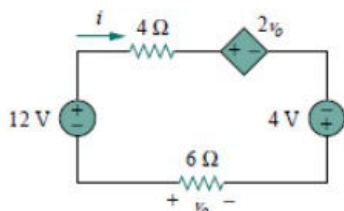


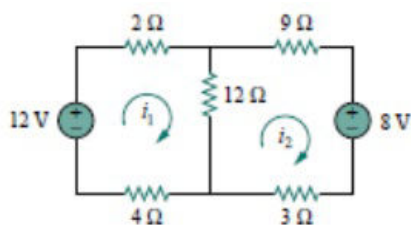
Set B

Time : 3 hrs
Total Marks: 100

1. a. Determine v_o and i in the circuit shown in Fig. (10 marks)

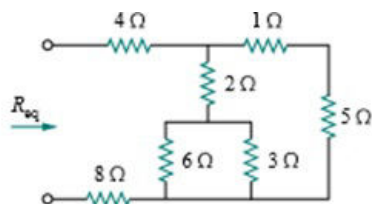


- b. Calculate the mesh currents i_1 and i_2 in the circuit of Fig. (10 marks)

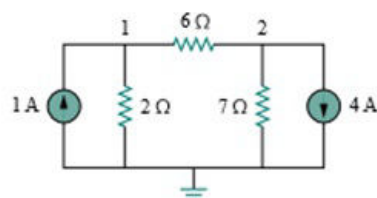


OR

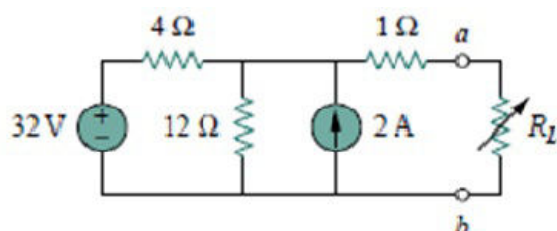
2. a. Find R_{eq} for the circuit shown in Fig. (10 marks)



Obtain the node voltages in the circuit in Fig. (10 marks)

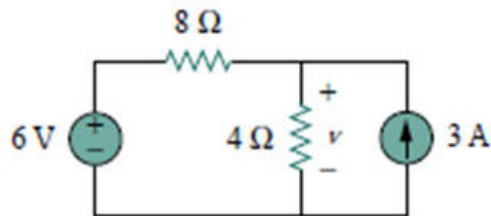


3. a Calculate the Thevenin's equivalent circuit at the terminals a and b of the circuit in Figure. (10 marks)



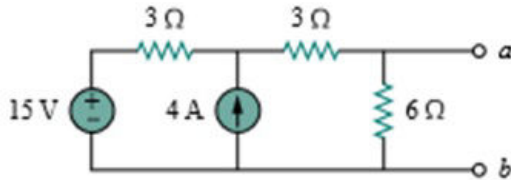
b. Use the superposition theorem to find v in the circuit in Figure.

(10 marks)

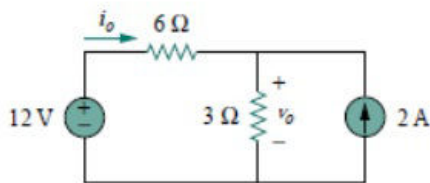


OR

4. a. Find the Norton equivalent circuit for the circuit in Fig. (10 marks)



- b. Apply source transformation to determine v_o and i_o in the circuit in Fig. (10 marks)



5. a. Two coils are mutually coupled, with $L_1 = 25$ mH, $L_2 = 60$ mH, and $k = 0.5$. Calculate the maximum possible equivalent inductance if: (5 marks)

(i) the two coils are connected in series

(ii) the coils are connected in parallel

b. Derive an expression for output voltage, output current and amplification factor of single tuned circuit under resonant conditions. Also find the expression for maximum value of output voltage, current and amplification factor.

(15 marks)

OR

6. a. Derive the equivalent inductance in a parallel connection of coupled coils. (15 marks)

b. What is the Quality factor and bandwidth of a series circuit that resonates at 6 kHz, has equal reactance of 4 kilo-ohms each, and a resistor value of 50 ohms? (5 marks)

7. a. Derive the expression for transient response $i(t)$ for an R-L circuit with a DC input. (10 marks)

b. In the series RL circuit with $R = 50$ ohms and $L = 0.5$ Henry, the applied voltage is $e = 10$ V. Find the resulting current in the circuit and determine the time constant. (10 marks)

OR

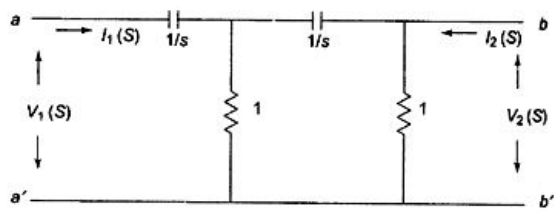
8. a. A capacitor of 2 microfarads with an initial charge $Q_0 = 200 \times 10^{-6}$ Coulombs is connected across the terminals of a 500 ohm resistor at $t = 0$. Calculate the time in which the transient

voltage across the resistor drops from 60V to 20 V.

(10 marks)

b. Derive the expression for transient current in a series RLC circuit excited by a DC input. (10 marks)

9. a. Find the Z parameters of the RC ladder network shown in figure. (15 marks)



b. Give the function of a filter. Classify filters and draw their frequency response. (5 marks)

Wishing you All the Best
