

1. $m = 1200 \text{ kg}$

$V_i = 50 \text{ km/hr} = 13.8 \text{ m/s}$

$V_f = 0$

$F = -1550 \text{ N}$

a) $E_k = \frac{1}{2}(1200)(13.8)^2 = 115,740.7 \text{ J} = 1.16 \times 10^5 \text{ J}$

b) $W = Fd = (-1550)(25) = -38750 \text{ J} = -3.9 \times 10^4 \text{ J}$

2. $m = ?$ $E_k = 4000 \text{ J}$

$V = 20 \text{ m/s}$

$4000 = \frac{1}{2}m(20)^2$

$\frac{4000}{200} = \frac{200m}{200}$

$m = 20 \text{ kg}$

3. $E_H = mc\Delta t = (1.5)(4180)(90-10) = 501,600 \text{ J} = 5.02 \times 10^5 \text{ J}$

4. $\frac{50,000}{770} = \frac{(2.0)(385)(t_f - 23)}{770}$

$64.935 = t_f - 23$

$t_f = 87.94 = 88^\circ\text{C}$

5. $\frac{2.4 \times 10^5}{90} = \frac{(6.0)c(15)}{90}$

$c = 2666.\bar{6} = 2.7 \times 10^3 \frac{\text{J}}{\text{kg}\cdot^\circ\text{C}}$

6. a) $W = \Delta E_k = \frac{1}{2}(0.015)[0 - (400)^2] = -1200 \text{ J}$

b) $F = ?$ $W = Fd$ $F = \frac{-1200}{0.20} = -6000 \text{ N}$

7. $W = \Delta E_k = 0 - \frac{1}{2}(1000)(27.7)^2 = -385,802 \text{ J} = -3.86 \times 10^5 \text{ J}$

8. $E_{pi} + E_{ki} = E_{pf} + E_{kf}$

$\frac{1}{2}mV_i^2 = mgh_f$

$\frac{\frac{1}{2}(8.0)^2}{9.8} = \frac{(9.8)h_f}{9.8}$

$h_f = 3.265 \text{ m} = 3.3 \text{ m}$

9. $\frac{mgh}{mgh} = \frac{3.5}{5.0} = 0.70$

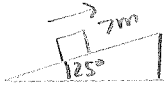
30% loss

$$10. \quad E_{pi} + E_{ki} = E_{pf} + E_{kf}$$

$(v_i = 0) \quad (h_f = 0)$

$$mgh_i = \frac{1}{2} m v_f^2 \quad (9.8)(20) = \frac{1}{2} v_f^2 \quad v_f = \sqrt{392} = 19.8 \text{ m/s}$$

11.



$$W = F \cdot d$$

$$= (mg) d_y = (50)(9.8)(7 \cdot \sin 25^\circ) = 1449.6 \text{ J} = 1450 \text{ J}$$

12.

$$P = \frac{W}{t} = \frac{Fd}{t} = \frac{(1.50 \times 10^3)(9.8)(15)}{30} = 7350 \text{ W}$$

13.

$$P = \frac{W}{t} = \frac{F d}{t} \quad \text{velocity} = (1.00 \times 10^3)(9.8)(4.0) = 3.92 \times 10^4 \text{ W}$$

14.

$$E_{pi} + E_{ki} = E_{pf} + E_{kf}$$

$$mgh_i + \frac{1}{2} m v_i^2 = mgh_f + \frac{1}{2} m v_f^2$$

$$(9.8)(15) + \frac{1}{2} (3.0)^2 = (9.8)(7.0) + \frac{1}{2} v_f^2$$

$$147 + 4.5 = 68.6 + \frac{1}{2} v_f^2$$

$$82.9 = 0.5 v_f^2 \quad v_f = \sqrt{165.8} = 12.9 \text{ m/s}$$