Q2.2

$$M_p = e^{\frac{-\pi\zeta}{\sqrt{1-\zeta^2}}} \qquad \zeta = 0.5$$

$$t_D = \frac{1+0.7\zeta}{\omega_n} \qquad \omega_n = 3.1$$

$$\frac{X(S)}{F(S)} = \frac{1}{MS^2+BS+K} \qquad F(S) = \frac{8.9}{S}$$

$$X(S) = \frac{8.9}{S(MS^2+BS+K)}$$

final value $\lim_{S\to 0} SX(S) = 0.03$

$$K = 296.7$$

$$\frac{(1/M)}{S^2+\frac{B}{M}S+K/M} = \frac{\omega_n^2}{S^2+2\zeta\omega_n+\omega_n^2}$$

$$\frac{K}{M} = \omega_n^2 \qquad M = 27.2 \text{ Kg}$$

$$\frac{B}{M} = 2\zeta\omega_n \qquad B = 157.97$$

Q2.3

$$G_c(S) = \frac{1.21(S+1.95)}{(S+4.56)}$$