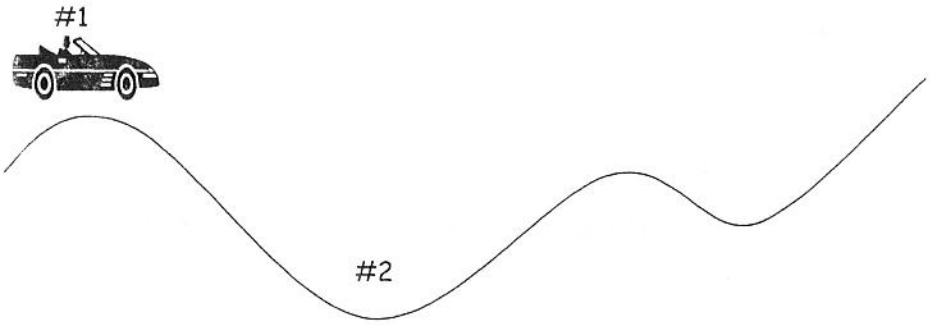
SE 402

Conservation of Energy Worksheet

1) The frictionless car below is moving at 4 m/s at position #1 (50 m above ground level). It has a mass of 1000 kg and is rolling along the hills in neutral. Point #2 is at ground level.



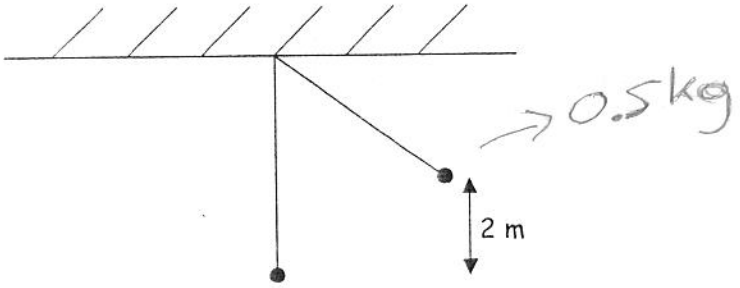
a) What is the total energy of the car at point #1?

b) What is the total energy of the car at point #2?

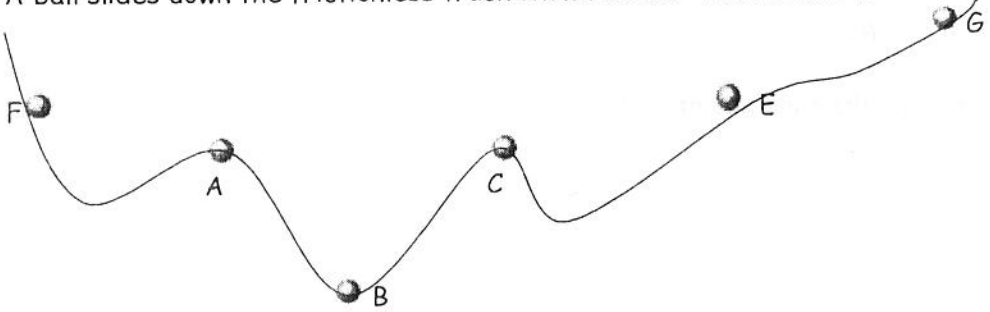
c) How fast will the car be moving when it reaches position #2 (at ground level)?

d) What is the maximum height above the ground that the car can reach on the right side?

2) A pendulum is pulled sideways so that it is raised a vertical distance of 2 m above its resting position. Find the maximum speed the pendulum reaches after being released.



3) A ball slides down the frictionless track shown below. The ball has no velocity at position F.



a) To what point does the ball rise on the opposite incline?

b) At what point(s) in the diagram is the speed at a maximum?

c) At what point(s) is the kinetic energy at a maximum?

d) At what point(s) is the speed zero?

e) At what point(s) is the potential energy at a minimum?

f) At what point(s) is the potential energy at a maximum?

4) An archer applies an average force to draw the bow string back. This causes the stretched bow to store 260 J of energy.

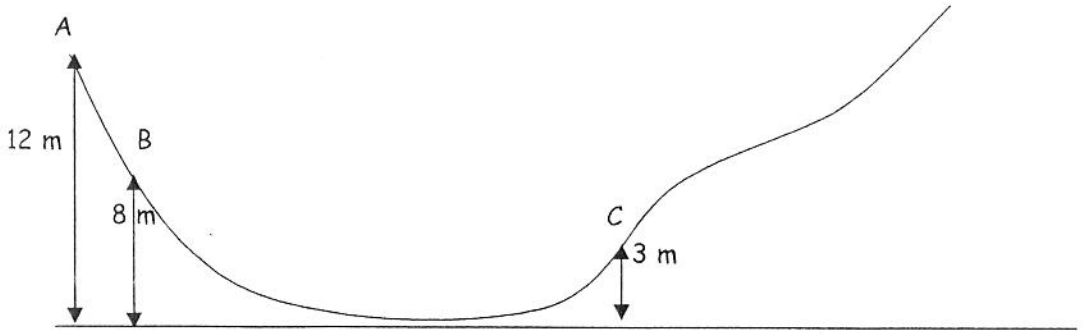
a) What type of energy is stored in the stretched bow?

b) How much kinetic energy does the arrow have **before** it is released?

c) How much potential energy will the arrow have **after** it leaves the bowstring?

d) If a 0.3 kg arrow is shot from this bow, then how **fast** will it be moving just after it leaves the bowstring?

5) At point "A" on the hill, there is a 55 kg skier moving at 6 m/s.



a) Find the skier's maximum speed. Where on the hill does she achieve this speed?

b) How far up the other hill will the skier be able to go?

c) How fast will the skier be moving at point B?

d) How fast will the skier be moving at point C?