

$$1) R = 100 \times 10^3 \Omega \quad L = 20 \times 10^{-3} H \quad C = 5 \times 10^{-9} F$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{20 \times 10^{-3} \times 5 \times 10^{-9}}} =$$

$$\omega_0 = 100000 \text{ rad/s} = 100K \text{ rad/s}$$

$$\alpha = \frac{R}{\omega_0 L} = \frac{100 \times 10^3}{100000 \times 20 \times 10^{-3}} = 50$$

$$\beta = \frac{\omega_0}{\alpha} = \frac{100000}{50} = 2000 \text{ rad/s}$$

$$\omega_1 = \omega_0 - \frac{\beta}{2} = 100000 - \frac{2000}{2} = 99,000 = 99K \text{ rad/s}$$

$$\omega_2 = \omega_0 + \frac{\beta}{2} = 100000 + \frac{2000}{2} = 101000 = 101K \text{ rad/s}$$

$$\text{w) } C = 0.1 F \quad R = 10 \Omega \quad L = 2 H$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{2 \times 0.1}} = 2.2 \text{ rad/s}$$

$$iii) \omega_0 = \frac{1}{\sqrt{LC}}$$

$$L = 100 \times 10^{-3} \text{ H} \quad C = 0.5 \times 10^{-3} \text{ F}$$

$$\therefore L = 100 \times 10^{-3} = 0.1 \text{ H} \quad C = 0.5 \times 10^{-3} = 0.0005 \text{ F}$$

$$\omega_0 = \frac{1}{\sqrt{100 \times 10^{-3} \times 0.5 \times 10^{-3}}} = 141.4 \text{ rad/s}$$

$$\omega_0 = \frac{\pi}{T} = \frac{\pi}{0.0005} = 6283 \text{ rad/s}$$

$$\text{Ansatz: } \ddot{x} + \omega_0^2 x = 0$$

$$x(t) = A \cos(\omega_0 t + \phi)$$

$$x(0) = 0 \Rightarrow A \cos(\phi) = 0$$

$$A \cos(0) = 1 \Rightarrow A = 1$$

$$x(0) = 0$$

$$1.0 \times 10^{-3}$$

$$0.1$$