Ch. 8 Homework

Phy 107

for Exam #2

Questions 2, 6, 9
Problems 1, 2, 8

Extra Problem: Sister walks steadily by at 0.5m/s with 2 cookies. Little brother ($m = 20kg$) can get a cookie if he runs & catches her. How much work does he do?

Questions

(2.) $F = 20{,}000N$ $d = 100m$ $W = F \cdot d = 2{,}000{,}000J$

$\text{Power} = \frac{\text{Work}}{\text{Time}}$ Crane #1 $\text{Power} = \frac{2 \times 10^6 J}{t}$

Crane #2 $\text{Power} = \frac{2 \times 10^6 J}{\frac{1}{3}t} = 3\left[\frac{2 \times 10^6 J}{t}\right]$

Crane #2 has 3X more power than Crane #1

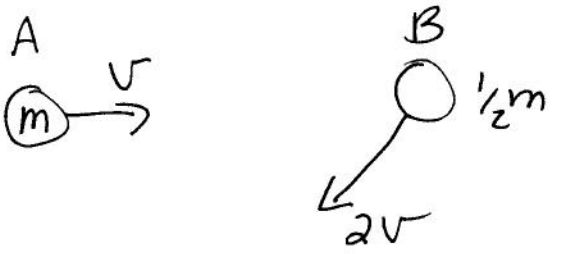
(6.) Kinds of energy

a) water behind dam – potential.
b) swinging pendulum – potential + kinetic
c) apple on a tree – potential
d) space shuttle in orbit – kinetic + potential

Ch. 8 HW

Qs

(9.)



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

$KE_B = \frac{1}{2}\left(\frac{1}{2}m\right)(2v)^2$

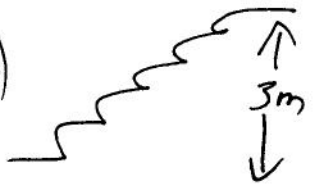
$= \frac{1}{4} m\, 4v^2$

$KE_B = m v^2$

$\therefore \quad KE_B = 2 \times KE_A$

Problems.

(1.) a)



$W = F \cdot d_{vert}$

$= mgh = (65\,kg)(9.8\,m/s^2)(3\,m)$

$W = 1911\,J$

b) 60 Watt bulb

$Power = 60W = \frac{Work}{time}$ $\quad Watt = \frac{J}{sec}$

$Work = 60W(1\,hr)\left(\frac{3600\,sec}{hr}\right) = 216{,}000\,J$

c) $\#\,Flights = \frac{216{,}000\,J}{1911\,J} =$ 113 flights

Ch. 8 HW

Ps (cont)

(2.) $m = 1\,kg$, $v = 10\,m/s$ $\qquad$ $m = 2\,kg$, $v = 5\,m/s$

$W = \Delta KE = \frac{1}{2} m(v_f^2 - v_i^2)$

$= \frac{1}{2} m[0 - (10\,m/s)^2]$

$= -50\,kg\,\frac{m^2}{s^2} = -50\,J$

$W = \Delta KE$

$= \frac{1}{2}(2kg)[0 - (5\,m/s)^2]$

$W = -25\,J$

Second ball will hurt less

(8.) $150\,lb = W$

$d = 3.5\,ft$

$W = F \cdot d = 150\,lb\,(3.5\,ft) = 525\,ft\text{-}lb. = W$

Extra Problem

$m = 20\,kg$, $v_i = 0$, $v_f = 0.5\,m/s$

$W = \Delta KE = \frac{1}{2}(20kg)[(0.5\,m/s)^2 - 0]$

$W = 2.5\,J$