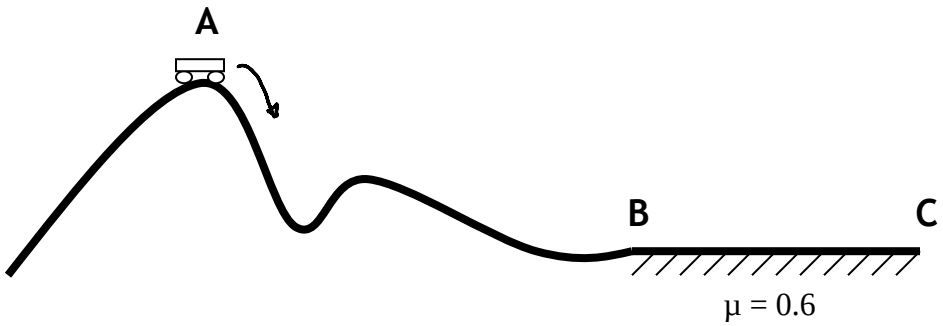
Name _____



The rollercoaster shown above arrives at point A with a velocity of 3 m/s. Assuming that point A is 80 m above the starting point and that the coaster has a mass of 1000 kg, how much net work was done on the coaster to get it to point A?

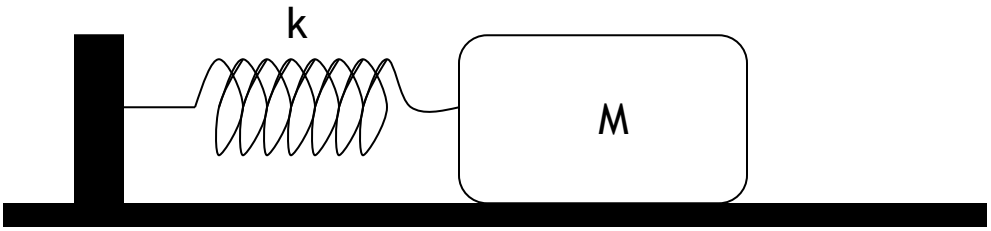
As the coaster rolls between points A and B, 100,000 J of energy is lost to friction. How fast is the coaster traveling at point B?

Assuming the coaster skids to a stop along a level skid pad between B and C (friction coefficient = 0.6), what is the minimum length of the skid pad required to stop the coaster?

What is the average acceleration of the coaster while on the skid pad?

What is the average power that the skidpad produces in the form of heat as the coaster slows to a stop?

Express answers to all questions below in terms of k, M, g, x, and μ.



The spring-mass system shown above is initially compressed by a displacement of x and held in place by a latch. What is the total mechanical energy of the system when it is latched?

The latch is then released, allowing the mass to oscillate back and forth. Assuming that the friction coefficient between mass M and the surface upon which it is resting is μ, determine the velocity attained when M first passes the equilibrium position.

Determine the total distance traveled back and forth before mass M comes to a complete stop.