

- (i) Sketch on a set of common axes, waveforms to represent the transient response of circuits having transfer functions with the following parameters

a)  $\zeta = 0.5, \omega_0 = 1 \times 10^3 \text{ rad s}^{-1}$

b)  $\zeta = 0.2, \omega_0 = 2 \times 10^3 \text{ rad s}^{-1}$

c)  $\zeta = 2, \omega_0 = 1 \times 10^3 \text{ rad s}^{-1}$

- (ii) Sketch the waveform defined below and explain how you would obtain its Fourier series, develop the analysis as far as you are able;

$$f(\omega t) = 0 \text{ for } 0 \leq \omega t \leq \pi/2$$

$$f(\omega t) = V \sin(\omega t) \text{ for } \pi/2 \leq \omega t \leq \pi$$

$$f(\omega t) = 0 \text{ for } \pi \leq \omega t \leq 3\pi/2$$

$$f(\omega t) = V \sin(\omega t) \text{ for } 3\pi/2 \leq \omega t \leq 2\pi$$