

Question 4.

$$\begin{aligned} \textcircled{b} \quad \omega &= \omega_n \sqrt{1 - \zeta^2} \\ &= 6.32 \sqrt{1 - (0.422)^2} \\ &= 5.73 \text{ Hz} \end{aligned}$$

Rise time

$$t_r = \frac{\pi}{\omega} = \frac{\pi}{(2)(5.73)} = 0.27 \text{ s}$$

Peak time

$$t_p = \frac{\pi}{\omega} = \frac{\pi}{(5.73)} = 0.55 \text{ s}$$

2% Setting time

$$= \frac{4}{\zeta \omega_n} = \frac{4}{(0.422)(6.32)} = 1.499 \text{ s}$$

©

