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06ES34

Third Semester B.E. Degree Examination, June/July 2011
Network Analysis

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions selecting at least TWO questions from each part.***
2. Missing data may be suitably assumed.

PART – A

1 a. Using source transformation and source shifting techniques, find voltage across 2Ω resistor in Fig.Q1(a). **(06 Marks)**

b. Find equivalent resistance at AB terminals in Fig.Q1(b). **(06 Marks)**

c. Find current in 2Ω resistors by Mesh analysis in Fig.Q1(c) **(08 Marks)**

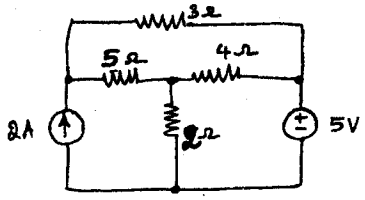


Fig.Q1(a)

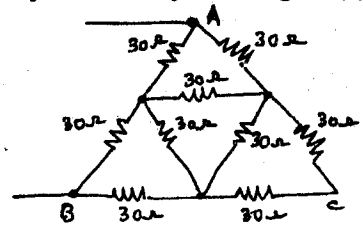


Fig.Q1(b)

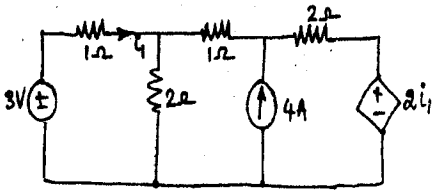


Fig.Q1(c)

2 a. Define the terms (i) graph, (ii) branch, (iii) node, (iv) tree, (v) link as referred to network topology. **(04 Marks)**

b. Write a tie-set schedule and then find all the branch currents for the circuit shown in Fig.Q2(b). **(08 Marks)**

c. Write the dual network for the network shown in Fig.Q2(c). Write the equations governing the given network and for its dual as well. **(08 Marks)**

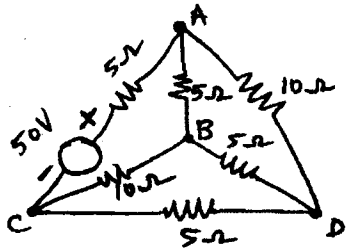


Fig.Q2(b)

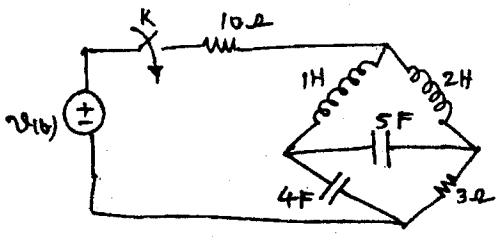


Fig.Q2(c)

3 a. Find V using the principle of superposition in network. State superposition theorem in Fig.Q3(a). **(10 Marks)**

b. State reciprocity theorem. Find i_x and hence verify reciprocity theorem for the network in Fig.Q3(b). **(10 Marks)**

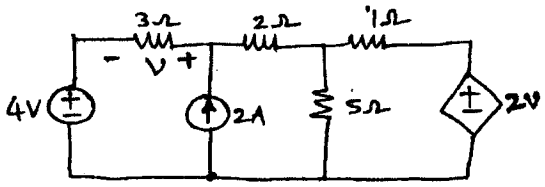


Fig.Q3(a)

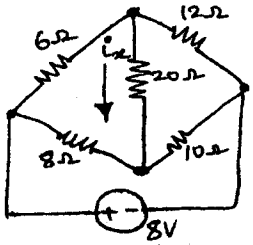


Fig.Q3(b)

4 a. State Norton's theorem. Determine the Norton's equivalent circuit across AB terminals in the network of Fig.Q4(a). Hence determine current in 5Ω resistor. **(10 Marks)**

b. State maximum power transfer theorem for a variable impedance Z_L as load and prove the same. **(05 Marks)**

c. Find the value of Z_L for which maximum power transfer occurs in the circuit given in Fig.Q4(c). **(05 Marks)**

