#1. Obtain the complete voltage response of $v(t)$ as shown in Fig. 1. Assuming

$$i_s(t) = 40e^{-3t}u(t) \text{ (Amp)} \quad \text{and} \quad i_s(0^-) = 0 \quad (22\%)$$

![Fig. 1]
#2. Refer to Fig. 2  (18 %)

(a) Find the value of impedance $Z_L$ such that maximum power is transferred to load $Z_L$.

(b) Compute the above (average) power transferred to the load.

Given that

$\omega = 10 \text{Mrad/Sec}, \quad R = 2 \Omega, \quad C = 0.1 \mu F, \quad L = 0.2 \mu H \quad \text{and} \quad V_s = 10\angle37.6^\circ \text{mV}$

#3. Refer to Fig. 3  (16 %)

(a) Find the resonant frequency, $\omega_o$, of the parallel circuit in Fig. 3.

(b) If the inductance $L$ can be varied, find its value at the circuit resonance.
#4 (18 %)

(a) Apply KCL at nodes 1, 2 and 3 as shown in the circuit below (Fig. 4a), and obtain the nodal equations.

(b) Apply KVL to loops 1, 2, and 3 as shown in Fig. 4b, and obtain the loop equations.

(Note: You don’t need to solve the above equations!)
(a) A three-phase, three-wire, 100 volt, ABC system supplies a balanced delta-connected load with impedance of $20 \angle 45^0$ ohms (refer to Fig. 5a). Determine the line currents and draw the phasor diagram.

(b) A three-phase, four wire, 208 volt, CBA system has a wye-connected load with $Z_A = 6\angle 0^0, Z_B = 6\angle 30^0, Z_C = 5\angle 45^0$ (refer to Fig. 5b). Obtain the three line currents and the neutral current. Draw the phasor diagram.

(Note that ABC system = positive phase-sequence system; And CBA system = negative phase-sequence system.)