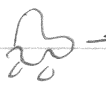
Glencoe 11-1 HW: 38, 39, 44, 46, 48, 49

38)  $V = 12.5\ m/s$ $m = 1600\ kg$

$KE = \frac{1}{2}mv^2 = \frac{1}{2}(1600\ kg)(12.5\ m/s)^2 = 1.3 \times 10^5\ J$

39)  $m = 1525\ kg$ $V = 108\ km/h = 30.0\ m/s$

$KE = \frac{1}{2}mv^2 = \frac{1}{2}(1525\ kg)(30.0\ m/s)^2 = 6.86 \times 10^5\ J$

44)  F_{FR} ← $WT = 14700\ N$ $V = 25\ m/s$ $m = \frac{14700\ N}{9.80\ m/s^2} = 1500\ kg$

$F_{FR} = -7100\ N$ $d = ?$

$W = \Delta KE$ $Fd = KE_2 - KE_1$ $KE_2 = 0$ So $d = \frac{-KE_1}{F}$

$d = -\frac{\frac{1}{2}(1500\ kg)(25\ m/s^2)^2}{-7100\ N} = 66\ m$

46)  $GPE = mgh = (60.0\ kg)(9.80\ m/s^2)(3.5\ m) = 2100\ J$

48)  $h = -5.50\ m$ $WT = 505\ N$ $GPE = mgh = WT\,d =$

$= (505\ N)(-5.50\ m) = -2780\ J$

49)  → $F = 150.0\ N$ $\Delta t = .030\ s$ $m = .060\ kg$ $KE = ?$

$\Delta P = Impulse = P_2 - P_1$ when $P_1 = 0$

$Impulse = F\Delta t = (150.0\ N)(.030\ s) = 4.5\ N \cdot s$

$\frac{F\Delta t}{m} = v = \frac{4.5\ N \cdot s}{.060\ kg} = 75\ m/s$

$KE = \frac{1}{2}mv^2 = \frac{1}{2}(.060\ kg)(75\ m/s)^2 = 170\ J$

Phy C11.1 40, 53, 55, 50, 56

40) $m = 45.\text{ kg}$, $v = 10.0\text{ m/s}$

A) $KE = \frac{1}{2}mv^2 = \frac{1}{2}(45\text{ kg})(10.0\text{ m/s})^2 = 2250\text{ J}$

$KE = 2300\text{ J}$

B) $KE = \frac{1}{2}mv^2 = \frac{1}{2}(45\text{ kg})(5\text{ m/s})^2 = 562.5\text{ J}$

C) $\frac{2250\text{ J}}{562.5} = 4$ Vel is a square so if you reduce speed by $\frac{1}{2}$ you drop KE by $\frac{1}{4}$.

---

53) $\bar{F} = 150.0\text{ N}$, $m = .060\text{ kg}$, $\Delta t = .030\text{ s}$

$F\Delta t = \Delta p = mv - mv_0$

$v = \frac{F\Delta t}{m} = \frac{(150.0\text{ N})(.030\text{ s})}{.060\text{ kg}} = 75\text{ m/s}$

$KE = \frac{1}{2}mv^2 = \frac{1}{2}(.060\text{ kg})(75\text{ m/s})^2 = 168.75 = 170\text{ J}$

---

55) $m_c = 2.00 \times 10^3\text{ kg}$, $v = 12.0\text{ m/s}$, $\Delta d = .500\text{ m}$

A) $\Delta KE = KE - KE_0 = 0\text{ J} - \frac{1}{2}(2.00 \times 10^3\text{ kg})(12\text{ m/s})^2$

$\Delta KE = -144000\text{ J}$

B) $W = \Delta KE = -144000\text{ J}$

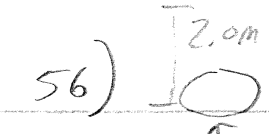
C) $W = fd$ $\quad F = \frac{W}{d} = \frac{-144000\text{ J}}{.500} = -288000\text{ N}$

---

50) $m = 10.0\text{ kg}$, $KE = 1960\text{ J}$

$mgh = KE$

$h = \frac{KE}{mg} = \frac{1960\text{ J}}{(10.0\text{ kg})(9.80\text{ m/s}^2)} = 20.0\text{ m}$

56) 

