USN | 1 | MV | 10 | EC | 107 |

10ES34

Third Semester B.E. Degree Examination, December 2011

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. Using the mesh current method, determine V_2 that results zero current in 4Ω resistor.

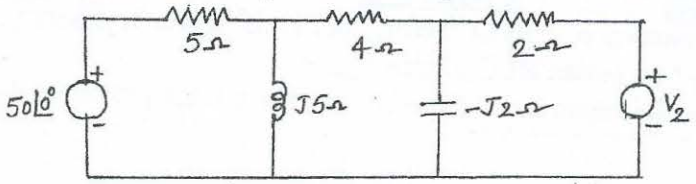

Fig.Q1(a) **(10 Marks)**

b. Find the currents in all resistors by Node voltage method. **(10 Marks)**

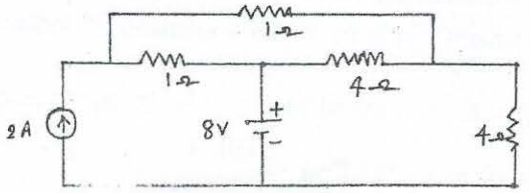

Fig.Q1(b)

2 a. Define the terms : i) Tree, ii) Co-tree, iii) Tie set schedule, iv) Cut set schedule, with respect to a graph of a network. **(04 Marks)**

b. For the network shown, draw the graph, select a tree, write the tie set schedule and obtain the equilibrium equations. Hence currents in various branches. **(16 Marks)**

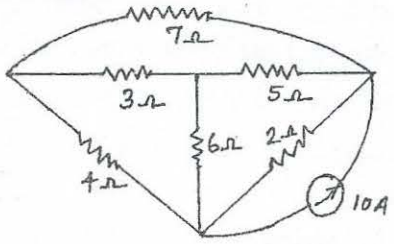

Fig.Q2(b)

3 a. Find the current through Z_3 by superposition theorem. **(10 Marks)**

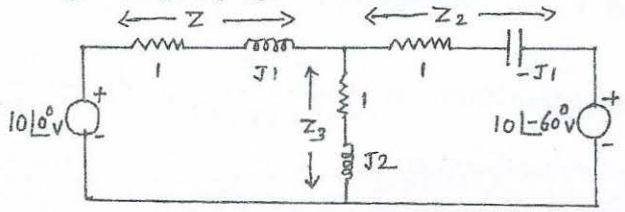

Fig.Q3(a)

b. State and explain reciprocity theorem. **(04 Marks)**

c. Use Millman's theorem to find current in Z_1 : **(06 Marks)**

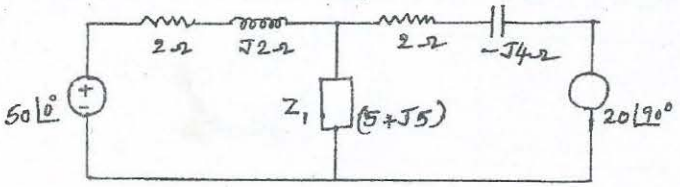

Fig.Q3(c)

4 a. For the circuit shown in Fig.Q4(a), find the value of R that will receive maximum power. Determine this power. **(08 Marks)**

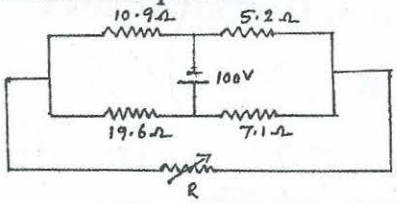

Fig.Q4(a)

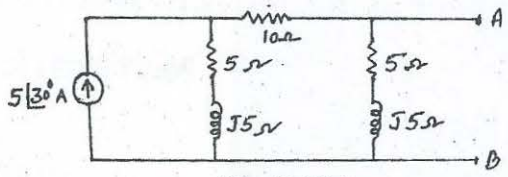

Fig.Q4(b)

b. Obtain the Thevenin and Norton equivalent circuits at terminals AB for the network shown. Hence, find the current through 10Ω resistor across AB. **(12 Marks)**

PART – B

5 a. Define the terms : i) Resonance, ii) Q factor, iii) Half power frequency, iv) Band width, v) Selectivity pertaining to a series RLC circuit. **(05 Marks)**

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

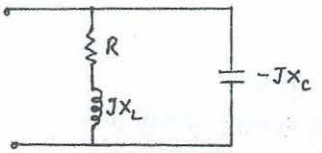

Fig.Q5(b)

(08 Marks)

c. Obtain the condition for maximum value of V_L by variation of inductance. **(07 Marks)**

6 a. In the network shown, switch 'K' is closed at t = 0 with the capacitor uncharged. Find the values for $i(0^+)$ $\frac{di(t)0^+}{dt}$ at $t = 0^+$ and also find $\frac{d^2i(0^+)}{dt^2}$. **(10 Marks)**

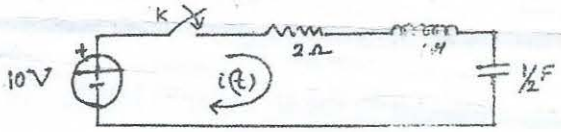

Fig.Q6(a)

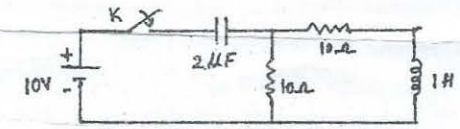

Fig.Q6(b)

b. In the given circuit, switch K is closed at time t = 0. Find the values of i_1, i_2, $\frac{di_1}{dt}$, $\frac{di_2}{dt}$, $\frac{d^2i_1}{dt^2}$, $\frac{d^2i_2}{dt^2}$ at $t = 0^+$. **(10 Marks)**

7 a. Find the Laplace transform of the following :

i) $\sin^2 t$ ii) $\cos^2 t$ iii) $\sin wt$ iv) $\int_0^t i(t).dt$ **(08 Marks)**

b. Find the inverse Laplace transform : i) $\frac{s^2+5}{s(s^2+2s+4)}$, ii) $\frac{2s+6}{s^2+6s+25}$. **(08 Marks)**

c. State and prove initial value theorem. **(04 Marks)**

8 a. Express Z parameters in terms of h parameters. **(06 Marks)**

b. For the network shown, find Z and Y parameters. **(14 Marks)**

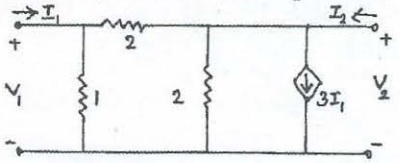

Fig.Q8(b)

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