2002 SCHEME

USN | | | | | | | | | | |

EE34

Third Semester B.E. Degree Examination, December 2010
Network Analysis

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Obtain the current source equivalent of a practical voltage source. **(05 Marks)**

b. In the network shown in Fig.Q1(b), find the power delivered by the source, using the nodal analysis. **(07 Marks)**

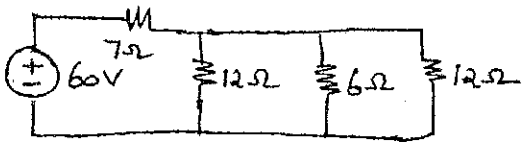

Fig.Q1(b)

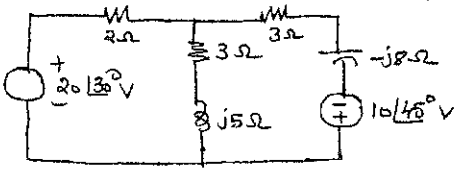

Fig.Q1(c)

c. Using mesh current analysis, find the current through the capacitor shown in Fig.Q1(c). **(08 Marks)**

2 a. State and prove the maximum power transfer theorem, for ac networks. **(06 Marks)**

b. Find the value of R_L shown in Fig.Q2(b) at which maximum power is transferred across ab. What is the maximum power transferred? **(07 Marks)**

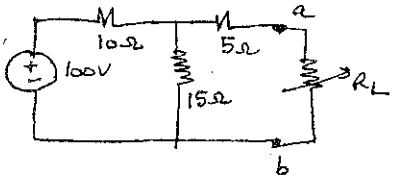

Fig.Q2(b)

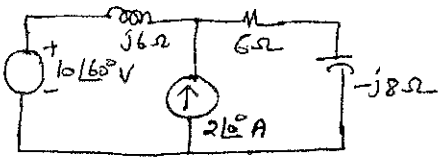

Fig.Q2(c)

c. Find the current through the 6Ω resistor shown in Fig.Q2(c), using the superposition theorem. **(07 Marks)**

3 a. Obtain the Thevenin's equivalent at terminals a-b shown in Fig.Q3(a). **(10 Marks)**

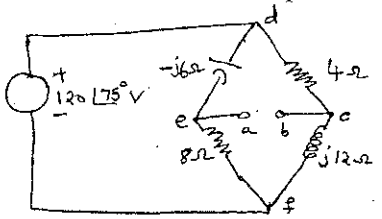

Fig.Q3(a)

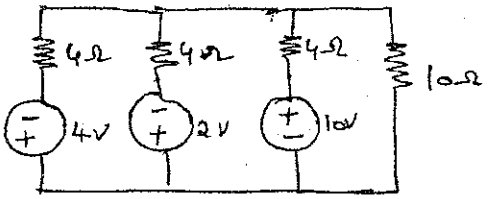

Fig.Q3(c)

b. State the reciprocity theorem. **(03 Marks)**

c. Using the Millman's theorem, find the current through the 10 Ω resistor shown in Fig.Q3(c). **(07 Marks)**

4 a. Define the following with respect to a graph:
i) Loop ii) Cut set iii) Tree iv) Co-tree **(06 Marks)**

b. For the graph shown in Fig.Q4(b), draw any two trees and corresponding co-trees. **(05 Marks)**

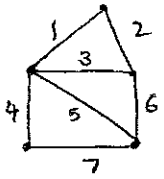

Fig.Q4(b)

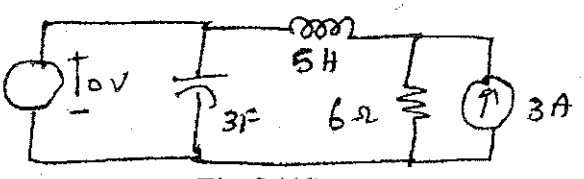

Fig.Q4(d)

4 c. If the node-brand reduced incidence matrix is $[A]=\begin{bmatrix} -1 & 1 & 0 & 0 & 1 & 0 \\ 0 & -1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & -1 & -1 \end{bmatrix}$, draw the graph. **(04 Marks)**

d. Obtain the dual of the network shown in Fig.Q4(d). **(05 Marks)**

5 a. Prove that a parallel R-L and R-C circuit can resonate at all frequencies. Derive the condition. **(07 Marks)**

b. In a series RLC circuit, R = 2 Ω, L = 2.0 mtr, C = 10 μF. Find the resonant frequency, Q factor, bandwidth and half power frequencies. **(06 Marks)**

c. Determine C for the network shown in Fig.Q5(c) for the network to resonate. **(07 Marks)**

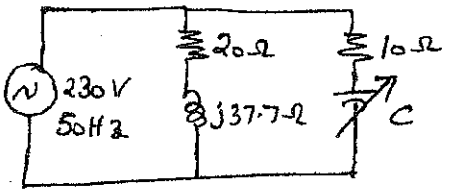

Fig.Q5(c)

6 a. In the circuit shown in Fig.Q6(a), find the initial current through the inductor, $i_L(t)$ and the time when the current in the inductor reduces to half its original value. The switch is opened at t = 0. **(08 Marks)**

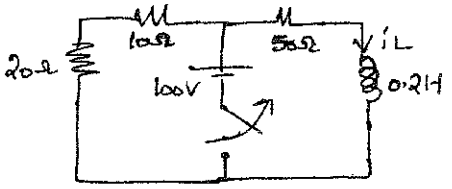

Fig.Q6(a)

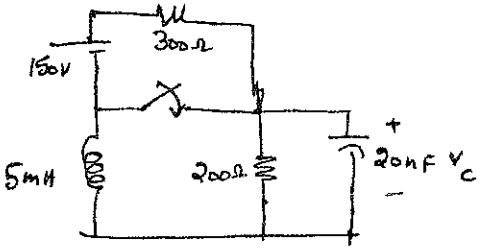

Fig.Q6(b)

b. In the network shown in Fig.Q6(b), obtain the expression for the voltage across the capacitor, if the switch is closed at t = 0. **(12 Marks)**

7 a. For the network shown in Fig.Q7(a), draw the frequency domain equivalent network and solve for $V_0(P)$ using Laplace transfers. **(10 Marks)**

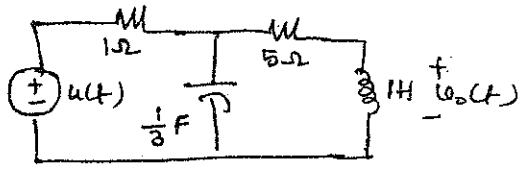

Fig.Q7(a)

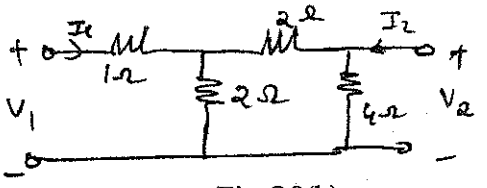

Fig.Q8(b)

b. In a series RL circuit an exponential voltage $V = 50\ e^{-100\ t}$ (V) is applied at t = 0. R = 10 Ω and L = 0.2 H. Evaluate the current using the Laplace transforms. **(10 Marks)**

8 a. Obtain the z-parameters of a two port network in terms of its h-parameters. **(07 Marks)**

b. Find the Y parameters of the network shown in Fig.Q8(b). **(07 Marks)**

c. Obtain the ABCD parameters of two networks connected in cascade. **(06 Marks)**

* * * * *