1. The sinusoidal voltage pulse below in (a) is applied to the circuit shown in (b). Use the convolution integral to find the value of V_0 at $t = \frac{\pi}{4}$ sec. (15%)
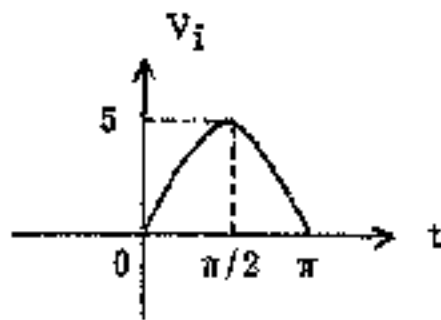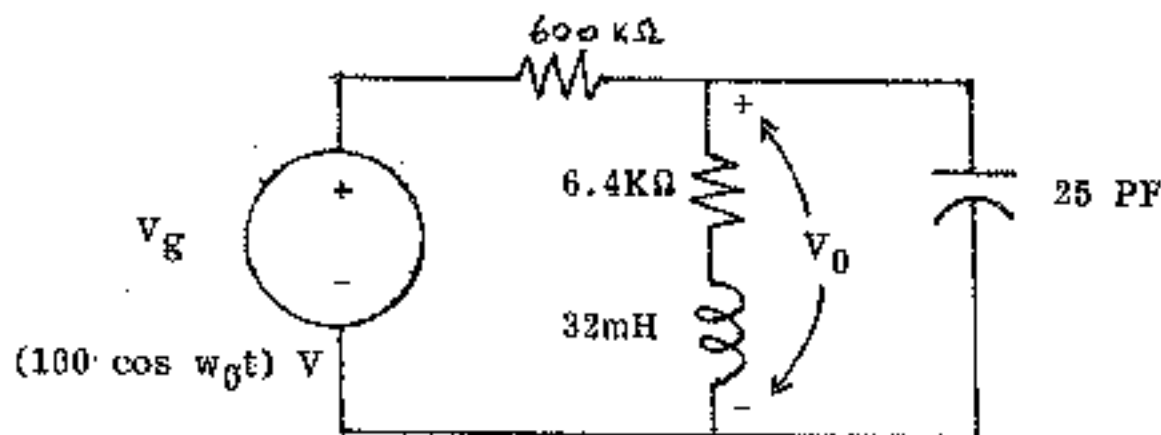

(a)
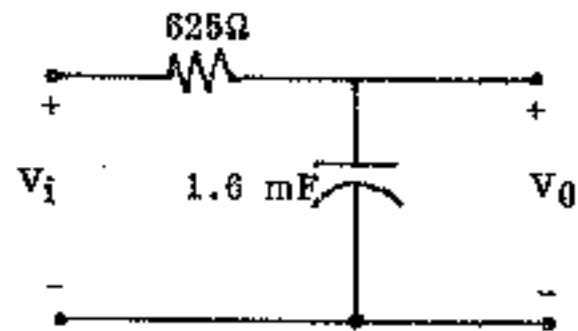
(b)

2. The frequency of the sinusoidal voltage source in the circuit below is adjusted to unity power-factor resonance. (15%)

   (a) What is the Q of the coil at the resonant frequency?

   (b) What is the peak amplitude of V_0 at resonant frequency?

3. The impedance of a series RLC circuit is $400 + j\,3800\ \Omega$ at a frequency of 20 K rad/s. The circuit is scaled in magnitude and frequency by the same factor, and when the impedance is measured at 5 K rad/s, it is found to be $1600 - j\,11{,}800\ \Omega$.

