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06ES34

Third Semester B.E. Degree Examination, June 2012
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. Determine loop currents I_1, I_2, I_3 and I_4 in the network shown in Fig.Q.1(a). Given R = 1Ω. **(06 Marks)**

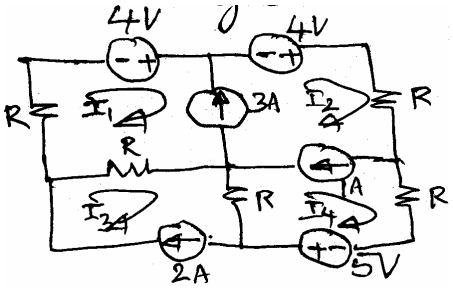


Fig.Q.1(a)

b. Determine node voltages V_1, V_2, V_3 and V_4 in the network shown in Fig.Q.1(b). Given V_s = 12V ; R_1 = 0.5Ω ; R_2 = 2.5Ω. **(08 Marks)**

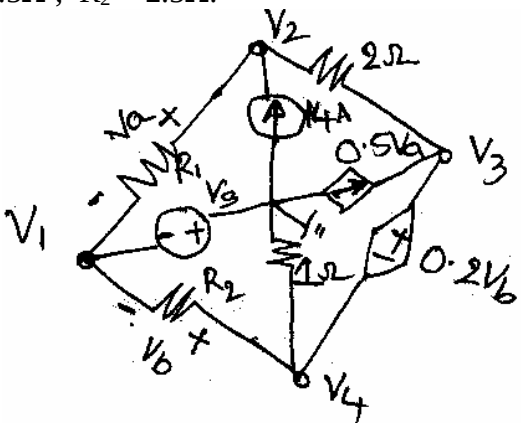


Fig.Q.1(b)

c. Determine current I_1 in the network shown in Fig.Q.1(c), using star – delta conversion. **(06 Marks)**

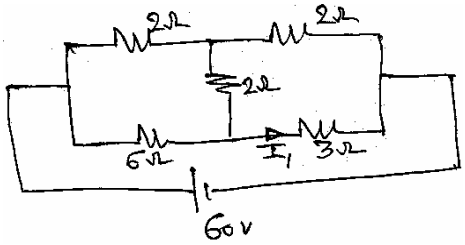


Fig.Q.1(c)

2 a. Explain the terms i) Tree ; ii) Link ; iii) Tie – set ; iv) Cut set with suitable examples. **(08 Marks)**

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.

b. Draw the graph of the network shown in Fig.Q.2(b). Select 2 and 4 on tree branches and obtain the cut set schedule and hence the tree branch voltages. **(12 Marks)**

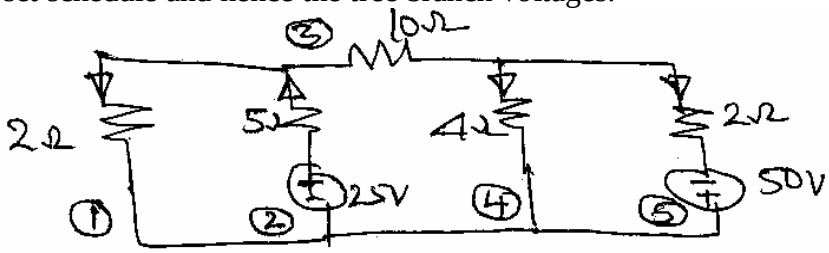


Fig.Q.2(b)

3 a. Determine load current I_L in the network shown in Fig.Q.3(a) using Millman's theory. **(06 Marks)**

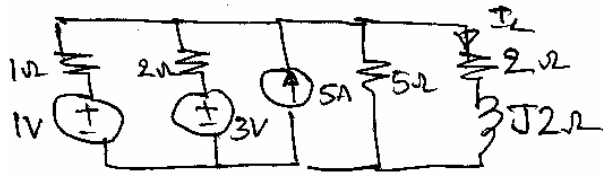


Fig.Q.3(a)

b. Obtain voltage v_x in the network shown in Fig.Q.3(b) using superposition theorem. **(08 Marks)**

