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10ES34

Third Semester B.E. Degree Examination, June/July 2018
Network Analysis

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Determine the current in 12Ω resistor shown in Fig.Q1(a), using source transformation method. **(06 Marks)**

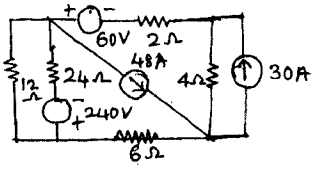

Fig.Q1(a)

b. Write the loop equations for the circuit shown in Fig.Q1(b) and solve for i_1, i_2 and i_3. **(06 Marks)**

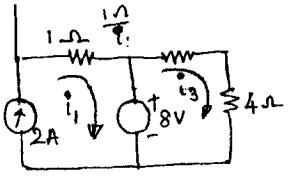

Fig.Q1(b)

c. For the network shown in Fig.Q1(c), find the node voltages V_C and V_d with node 'e' as reference node. **(08 Marks)**

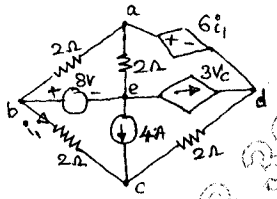

Fig.Q1(c)

2 a. Write a tie-set schedule and then find all the branch currents for the circuit shown in Fig.Q2(a). Assume inner branches as tree branches. **(10 Marks)**

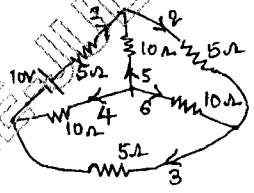

Fig.Q2(a)

b. Draw the dual of the network shown in Fig.2(b). Write the loop equations for the given network and the node equations for its dual, to show that they form dual set of equations. **(10 Marks)**

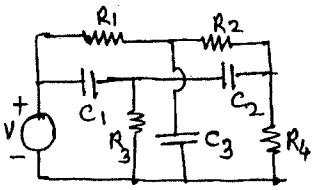

Fig.Q2(b)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

3 a. State and explain : i) Reciprocity theorem ii) Millman's theorem as applied to electrical circuits. **(10 Marks)**

b. Find i_0 and i from the circuit of Fig.3(b), using super position theorem. **(10 Marks)**

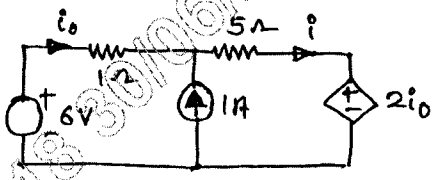

Fig.Q3(b)

4 a. State and explain Thevenin's theorem. **(04 Marks)**

b. Obtain the Thevenin's equivalent circuit of the network shown in Fig.Q4(b). **(08 Marks)**

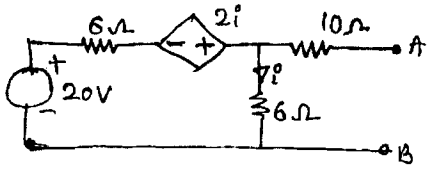

Fig.Q4(b)

c. For the circuit shown in Fig.Q4(c), find resistance value to be connected across AB for maximum power transfer. Find also the value of maximum power. **(08 Marks)**

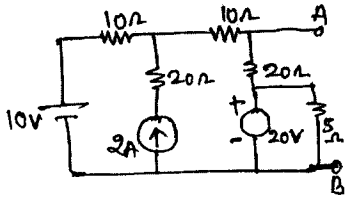

Fig.Q4(c)

PART – B

5 a. For the network shown in Fig.Q5(a), calculate resonant frequency, if a 10volt of frequency equal to resonant frequency is applied to the circuit. Also calculate the value of voltages V_C, V_L across C and L respectively. Find the frequencies at which these voltages V_C and V_L are maximum. **(08 Marks)**

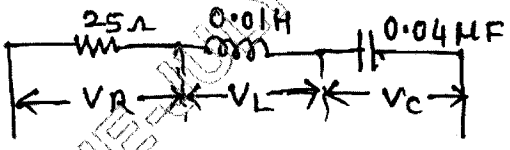

Fig.Q5(a)

b. Derive an expression for the resonance frequency of a resonant circuit consisting of R_L, L in parallel with R_C, C. **(06 Marks)**

c. Determine the value of 'L' for which the circuit shown in Fig.5(c) is resonant at a frequency of w = 500rad/sec. **(06 Marks)**