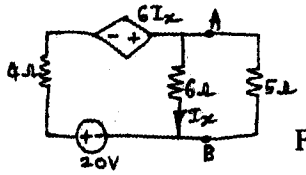


Fig.Q4(a)

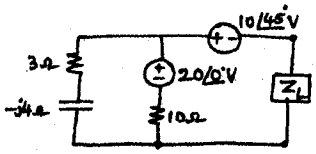


Fig.Q4(c)

PART – B

5 a. Explain the properties of RLC series resonant circuit. **(04 Marks)**

b. Find the resonant frequency in a series resonant circuit having an inductance of 50 mH and a condenser of 5μF. Find the resistance of the circuit if the circuit draws a current of 10 mA at resonance with a supply voltage of 50V. Also find the quality factor of the circuit. **(06 Marks)**

c. Explain in brief bandwidth and selectivity in series resonant circuit. A series RLC circuit has R = 2Ω, L = 2mH and C = 10μF. Calculate Q factor, the bandwidth, the resonant frequency and the half power frequencies f_1 and f_2. **(10 Marks)**

6 a. Explain the behaviour of R, L, C elements at the time of switching, at t = 0 both at t = 0+ and t = ∞. **(06 Marks)**

b. Determine i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at t = 0+ when the switch K is moved from position 1 to 2 at t = 0 in the network shown in Fig.Q6(b). **(07 Marks)**

c. Determine V, $\frac{dV}{dt}$ and $\frac{d^2V}{dt^2}$ at t = 0+ when the switch K is opened at t = 0 in Fig.Q6(c). **(07 Marks)**

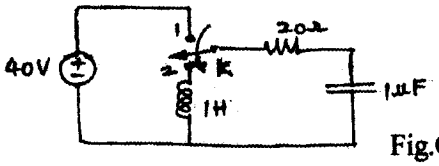
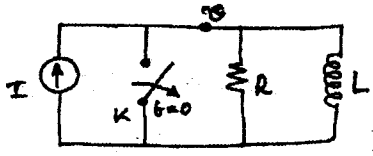


Fig.Q6(b)



R = 100Ω
L = 1H
I = 2A
Fig.Q6(c)

7 a. Find the current i(t) when switch K is opened at t = 0 with the circuit having reached steady state before the switching in Fig.Q7(a). Find current at t = 0.5 sec. **(10 Marks)**

b. Find the current i(t) assuming zero initial conditions when switch K is closed at t = 0; The excitation V(t) is a pulse of magnitude 10V and duration of 2 sec. Consider R = 10Ω, C = 2F. Refer Fig.Q7(b). **(10 Marks)**

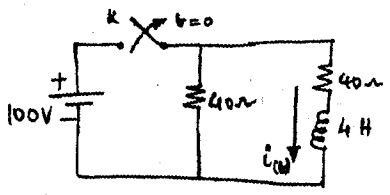


Fig.Q7(a)

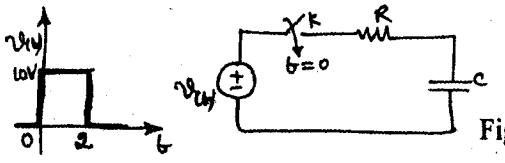


Fig.Q7(b)

8 a. Define Z parameters. Determine Z parameters for the network shown in Fig.Q8(a). **(10 Marks)**

b. Define transmission parameters. Determine the transmission parameters for the network shown in Fig.Q8(b). **(10 Marks)**

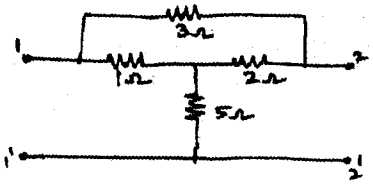


Fig.Q8(a)

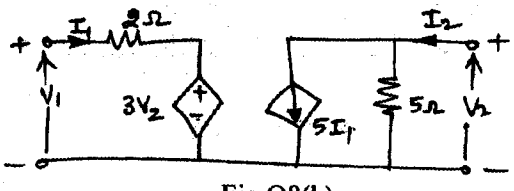


Fig.Q8(b)

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