$W = \Delta KE = \frac{1}{2}mv^2 - 0J$

$m = \frac{32N}{9.8 m/s^2} = 3.265 kg$

$v = \sqrt{\frac{2W}{m}} = \sqrt{\frac{(410N)(2.0m)}{3.265kg}}$

$v = 22.41 m/s$

$mgh = \frac{1}{2}mv^2$ $\quad h = \frac{v^2}{2g} = \frac{(22.41 m/s)^2}{2(9.8 m/s^2)} = 25.63 = 26m$

$\Sigma F = ma \quad a = \frac{\Sigma F}{m} = \frac{410N}{3.265 kg} = 125.6 m/s^2$

$v^2 = v_0^2 + 2a\Delta d = 2(125.6 m/s)(2.0m) = 22.41 m/s$

$\Delta d = \frac{v^2 - v_0^2}{2(a)} = \frac{(-22.41 m/s)^2}{2(-9.80 m/s^2)} = 25.63 m/s = 26 m/s$

11.2 HW 58, 62, 64, 66, 68

58) 59

PH4

$h = 160\,m$
$m = 20.\,kg$

A) $GPE = mgh = (20.\,kg)(9.80\,m/s^2)(160\,m)$ $19600\,J$
=

B) Same as GPE or $19600\,J$

C) $v = \sqrt{\frac{2KE}{m}} = \sqrt{\frac{2(19600\,J)}{20.\,kg}} = 44\,m/s$

---

59)

$m = .30\,kg$
$F = 201\,N$
$d = 1.3\,m$

$fd = \frac{1}{2}mv^2$

(A) $v = \sqrt{\frac{2fd}{m}} = \sqrt{\frac{2(201\,N)(1.3\,m)}{.30\,kg}} = 41.7 = 42\,m/s$

(B) $mgh = \frac{1}{2}mv^2$ $\quad h = \frac{v^2}{2g} = \frac{(42\,m/s)^2}{2(9.80\,m/s^2)} = 9.0 \times 10^1\,m$

---

62)

$m_1 v_1 + m_2 v_2 = 0$

$v_2 = -\frac{m_1 v_1}{m_2} = -\frac{(.050\,kg)(310\,m/s)}{30.0\,kg} = .517\,m/s$

$m_B = 50.0\,g = .050\,kg$
$m_g = 30.0\,kg$
$v_B = 310.\,m/s$

(A) $P_B = (.050\,kg)(310\,m/s) = 15.5\,kg \cdot m/s$
$P_G = (30.0\,kg)(.517\,m/s) = 15.5\,kg \cdot m/s$

(B) $KE_B = \frac{1}{2}(.050\,kg)(310\,m/s)^2 = 2.40 \times 10^3\,J$

$KE_g = \frac{1}{2}(30.0\,kg)(.517\,m/s)^2 = 4.01\,J$

---

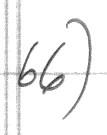
64)

$v = 1.00 \times 10^2\,km/h = 27.8\,m/s$

$mgh = \frac{1}{2}mv^2$ $\quad h = \frac{v^2}{2g} = \frac{(27.8\,m/s)^2}{2(9.80\,m/s^2)} = 39.4\,m$

Phy HW 3-20

11.2

66)  wt = 420 N — 1.00 m — .40 m —

(A) $h = .60\,m$

$mgh = \frac{1}{2}mv^2 \quad v = \sqrt{2gh} = \sqrt{2(9.80\,m/s^2)(.60\,m)}$

$m = \frac{420\,N}{9.8} = 42.9\,kg$

$v = 3.4\,m/s$

B) $v_1 = 3.4\,m/s \quad v_2 = 2.0\,m/s$

$W = \Delta KE = \frac{1}{2}(42.9\,kg)(2.0\,m/s)^2 - \frac{1}{2}(42.9\,kg)(3.4\,m/s)^2$

$W = -160\,J$

---

66) $m_m = 20\,kg \quad W_{FR} = ?$

$h_2 = 4.8\,m \qquad v = \sqrt{2gh} = \sqrt{2(9.80\,m/s^2)(4.8\,m)}$

$v = 9.70\,m/s$

$v_1 = 3.2\,m/s$

$W = \Delta KE = \frac{1}{2}(20\,kg)(3.2\,m/s)^2 - \frac{1}{2}(20\,kg)(9.20\,m/s)^2 = -1200\,J$
