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10ES34

Third Semester B.E. Degree Examination, June/July 2019
Network Analysis

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Determine R_{in} using Star – Delta transformation in the network as shown in Fig Q1(a)

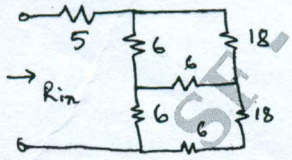

Fig Q1(a) **(06 Marks)**

b. For the network shown Fig Q1(b). Determine node voltage V_1, V_2, V_3, and V_4. Using nodal analysis.

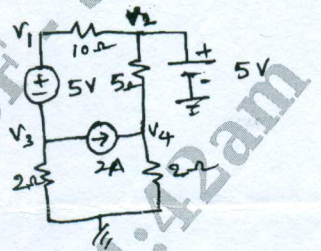

Fig Q1(b) **(07 Marks)**

c. Using Mesh analysis find the current through 10Ω resistor as shown in Fig Q1(c).

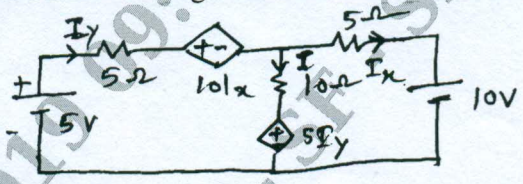

Fig Q1(c) **(07 Marks)**

2 a. Define the terms with examples :
i) Tree ii) Co-tree iii) Tie-set schedule iv) Cut set schedule v) Link. **(10 Marks)**

b. In the network shown in Fig Q2(b) consider branches 1, 3, 4 forming a tree. Write a tie-set schedule and obtain equilibrium equations. Hence in various branches.

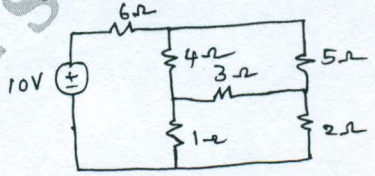

Fig Q2(b) **(10 Marks)**

3 a. State and explain super position theorem. **(06 Marks)**

b. In the single current source circuit shown in Fig Q3(b). Find voltage V_x, Interchange the current source and resulting voltage V_x. Is the Reciprocity theorem verified? **(08 Marks)**

c. Use Millman's thorem to find the current through the 10Ω resistance in the circuit Fig Q3(c). **(06 Marks)**

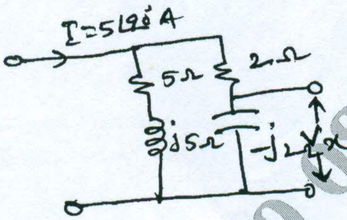

Fig Q3(b)

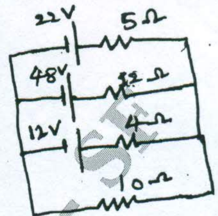

Fig Q3(c)

4 a. State and explain Thevenin's theorem. **(06 Marks)**

b. Find the current through 16Ω resistor using Norton's theorem in Fig Q4(b). **(07 Marks)**

c. Find the load impedance to be connected across terminals AB for the maximum power transfer. The network is shown in Fig Q4(c). Also find the maximum power delivered to the load. **(07 Marks)**

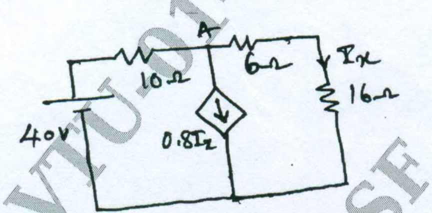

Fig Q4(b)

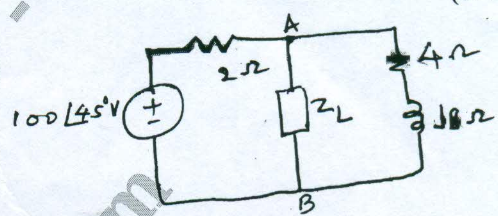

Fig Q4(c)

PART – B

5 a. Define the terms : i) Resonance ii) Q-factor iii) Half power frequency iv) Bandwidth. **(04 Marks)**

b. Obtain an expression for the reasonance frequency for the circuit shown in Fig Q5(b).

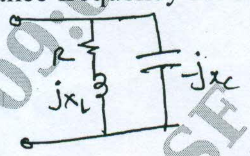

Fig Q5(b). **(08 Marks)**

c. State properties and Application of series resonant circuit. **(08 Marks)**

6 a. For the network shown in Fig Q6(a) find i_1, i_2, $\frac{di_1}{dt}$, $\frac{di_2}{dt}$, $\frac{d^2i_2}{dt^2}$, at $t = 0^+$. The circuit was in steady state before the closure of the switch. Assume all initial conditions zero. **(10 Marks)**

b. For the network shown in Fig Q6(b) the switch is moved from position 1 to position 2 at t = 0 the steady state has been reached before switching. Calculate, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$, at $t = 0^+$. **(10 Marks)**

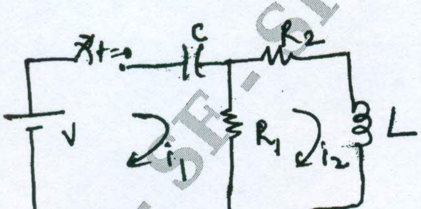

Fig Q6(a)

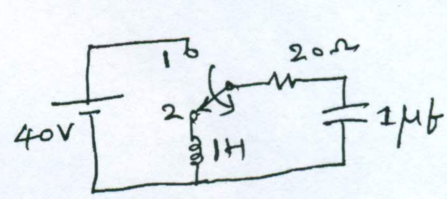

Fig Q6(b)

7 a. The network shown in Fig Q7(a) was in steady state before t = 0. The switch is opened at t = 0. Find i(t) for t > 0 using Laplace transform. **(10 Marks)**

b. For the nework shown in Fig Q7(b) find the voltage across 0.5Ω resistor, when the switch is opened at t = 0. Assume all initial conditions zero. **(10 Marks)**

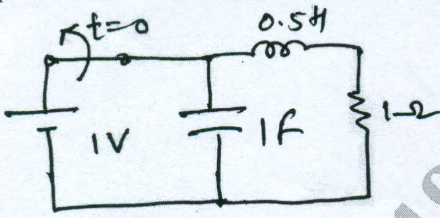

Fig Q7(a)

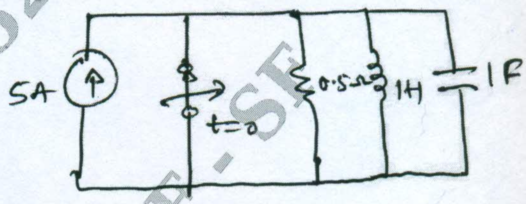

Fig Q7(b)

8 a. Explain z ad y parameter with equivalent circuit. Also express z-parameter interms of y-parameters. **(10 Marks)**

b. Determine Z – parameters for the circuit shown in Fig Q8 (b).

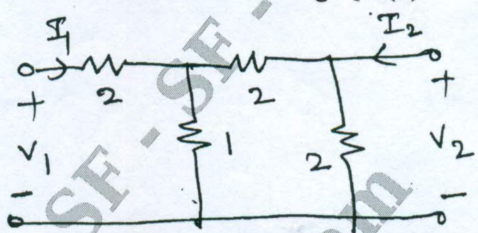

Fig Q8(b) **(10 Marks)**

And also find y-parameters

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