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10ES34

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Network Analysis

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Find 'V_1', for the circuit shown in Fig.Q1(a) using source transformation. **(06 Marks)**

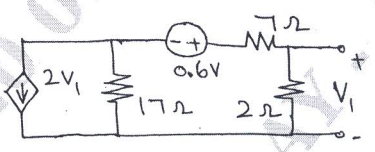

Fig.Q1(a)

b. Find the voltage 'V_X' for the network shown in Fig.Q1(b) using nodal analysis. **(06 Marks)**

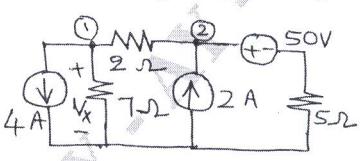

Fig.Q1(b)

c. Using loop analysis, find the value of V_X and I_X for the network shown in Fig.Q1(c). **(08 Marks)**

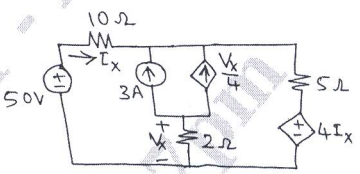

Fig.Q1(c)

2 a. What are the properties of incidence matrix and also draw the reduced incidence matrix for the network shown in Fig.Q2(a). **(06 Marks)**

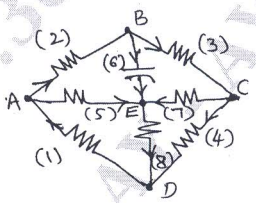

Fig.Q2(a)

b. Find the maximum possible number of tree's for the network shown in Fig.Q2(b). **(06 Marks)**

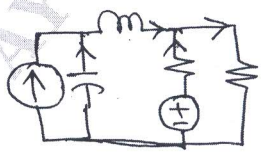

Fig.Q2(b)

c. For the network shown in Fig.Q2(c), draw its dual, write in the intego-differential form for :
i) Mesh equations for the given network ii) Node equations for the dual. **(08 Marks)**

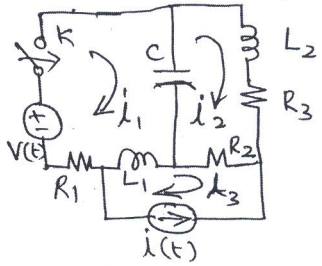

Fig.Q2(c)

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. Using superposition theorem, find the current through 20Ω resistor for the circuit shown in Fig.Q3(a). **(08 Marks)**

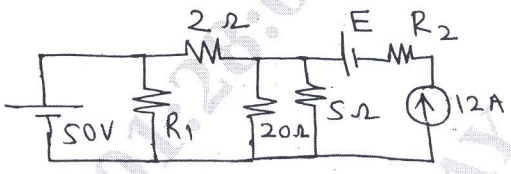

Fig.Q3(a)

b. For the circuit shown in Fig.Q3(b), find the value of V_X and verify reciprocity theorem. **(08 Marks)**

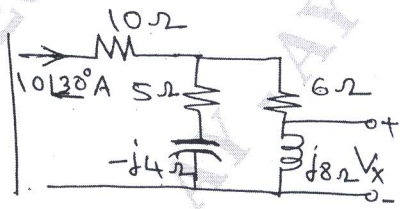

Fig.Q3(b)

c. State Millman's theorem. **(04 Marks)**

4 a. What should be the value of 'R' such that maximum power transfer can takes place from the rest of the network to 'R'. Obtain the amount of this power for the network shown in Fig.Q4(a). **(08 Marks)**

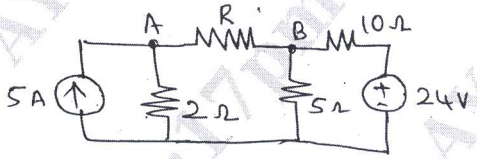

Fig.Q4(a)

b. Obtain the Thevinin's equivalent circuit of the circuit shown in Fig,.Q4(b) and also state the theorem. **(08 Marks)**