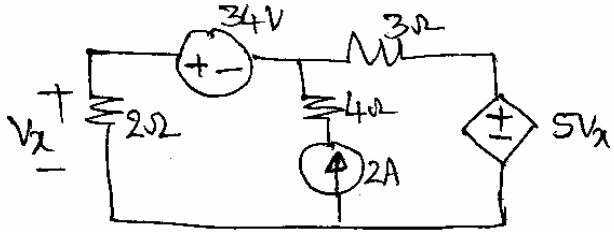


Fig.Q.3(b)

c. Determine voltage v_x in the network shown in Fig.Q.3(c). Hence verify reciprocity theorem. **(06 Marks)**

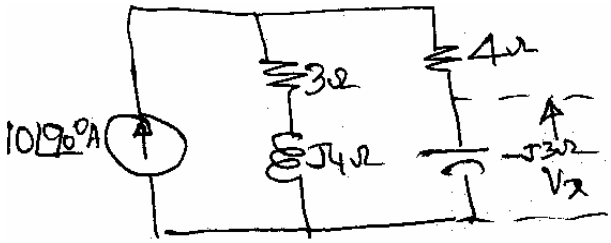


Fig.Q.3(c)

4 a. Determine Thevenin's equivalent network for the network shown in Fig.Q.4(a). **(08 Marks)**

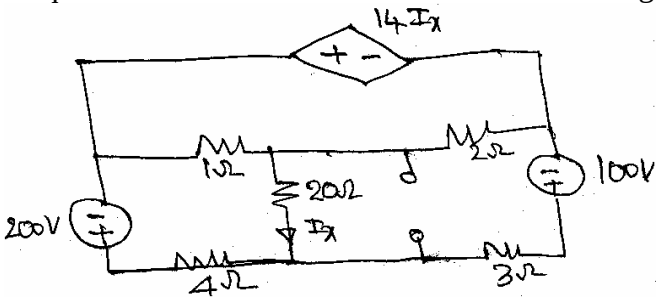


Fig.Q.4(a)

b. Determine R and C in the network shown in Fig.Q.4(b) for maximum power transfer. Also find maximum power v = 250 Sin 500 t volts. **(06 Marks)**

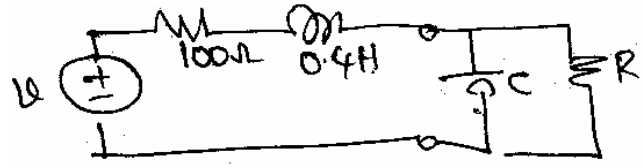


Fig.Q.4(b)

c. A LTI network when terminated with i) R = 1Ω, current is 5∠-45°A and ii) X_C = 1Ω the current is 10 ∠45°A. Find Theremin's equivalent network and the current when terminated with X_L = 1 Ω. **(06 Marks)**

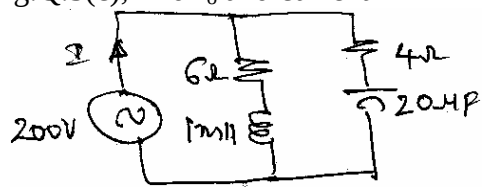
PART – B

5 a. Obtain expressions for resonant frequency, quality factor, half power frequencies for a series RLC network. **(08 Marks)**

b. In a series RLC network under resonance, voltage across capacitor is 400V and impedance is 100Ω. Bandwidth is 75 Hz with applied voltage of 70.7v. Find R, L, C. **(06 Marks)**

c. For the network shown in Fig.Q.5(c), find f_o and current I **(06 Marks)**

Fig.Q.5(c)



6 a. In the circuit shown in Fig.Q.6(a), find the following i(o+), $\frac{di}{dt}(o+)$ $\frac{d^2i}{dt^2}(o+)$ when switch K is closed at t = 0. **(08 Marks)**

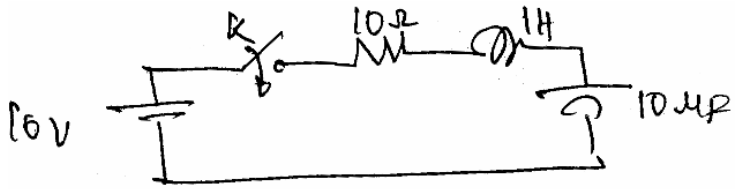


Fig.Q.6(a)

b. In the network shown in Fig.Q.6(b), switch K is closed at t = 0 with steady state condition established. Find : $i_1(o+)$ $i_2(o+)$, $\frac{di_1}{dt}(o+)$ $\frac{di_2}{dt}(o+)$. **(12 Marks)**

