Chapter 6 - Work and Kinetic Energy

Physics 206

Group 1 Problems:
Problem 1:

$$\mu = \frac{v_0^2}{2gD}$$

Problem 2:

$$\Delta x = 4.25 \text{ m}$$

Problem 3:

$$v_2 = \sqrt{\frac{2}{m}\left(\frac{a}{4}(x_2^4 - x_1^4) - \frac{b}{3}(x_2^3 - x_1^3) + c(x_2 - x_1)\right) + v_1^2}$$

Problem 4:

$$W = 2$$
$$\theta = 84.1 \text{ degrees}$$

Problem 5:

$$W = 9.00 \text{ J}$$

Group 2 Problems:
Problem 6:

(a) $x_f = \sqrt{\frac{2mgL\sin\theta}{k}}$

(b) $v_0 = \sqrt{2\mu_k gL\cos\theta + \frac{2}{3}\mu_k gD}$

(c) $v_0 = \sqrt{2\mu_k gL\cos\theta + \frac{2}{3}\mu_k g\left(D + \sqrt{\frac{2mgL\sin\theta}{k}}\right)}$

Problem 7:

(a) $W_f = \frac{5}{2}mgR - \frac{1}{2}mv_0^2$

(b) $v = \sqrt{5gR}$

Problem 8:

$$v_0 = \sqrt{\frac{2}{m}\left(-mg_X h + \frac{a}{4}h^4 - \frac{b}{2}h^2 + ch\right)}$$

Problem 9:

$$k = \frac{2mgL\sin\theta}{D^2}$$

Group 3 Problems:
Problem 10:

$$P_N = 6360 \text{ W}$$
$$P_g = -2930 \text{ W}$$
$$P_f = 2420 \text{ W}$$

Problem 11:

$$x = 4\left(L \pm \frac{D}{2}\right) - \frac{2v_0^2}{\mu_k g}$$

Problem 12:

$$\alpha = 2.12 \times 10^{-26} \text{ Nm}^2$$
$$d = 2.82 \times 10^{-10} \text{ m}$$