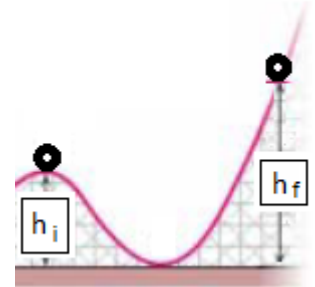


Unit Test 3: Power and Energy Practice Test Name: _____

- 1) A 25 N force directed at 40° above the horizontal moves a 10 kg crate along a horizontal surface at constant velocity. How much work is done by this force in moving the crate a distance of 20 m?

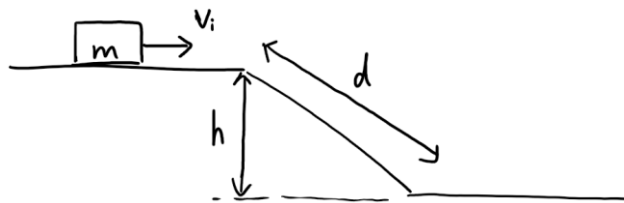
Ans) _____

- 2) A frictionless roller coaster goes over the top of a 20m high hill (h_i) with a speed of 5.2 m/s. It then runs down another hill and up a huge slope (h_f). How high up the second slope does the rollercoaster go before stopping?



Ans) _____

- 3) A 10 kg model car slides along a frictionless surface at a constant speed of 4.0 m/s. the car then slides down a frictionless incline and over a second horizontal surface as shown below $h=3.0$ m and $d=5.0$ m



- a) what is the kinetic energy of the car as it slides on the upper surface

Ans) _____

- b) while on the upper surface, how much gravitational potential energy does it have with respect to the lower surface?

Ans) _____

- c) what is the kinetic energy of the car as it slides on the lower surface

Ans) _____

- d) what is the speed of the car as it slides on the lower surface?

Ans) _____

- e) what minimum coefficient of kinetic friction is required to stop the car over a distance of 5 m along the lower surface?

Ans) _____

- 4) A 400 W motor is used to lift a 67 kg person a vertical distance of 5 m in 20 s. What is the efficiency of the motor?

ans) _____

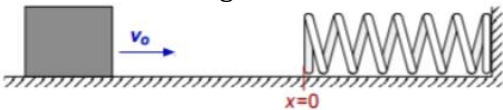
- 5) Bruce, a 75 kg passenger in a van, is wearing a seat-belt when the van moving at 15 m/s collides with a concrete wall. The front end of the van collapses 0.50 m in coming to rest.

- What was Bruce's kinetic energy before the crash?
- What average force did the seat belt exert on Bruce during the crash?

a) _____

b) _____

- 6) A block ($m = 5.0$ kg) is moving at a velocity of $v_0 = 15$ m/s along a horizontal frictionless surface toward a massless spring ($k = 8$ N/m) that is attached to a wall. How much will the spring be compressed if it stops the moving block.



ans) _____

- 7) While preparing dinner, Mr. Cheung's 50 g gold wedding ring was left in the oven and baked to 230° C. He drops the gold ring into a pot of 0.5 kg of water at 20° C until the temperature reach thermal equilibrium. What is final temperature of the gold ring and the water?

ans) _____