

## HW #2 Solutions

1.6  $\omega = 3000(2\pi)/60 = 314.16$  rad/sec. Period  $P = 2\pi/\omega = 60/3000 = 1/50$  sec.

1.7  $\omega = 5$  rad/sec. Period  $P = 2\pi/\omega = 2\pi/5 = 1.257$  sec. Frequency  $f = 1/P = 5/2\pi = 0.796$  Hz.

1.8  $k=0.1977$  lb/in

2.2

$$t = \frac{60/5280}{90} 3600 = 0.455 \text{ sec}$$

$$x = \frac{1}{2}gt^2 = 16.1(0.455)^2 = 3.326 \text{ ft}$$

2.5

$$y = R \sin(\phi)$$

$$x = \frac{v_x}{g} \sqrt{v_y^2 - 2gy} - \frac{v_x v_y}{g}$$

$$D = x + R \cos(\phi)$$

2.7

a)  $L = 2.808$  ft

b)  $I_o \ddot{\theta} + mgl \sin(\theta) = 0$

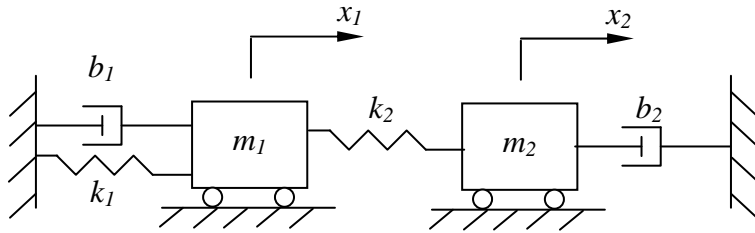
2.8

a)  $I_A \ddot{\theta} + m_C g L_1 \sin(\theta) - mg L_2 \cos(\beta - \theta) = 0$

b)  $mg = \frac{m_C g L_1 \sin(\theta)}{L_2 \cos(\beta - \theta)}$

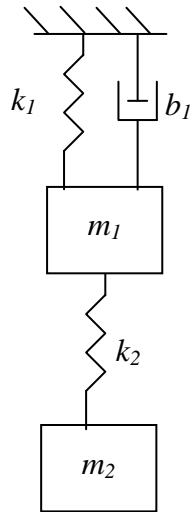
c)  $mg = 22.713$  N

Some Additional Problems:



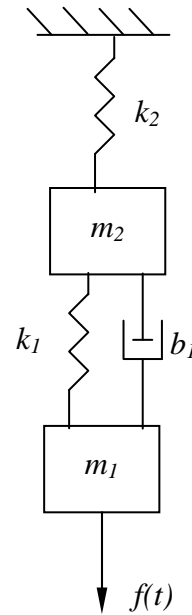
$$m_1 \ddot{x}_1 + b_1 \dot{x}_1 + (k_1 + k_2)x_1 = k_2 x_2$$

$$m_2 \ddot{x}_2 + b_2 \dot{x}_2 + k_2 x_2 = k_2 x_1$$



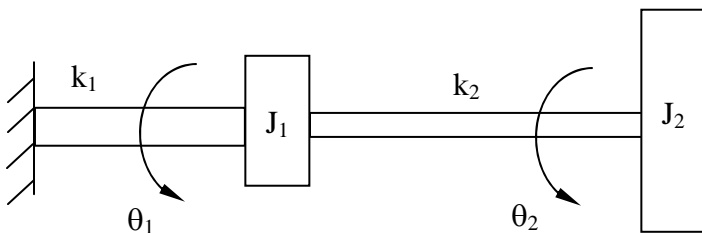
$$m_1 \ddot{x}_1 + b_1 \dot{x}_1 + (k_1 + k_2)x_1 = k_2 x_2$$

$$m_2 \ddot{x}_2 + k_2 x_2 = k_2 x_1$$



$$m_1 \ddot{x} + b_1 \dot{x} + k_1 x = b_1 \dot{y} + k_1 y + f(t)$$

$$m_2 \ddot{y} + b_1 \dot{y} + (k_1 + k_2)y = b_1 \dot{x} + k_1 x$$



$$J_1 \ddot{\theta}_1 + (k_1 + k_2)\theta_1 = k_2 \theta_2$$

$$J_2 \ddot{\theta}_2 + k_2 \theta_2 = k_2 \theta_1$$