

Mechanical Work

Work = Force x Distance

$$W = Fd$$

Units of work are joules, same as for energy. 1 joule is the work done by force 1 newton over distance traveled 1 meter.

$$1\text{J} = 1\text{N} \cdot 1\text{m}$$

Homework 14

Problem 1.

A cyclist is moving at a constant speed of 10 m/s on a flat road. There is an air resistance force acting on him which is $F=100$ Newtons, directed backwards (called air drag).

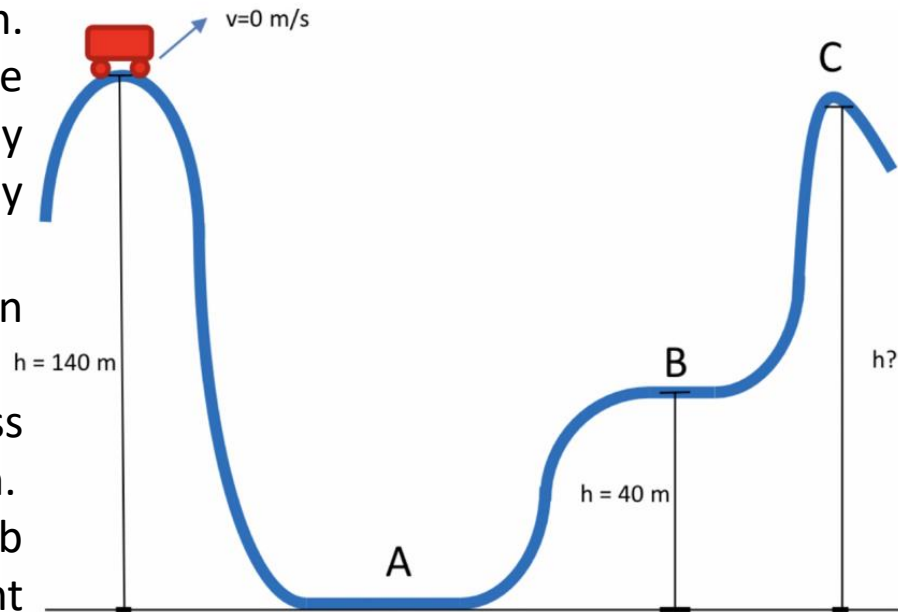
What is the work done by the bicyclist over 1 minute (assuming there are no other losses except of the air drag)?

Problem 2. Kingda Ka, the highest roller coaster in the world, has a drop of 140m. Imagine the roller coaster follows the trajectory pictured below, and neglect any friction or air resistance (so mechanical energy is constant).

a) What is the speed of the roller coaster on points A and B?

- Hint: You do not need to know the mass of the roller coaster to solve this problem.

b) Bonus: The roller coaster will try to climb back up to point C. What is the highest point that the roller coaster could get to?



Pictures (choose whether you want to print this slide)



Problem 1.



Problem 2.