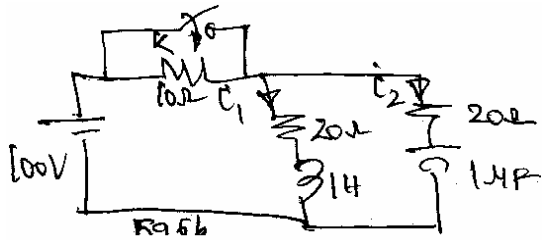


Fig.Q.6(b)

7 a. Determine Laplace transform for the following waveform shown in Fig.Q.7(a). **(10 Marks)**

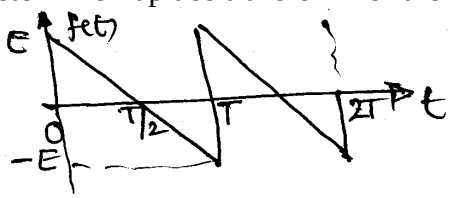


Fig.Q.7(a)(i)

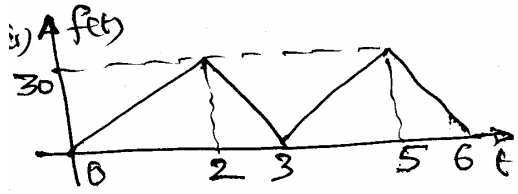


Fig.Q.7(a)(ii)

b. In the network shown in Fig.Q.7(b) switch K is opened at t = 0; find $v_1(t)$ and $v_2(t)$ for t > 0 using Laplace transformation method. **(10 Marks)**

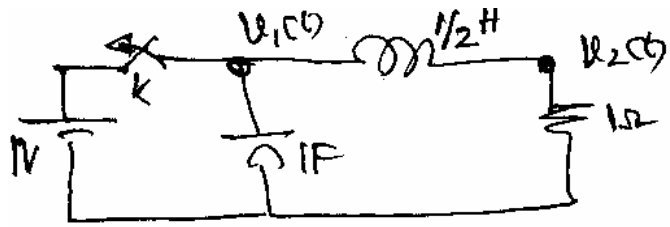


Fig.Q.7(b)

8 a. Define Z and Y parameters of a 2 port network. **(04 Marks)**

b. Determine Z and Y parameters of the 2 port network shown in Fig.Q.8(b). **(10 Marks)**

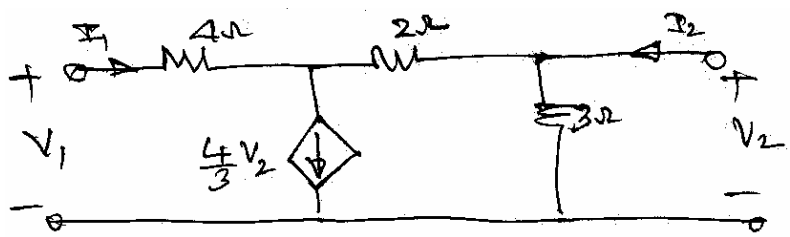


Fig.Q.8(b)

c. Obtain T parameters for the 2 port network shown in Fig.Q.8(c). **(06 Marks)**

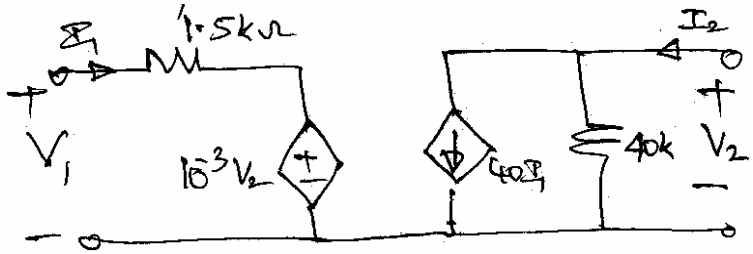


Fig.Q.8(c)

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