

1. Using superposition, find the terminal voltage  $V_{ab}$  in the circuit of Fig. 1. (20%)

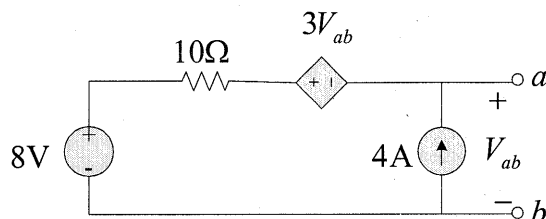


Fig. 1

2. Assume the OPA in the circuit of Fig. 2 is ideal.

(a) Calculate  $i_x$  and  $v_o$ . (10%)

(b) Find the power dissipated by the 60-k $\Omega$  resistor. (5%)

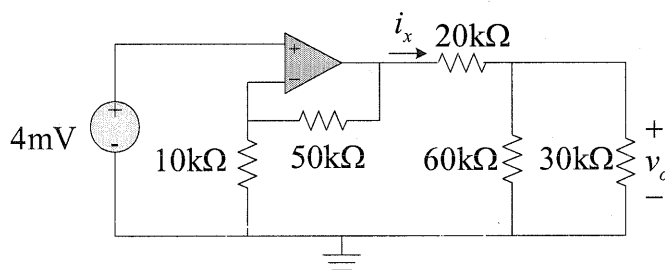


Fig. 2

3. Under steady-state dc conditions, find  $i_L$ ,  $v_C$ , and the energy stored in the capacitor in the circuit of Fig. 3. (15%)

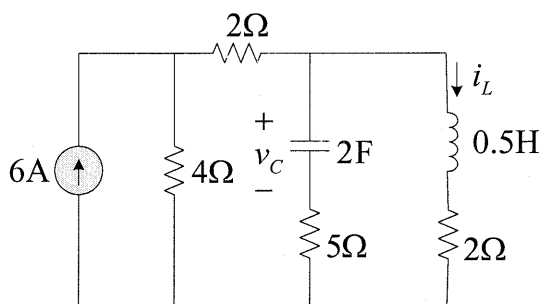


Fig. 3

4. Consider the circuit shown in Fig. 4.
- Find the resonant frequency  $\omega_o$ . (6%)
  - Find the input impedance  $Z_{in}(\omega_o)$ . (6%)
  - Find the quality factor. (6%)

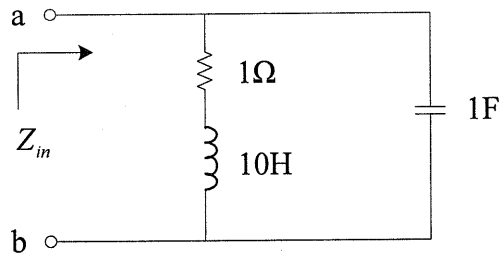


Fig. 4

5. For the circuit shown in Fig. 5. Find the sinusoidal steady state value of  $i(t)$ . (12%)

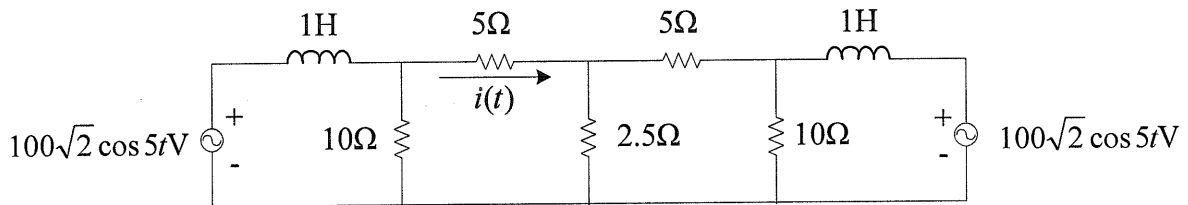


Fig. 5

6. For the circuit shown in Fig. 6.
- Find the Thevenin equivalent circuit with respect to the terminals a, b. (10%)
  - If an adjustable resistor  $R_L$  is connected to the terminals a, b, what is the maximum average power delivered to  $R_L$ ? (10%)

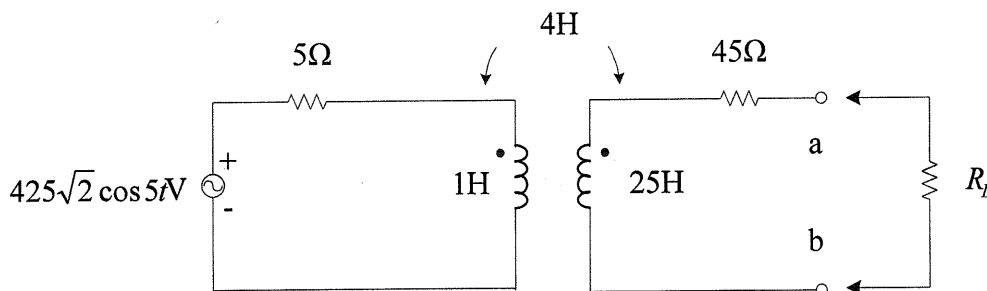


Fig. 6