



Find  $V_o(t)$ :

$$V_s(t) = \begin{cases} 0 & t < 0 \\ 80 & 0 \leq t < 2.5\text{ms} \\ 0 & 2.5\text{ms} \leq t < \infty \end{cases}$$

$$\tau = \frac{L}{R} = \frac{40 \times 10^{-3}}{20} = 2\text{ms}$$

$$V_o(t) = V_o(\infty) + [V_o(0) - V_o(\infty)]e^{-t/2 \times 10^{-3}}$$

$$= 80e^{-500t} \text{ V}$$

phasor

$$V = 50 \cos(5000t - 60^\circ) + 25 \sin(5000t + 110^\circ) - 75 \cos(5000t - 30^\circ)$$

$$50 \cos(5000t - 60^\circ) + 25 \cos(5000t + 20^\circ) + 75 \cos(5000t + 150^\circ)$$

$$50 \angle -60^\circ + 25 \angle 20^\circ + 75 \angle 150^\circ$$

$$50 \cos(-60) = 25$$

$$50 \sin(-60) = -43.3$$

$$25 \cos(20) = 23.49$$

$$25 \sin(20) = 8.55$$

$$75 \cos(150) = -64.95$$

$$75 \sin(150) = 37.5$$

$$25 + 23.49 + (-64.95) + j(-43.3 + 8.55 + 37.5)$$

$$-16.46 + j 2.75$$

$$V = \sqrt{(-16.46)^2 + (2.75)^2}$$

$$V = 16.69$$

$$\theta = \tan^{-1}\left(\frac{2.75}{-16.46}\right) + 180$$

$$\theta = 170.52^\circ$$

$$P^{-1} \{ 16.69 \angle 170.52^\circ \}$$

$$\boxed{16.69 \cos(5000t + 170.52^\circ)}$$