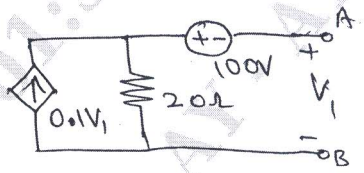

Fig.4(b)

c. State and explain Norton's theorem. **(04 Marks)**

PART – B

5 a. Derive the expression of a frequency of RLC resonance circuit at which voltage drop across the capacitor is maximum. And also express f_c interms of f_0. **(08 Marks)**

b. Find the value of 'L' at which circuit shown in Fig.Q5(b) resonate at a frequency of w = 500rad/sec. **(06 Marks)**

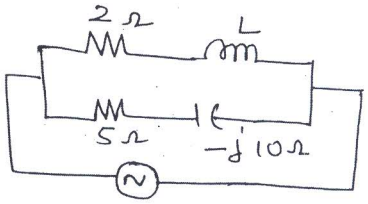

Fig.Q5(b)

c. It is required that a series RLC – circuit should resonate at 1 MHz. Determine the value of R, L, and C if BW is 500 Hz and impedance at resonance is 50Ω. **(06 Marks)**

6 a. Explain the importance of initial and final conditions in a networks and also write the procedure for evaluating initial conditions. **(06 Marks)**

b. Find $i_L(0^+)$ and $V_C(0^+)$ for the network shown in Fig.Q6(b). The circuit is in steady state with switch in the closed condition. **(06 Marks)**

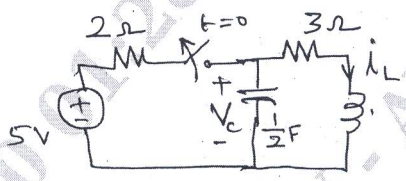

Fig.Q6(b)

c. For the network shown in Fig.Q6(c), the switch is changed from position 1 to position 2 at t = 0. Steady state condition having been reached in position 1. Find the value of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$. **(08 Marks)**

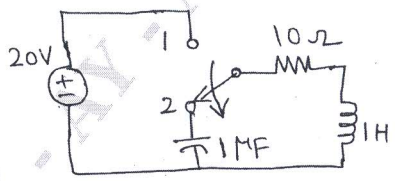

Fig.Q6(c)

7 a. Find the Laplace transform of the waveform shown in Fig.Q7(a). **(10 Marks)**

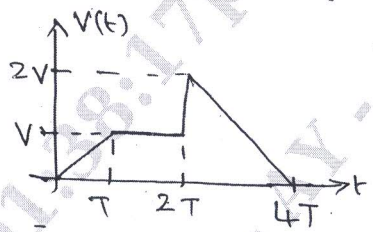

Fig.Q7(a)

b. For the network shown in Fig.Q7(b), draw the transformed circuit and obtain there from $V_2(s)$ if $V_1(0) = 10$volts, $V_2(0) = 25$volts, $V(t) = 50\cos 2t\ u(t)$. **(10 Marks)**

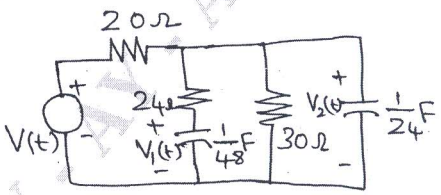

Fig.Q7(b)

8 a. Obtain Y–parameters in terms of :
i) Z–parameter ii) Transmission parameters. **(10 Marks)**

b. Find the h-parameters for the two port network shown in Fig.Q8(b). **(10 Marks)**

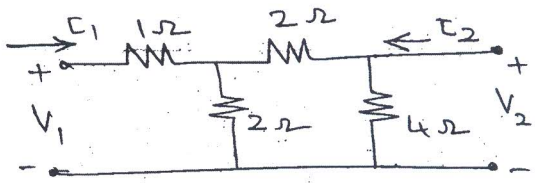

Fig.Q8(b)

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