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10ES34

Third Semester B.E. Degree Examination, June/July 2015

Network Analysis

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Derive expression for
i) Star to delta transformation ii) Delta to star transformation **(10 Marks)**

b. For the Network shown find the node voltages Vd and Vc Fig. Q No. 1 (b). **(10 Marks)**

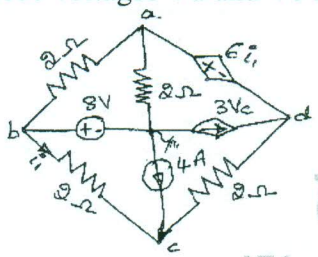


Fig.Q1(b)

2 a. Define the following with examples
i) Oriented graph ii) Tree iii) Fundamental cut set iv) Fundamental tie set **(08 Marks)**

b. For the network, Shown Fig. Q No.2 (b) write the tie set schedule, tie set matrix and obtain equilibrium equation in matrix form using KVL. Calculate branch currents and branch voltage. Follow the same orientation and branch numbers use 4, 5 and 6 as tree branches. **(12 Marks)**

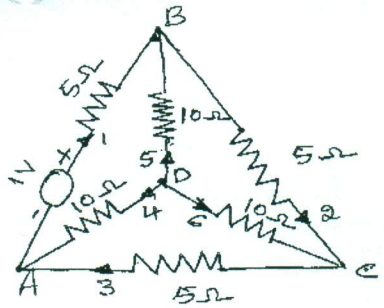


Fig.Q2(b)

3 a. State and prove Reciprocity theorem. **(07 Marks)**

b. Find the output voltage Eo of the Network shown Using Millman's theorem. Fig. Q No. 3(b)

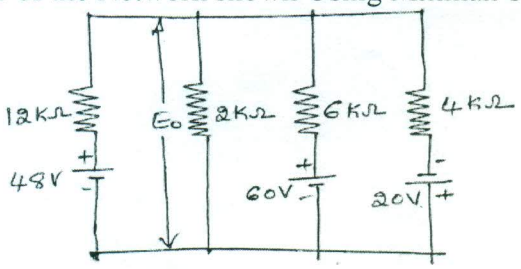
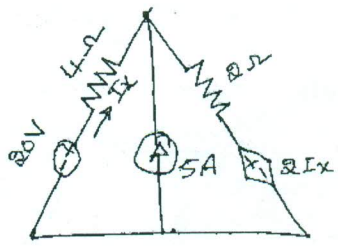


Fig.Q3(b)

(06 Marks)

c. Using superposition theorem, find the current IX the network shown in Fig. Q No.3(c)

Fig.Q3(c)

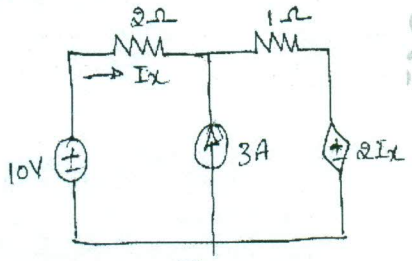


(07 Marks)

4 a. State Norton's theorem. Show that Thevenin's equivalent circuit is the dual of Norton's equalent circuit. **(06 Marks)**

b. Obtain the current I_x by using Thevenin's theorem for the network shown in Fig Q No.4(b)

Fig.Q4(b)



(08 Marks)

c. State maximum power transfer theorem. Prove that $Z_L = Z_o^*$ for Ac circuits. **(06 Marks)**

PART – B

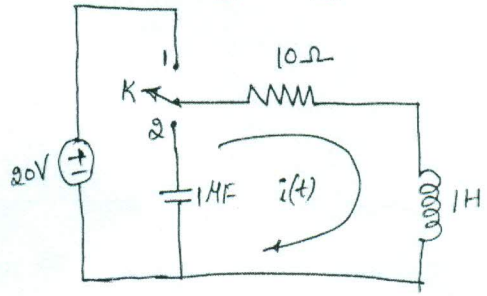
5 a. Show that $f_0 = \sqrt{f_1 f_2}$ fro series Resonance circuit. **(06 Marks)**

b. A voltage of 100 sin wt is applied to an RLC series circuit at resonant frequency. The voltage across a capacitor was found to be 400V. The bandwidth is 75Hz. The impedence at resonance is 100Ω. Find the resonant frequency and constants of the circuit. **(06 Marks)**

c. Derive an expression for the resonant frequency of a resonant frequency of a resonant circuit consisting of R_L L in parallel with R_c C. Draw the frequency response curve of the above circuit. **(08 Marks)**

