

$$b.) F = -Kx \quad K = \frac{F}{x}$$

$$F = \frac{13.3g}{1000} \cdot 9.81$$

$$= 0.1305 N$$

$$\frac{V}{\frac{1}{\rho_{in}}} \quad V \cdot \frac{\rho_{in}}{V} = \frac{V}{\rho_{in}}$$

$$\frac{mV}{g} \quad \frac{mV}{\rho_{in}}$$



$$\frac{x}{F} = \frac{\frac{1}{K}}{\frac{m}{K}s^2 + \frac{B}{K}s + 1}$$

$$\frac{1}{\omega_n} = \frac{1}{\omega_n^2}$$

$$K = M \omega_n^2$$

$$= \frac{75.6g}{1000} (13.33)$$

$$2.3 \ a.) \quad \omega_{b1} = \frac{1}{\tau_1} = \frac{R_p}{L_p}$$

$$\omega_{b2} = \frac{1}{\tau_2} = \frac{R_m + 2R_s}{2L_o}$$

$$R_s = 1625 \Omega \quad R_m = 1e6 \Omega$$

$$R_p = 4085 \Omega$$

$$\omega_{b2} 2L_o = R_m + 2R_s$$

$$\omega_{b1} = 295 \text{ Hz} \quad \omega_{b2} = 22.07 \text{ kHz}$$

$$L_p = \frac{R_p}{\omega_{b1}} = \frac{408}{295} = 1.38$$

$$\text{or} = \frac{408}{(22.07 \cdot 10^3)} = 0.02201$$

$$\omega_{b2} = 22070 \text{ Hz}$$

$$L_o = \frac{R_m + 2R_s}{\omega_{b2} 2} = \frac{1e6 + 2(162)}{22.07e3(2)}$$

$$c.) \quad \frac{2R_m K_m x}{R_p(R_m + 2R_s)} = K_s \quad K_m = \frac{K_s R_p (R_m + 2R_s)}{2R_m x}$$

$$\left(\frac{L_p}{R_p} s + 1 \right) \left(\frac{2L_o}{R_m + 2R_s} s + 1 \right) \frac{L_p}{R_p} \frac{2L_o}{R_m + 2R_s} s^2 + \left(\frac{L_p}{R_p} + \frac{2L_o}{R_m + 2R_s} \right) s + 1$$