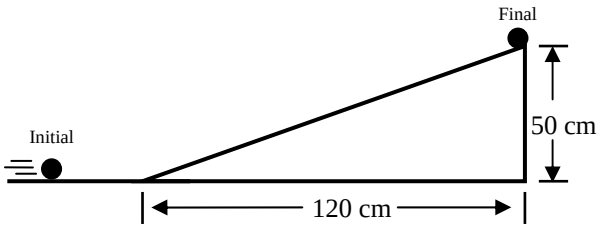


(C) What is the average force the spring applies to the ball? (Remember the ball is moving vertical so you must think off all the forces acting on the ball)

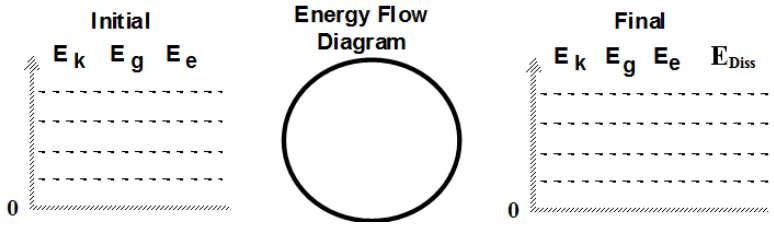
3) Using the diagram to the right, what is the speed of the ball the instant before it hits the ground?



4) A 2 kg ball is at the bottom of a hill moving at 5.0 m/s.
(A) If the ball stops as it reaches the very top of the hill, as shown to the right, how much energy was dissipated?



(B) Construct a quantitative energy bar graph for the situation presented in (A).

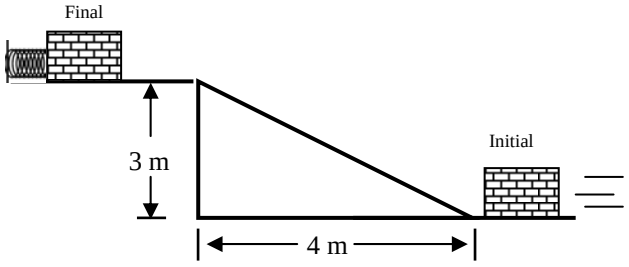


(C) Bonus: For this question assume friction is negligible. How far up the incline (not the height) will the ball reach if it has an initial speed of 2.45 m/s?

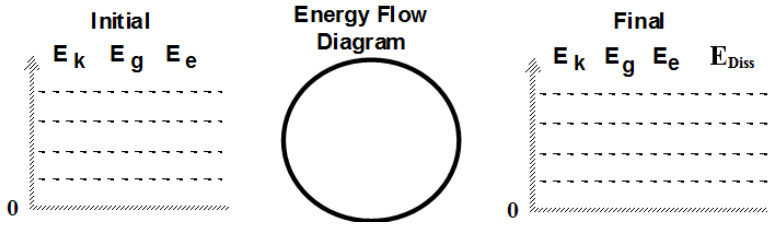
5) (A) A person is pushing a 5.0 kg box with a force of 35 N. If the coefficient of friction between the box and the floor is 0.50 and the box is initially moving at 2.0 m/s, what will be the speed of the box after it moves 13.0 m?

(B) If the person stops pushing after it reaches the position of 13.0 m as in part (A), how much farther will it travel before it stops?

6) A 1.2 kg brick has compressed a spring (spring constant of 8800 N/m) 15.0 cm as shown in the diagram to the right. (A) What was the intial speed of the brick at the bottom of the ice covered hill? Assume friction is negligible.



(B) Construct a quantitative energy bar graph for the situation above.



(C) Now the spring pushes the brick back down the hill. If there IS friction on the brick but only once it reaches the bottom of the hill, what is the coefficient of friction between the brick and the surface at the bottom of the hill if the brick stops in 18.5 m after it reaches the bottom of the hill?