A.P. PHYSICS
Worksheet Chapter
Work & Energy

Name _____
Date _____

Read all questions carefully. Show all work for full credit. Circle your answers. Worksheet is due_____.

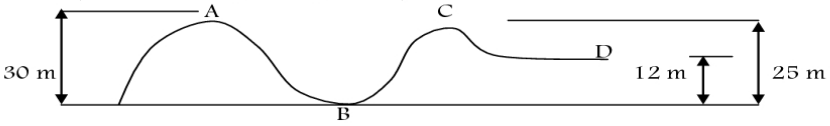
1.) A small hoist can raise 100 kg of bricks to the top of a construction project 30-m above the street in half a minute. Determine the power provided.

2.)Estimate the (a) kinetic energy and the (b) speed required for a 70-kg pole vaulter to just pass over a bar 5.0 m high. Assume the vaulter's center of mass is initially 0.90 m off the ground and reaches its maximum height at the level of the bar itself.

3.) A 1000-kg car racing up a mountain road runs out of gas at a height of 35 m while traveling at 22 m/s. Cleverly, the driver shifts into neutral and coasts onward. (a) Neglecting all friction losses, will he clear the 65-m peak? (b) Would it help to throw out any extra weight or even jump out and run alongside the car? (c) Not having any brakes, at what speed will he reach the bottom of the mountain?

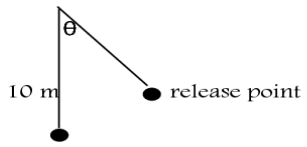
4.) In the high jump, the kinetic energy of an athlete is transformed into gravitational potential energy without the aid of a pole. With what minimum speed must the athlete leave the ground in order to lift his center of mass 2.10 m and cross the bar with a speed of 0.70 m/s?

5.) A roller coaster is pulled up to point A where it and its screaming occupants are released from rest. Assuming no friction, calculate the speed at points B, C and D.



6.) A driver notices that her 1000 kg car slows down from 90 km/h to 70 km/h in about 6.0 s on level ground when it is in neutral. Approximately what power (in watts and hp) is needed to keep the car traveling at a constant 80 km/h?

7.) A 75 kg student runs at 5.0 m/s, grabs a rope, and swings out over a lake. He releases the rope when his velocity is zero. (a) what is the angle, θ, when he releases the rope? (b) What is the tension in the rope just before he releases it? (c) What is the maximum tension in the rope?



8.) One car has twice the mass of a second car, but only half as much kinetic energy. When both cars increase their speed by 5.0 m/s, they then have the same kinetic energy. What were the original speeds of the two cars?