   (a) Calculate the original values of R, L, and C.
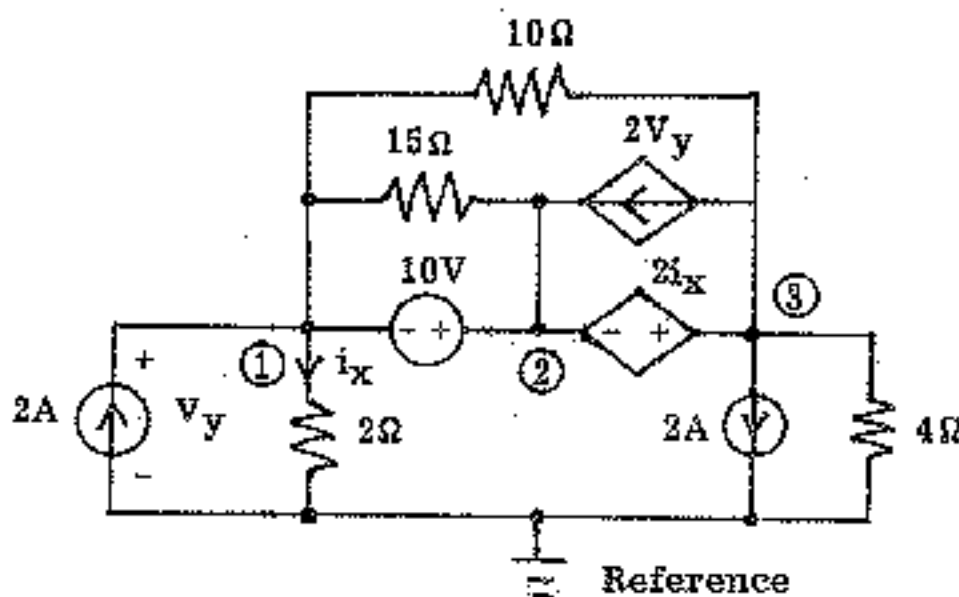
   (b) Calculate the resonant frequency. (15%)

4. For the following network, the switch has been open for a very long time and is closed at t=0. Please find i(t) for t>0. (20%)
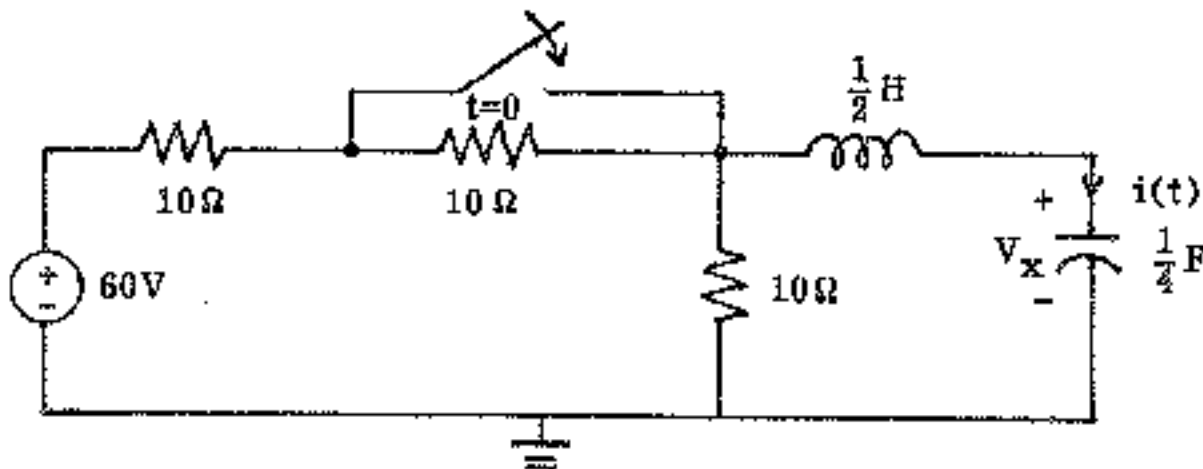
5. Find the voltages at different nodes (i.e., V_1, V_2, V_3) for the following network. (15%)

6. In the following three phase system, it is assumed the wattmeter is ideal and the balanced Y-connected load is connected to a balanced three phase voltage source. If the load consumes complex power $S = 1000\sqrt{3} \ \angle 30°$ VA, find the reading of the wattmeter. (20 %)