



Please Answer The Following:

**Question # 1: ( 25 Points)**

For the circuit shown in figure 1, find:

- a-  $I(0^-)$ ,  $V_C(0^-)$ ,  $I_C(0^+)$  and  $V_L(0^+)$ . (5 pts)
- b- The current  $i(t)$  for  $t > 0$ . (12 pts)
- c- Energy stored in a capacitor at  $t=0.02$  sec. (8 pts)

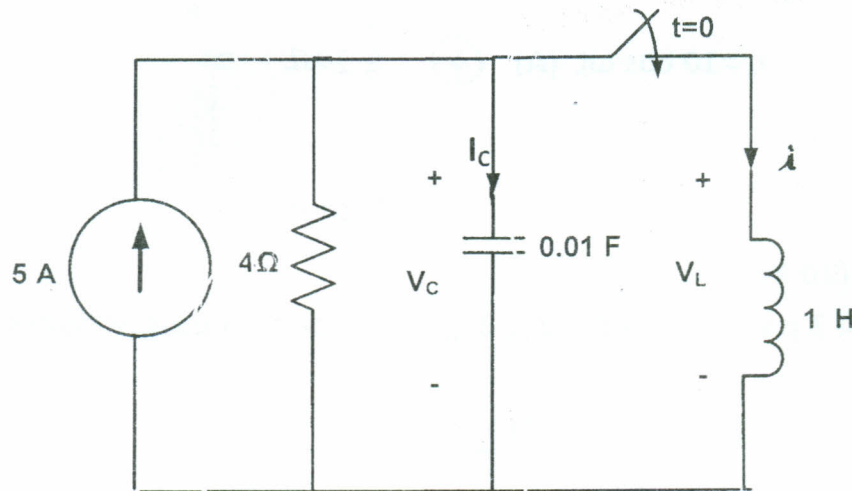


Figure 1

**Question # 2: ( 25 Points)**

For the frequency domain circuit shown in figure 2, calculate:

- a- The current  $I_1$  and the voltage  $V_o$ . (15 pts)
- b- The active power delivered by the source. (4 pts)
- c- The value of  $V_o$  when  $I_2=0$ . (6 pts)

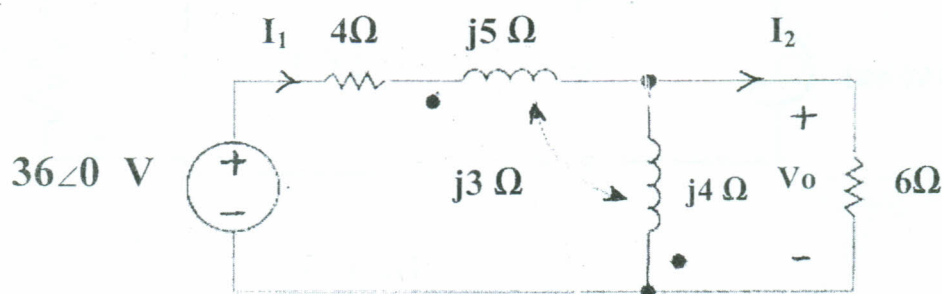


Figure 2

**Question #3: (20 Points)**

For the circuit shown in figure 3, find:

- a- The transfer function  $H(\omega) = I_o(\omega)/I_s(\omega)$  and its poles and zeros. (8 pts)
- b- Resonance frequency ( $\omega_0$ ) and the circuit impedance at resonance. (6 pts)
- c- Circuit quality factor and the current  $i_o(t)$  at resonance. (6 pts)

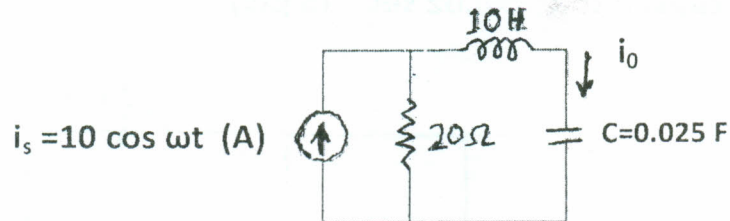


Figure 3

**Question #4: (20 Points)**

If the values of Z parameters  $Z_{11}, Z_{12}, Z_{21}, Z_{22}$  of the two-port network of figure 4 are

$$Z = \begin{bmatrix} 25 & j30 \\ j10 & 20 \end{bmatrix} \text{ Ohms}$$

Calculate :

- a- Values of  $I_1, I_2, V_1$  and  $V_2$ . (12 pts)
- b- The total circuit input impedance and power consumed by the load ( $40 \Omega$ ). (8 pts)

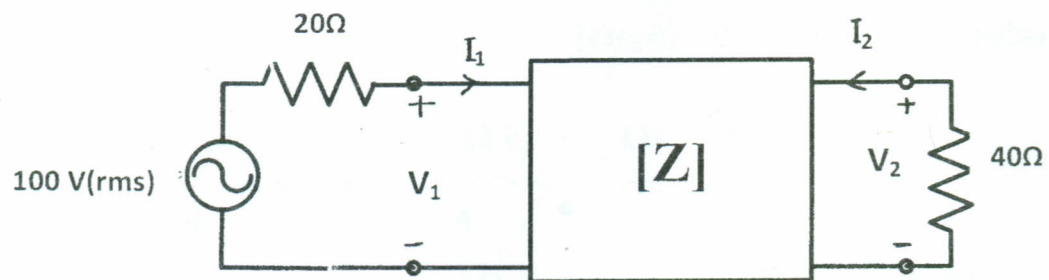


Figure 4

With My Best Wishes  
Prof. Dr. Mohammed El-Saied