

(c)

cont.

$$5\% OS \Rightarrow \left\{ \omega_n = \frac{-\ln(0.05)}{\sqrt{\ln(0.05)^2 + \pi^2}} = 0.6901 \right\}$$

$$\omega_n = \frac{46}{0.69} = 6.67$$

$$f_S = 1s \Rightarrow \frac{4.6}{\omega_n} = 1 \Rightarrow \omega_n = 4.6$$

from calculation:

$$\frac{1}{2} k_{el} d + \frac{1}{4} = 2(4.6) \Rightarrow \underline{k_{el} = 17.9}$$

$$\frac{1}{2} k_p = (6.67)^2 \Rightarrow \underline{k_p = 89.0}$$