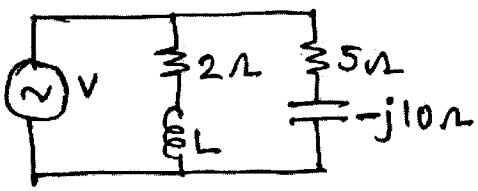

Fig.Q5(c)

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

b. In the network shown in Fig.Q6(b), switch K is changed from position a to b, at t = 0. Solve for i, $\frac{di}{dt}, \frac{d^2i}{dt^2}$ at t = 0+. Assume that the capacitor is initially unchanged. **(08 Marks)**

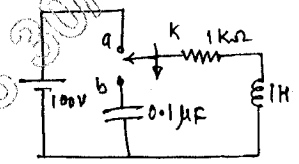

Fig.Q6(b)

c. In the network shown in Fig.Q6(C), the switch K is opened at t = 0. Solve for the values of V, $\frac{dv}{dt}, \frac{d^2v}{dt^2}$ at t = 0+. **(06 Marks)**

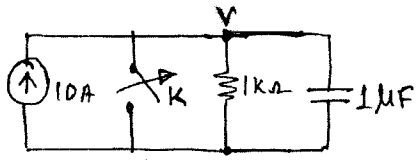

Fig.Q6(c)

7 a. Find the current in the circuit shown in Fig.Q7(a) at an instant after the opening of the switch if a current of 1 ampere had been passing through the circuit at the instant of opening. **(08 Marks)**

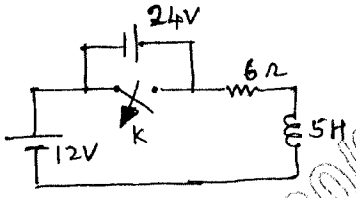

Fig.Q7(a)

b. Using convolution theorem, find f(t) of a function f(s) where $f(s) = \frac{1}{(S^2+4)^2}$. **(06 Marks)**

c. Find the Laplace transform of the periodic waveform of Fig.Q7(c). **(06 Marks)**

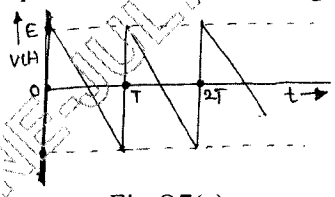

Fig.Q7(c)

8 a. Define 'Z' parameters. **(04 Marks)**

b. Obtain the relationship between T and h parameters. **(06 Marks)**

c. Obtain the Y-parameters of the two port network shown in Fig.Q8(c). **(10 Marks)**

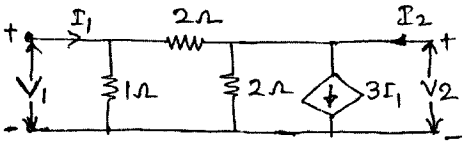

Fig.Q8(c)

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Date: 30/06/2018 Time: 2:00 pm to 5:00 pm

10ES34

Third Semester B.E. Degree Examination, June/July 2018

Network Analysis

Q.No. 1 (b) Write the loop equations for the circuit shown in Fig.Q1(b) and solve for i_1, i_2 and i_3.

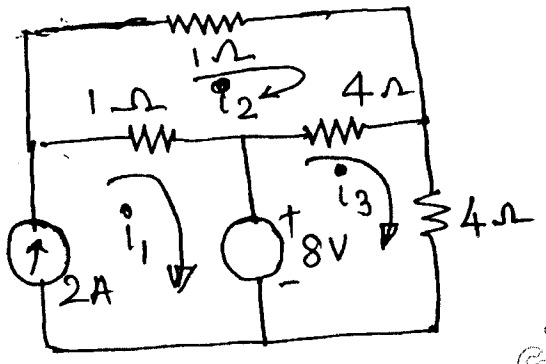

Fig.Q1(b)

(06 Marks)