SET 2 OF 2

Potential and Kinetic Energy Worksheet

Name: KEY

Refer to your answers to the companion worksheet (Set 1 of 2). The numbered questions below are matched with the same number questions on the other worksheet. Notice that you begin with # 2 so refer to #2 on the other page).

2. The bell's mass is 19.38 Kg (You know the bell's weight, to find it's mass use Fg = mg to solve for mass. g = 9.8 m/s/s).

$F_g = 190N$

$F_g = m\,g$

$190 = m\,(9.8)$

$m = 190/9.8 = 19.38Kg$

The gravitational potential energy at the top equals the kinetic energy at the bottom.

The bell's gravitational potential energy at the top of the tower is 8550 J.

Using the Law of Conservation of Energy, what is the kinetic energy of the bell just before it hits the ground? (assume the air resistance is negligible so there is no energy dissipated as it falls).

$E_K =$ 8550 J

Find Its velocity just before it hits the ground

$E_K = \frac{1}{2} m v^2$

$(8550) = \frac{1}{2}(19.38) v^2$

$8550 = (9.69) v^2$

$v^2 = 882.35$

$\sqrt{v^2} = \sqrt{882.35}$

$v = 29.7 \frac{m}{s}$

3. Refer to number 3 on the companion page. List the know values for the apple:

TOP

$E_g =$ 6.0 J $m =$ 0.204Kg $h =$ 3m g = 9.8 m/s/s

Using the Law of Conservation of Energy, what is the kinetic energy of the apple just before it hits the ground? (assume the air resistance is negligible so there is no energy dissipated as it falls).

BOTTOM

$E_K =$ 6.0 J

Find Its velocity just before it hits the ground

$E_K = \frac{1}{2} m v^2$

$(6) = \frac{1}{2}(0.204) v^2$

$6 = (0.102) v^2$

$v^2 = \frac{6}{0.102}$

$v^2 = 58.824$

$v = \sqrt{58.824} = 7.67 \frac{m}{s}$

6. Refer to number 6 on the companion page. List the know values for the diver:

E_K = 15000 J m = 50 kg v = 24.49 m/s g = 9.8 m/s/s

Using the Law of Conservation of Energy, what is the diver's gravitational potential energy when she is on the diving platform? (assume the air resistance is negligible so there is no energy dissipated as it falls).

E_G = 15000 J

Find the height of the platform.

$E_g = m\ g\ h$

$(15000) = (50)(9.8)(h)$

$15000 = 490h$

$h = 30.6\text{ m}$

13. Refer to number 13 on the companion page. List the know values for the ~~diver~~ roller coaster.

E_G = 69,552 J Fg = 966 N m = 98.57 kg h = 72 m g = 9.8 m/s/s

Using the Law of Conservation of Energy, what is the coaster's kinetic at the bottom of the hill? (assume the air resistance is negligible so there is no energy dissipated as it falls).

E_K = 69,552 J

Find the coaster's velocity at the bottom of the hill.

$E_K = \frac{1}{2}\ m\ v^2$

$(69{,}552) = \frac{1}{2}(98.57)(v)^2$

$69{,}552 = 49.285\ v^2$

$v^2 = 1411.22$

$v = \sqrt{1411.22} = 37.57$

$v = 37.57\ \frac{m}{s}$