Question 1) Let an input of $V(t) = 240 \sin(\omega_0 t + \frac{\pi}{4})$ Volts is applied as input to the circuit below. At what value of $\omega_0$ will the voltage sinusoid $v_R(t)$ achieve the minimal amplitude. (Recall that amplitude of a sine wave is the maximal level it can take, i.e. $\alpha$ in $\alpha \sin(\omega t)$)

Can you justify the term resonant frequency, for the $\omega_0$ you found in the question above.

Question 2) Find the voltage across the inductor if $V(t) = e^{-5t} \cos(4t - 30^\circ)u(t)$ Volts.

Question 3) If $V(t) = 10 \cos(2t - \frac{\pi}{3})$, find the Thevenin equivalent between $A$ and $B$. 

### Figure 1
![Circuit Diagram 1](image1)

### Figure 2
![Circuit Diagram 2](image2)

### Figure 3
![Circuit Diagram 3](image3)
Question 4) In Figure 4, let $V(t) = 24\sqrt{2}\cos(2t)$ Volts. Find the voltage across terminals $A$ and $B$.

![Figure 4]

Question 5) If $V_1(t) = \cos 4t$ and $V_2(t) = 2\sin 8t$, find the current through the capacitor.

![Figure 5]