Sample test questions:

Multiple choices: (Only one answer is correct. Please choose the best answer you think.)

1. In which one of the following systems is there a decrease in gravitational potential energy?

(a) A boy stretches a horizontal spring.
(b) A girl jumps down from a chair.
(c) A crate rests at the bottom of an inclined plane
(d) A car ascends a steep hill.
(e) Water is forced upward through a pipe.

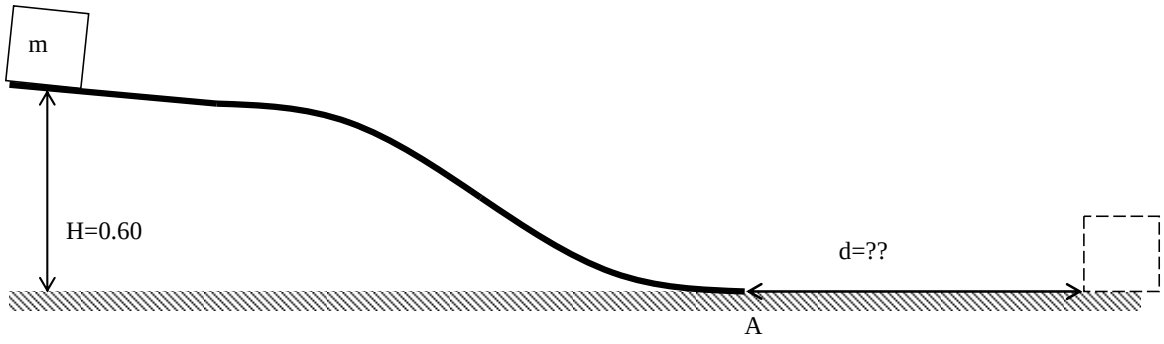
2. Which one of the following has the largest kinetic energy?

(a) A raindrop falling.
(b) A person swimming
(c) A jet airplane flying at its maximum speed
(d) The earth moving in its orbit around the sun
(e) A space shuttle orbiting the earth.

Answer: 1. B 2. D

Comprehensive questions:

3. A small object, whose mass is 0.050 kg, is sliding down a ***frictionless*** track. The height of the track is .60 m. At the end of the track, shown as point A in the graph, the object keeps sliding on the ground whose coefficient of friction is $\mu_k = 0.20$. How far does the object slide on the ground beyond point A?



Brief Solution:

When the object is on the track, only gravity does the work, the normal force doesn't do the work. We can apply the work-energy theorem.

$W_{total} = \Delta KE$ *where*

$W_{total} = W_{mg} + W_N + W_{friction} = mg(h_i - h_f) + 0 + F_{friction} \cdot d \cdot \cos(\theta)$

(What is θ here???)

and $f = N \cdot \mu_k = (0.050kg)(9.8m/s^2)(0.20)$ *=0.098 N*

Plug in $\Delta KE = KE_f - KE_i = 0 - 0$

we have d = 3.0 m

Or, you may use a two step approach. First figure out the speed at point A before it get on the frictional surface, where mgh=0.5mv^2 . Then get into the second step to figure out how much work is needed to make the kinetic energy drops to zero.