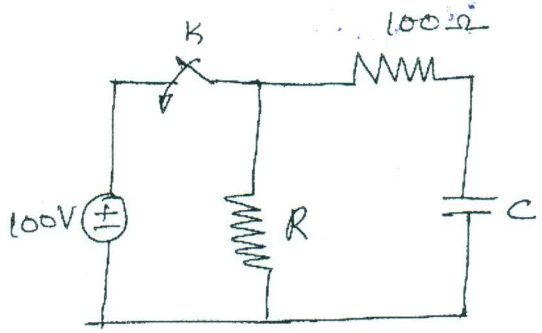
6 a. In the circuit shown, switch K is changed from 1 to 2 at t = 0, steady state having been attained in position 1. Find the values of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$. **(10 Marks)**

Fig.Q6(a)



b. In the circuit shown, switch K is kept open for very long time, on closing K, after 10ms, Vc = 80V. Then the switch K is kept closed for a long time. When the switch is opened again, Vc = 90V after half second, calculate values of R and C. Fig. Q No.6 (b)

Fig.Q6(b)

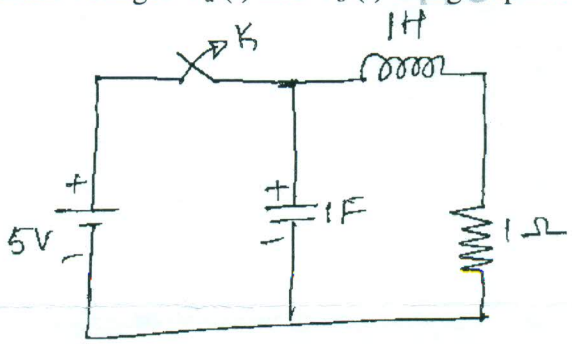


(10 Marks)

7 a. State and prove i) Initial value theorem ii) Final value theorem as applied to Laplace transform. What are the limitations of each theorem. **(10 Marks)**

b. In the circuit shown, in Fig.Q No.7 (b) switch is initially closed. After steady the switch is opened, Determine the nodal voltages V_a (t) and V_b (t) using Laplace transform method.

Fig.Q7(b)



(10 Marks)

8 a. Define z-parameters. Express z-parameters in terms of y – parameters. **(10 Marks)**

b. Find y parameters and z parameters for the circuit shown.

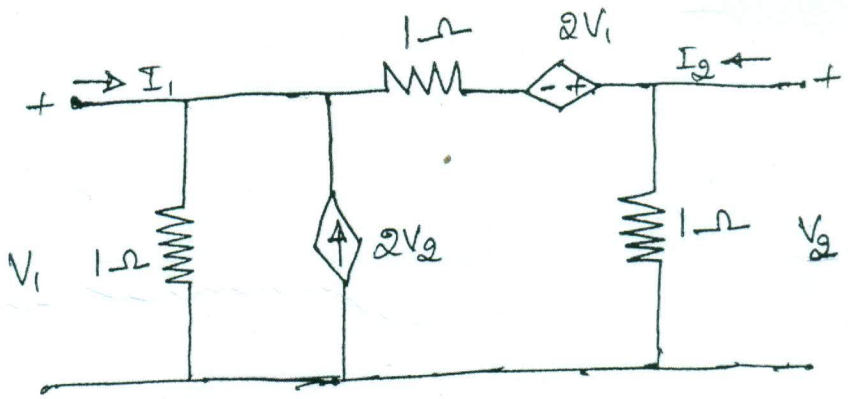


Fig.Q8(b) **10 Marks)**

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