

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.

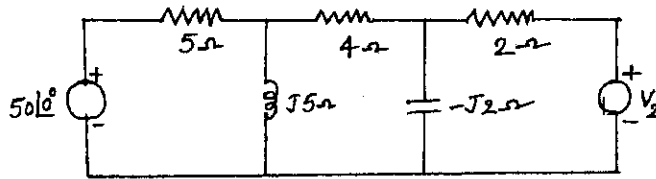


Fig.Q1(a)

(10 Marks)

- b. Find the currents in all resistors by Node voltage method.

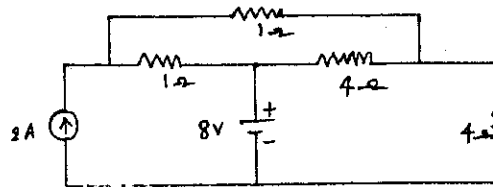


Fig.Q1(b)

(10 Marks)

- 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)

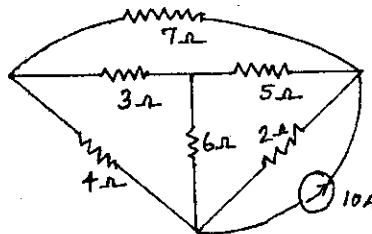


Fig.Q2(b)

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

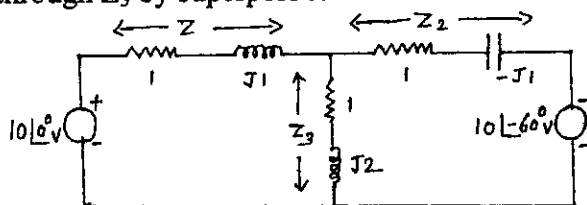


Fig.Q3(a)

- b. State and explain reciprocity theorem. (04 Marks)
 c. Use Millman's theorem to find current in Z_1 : (06 Marks)

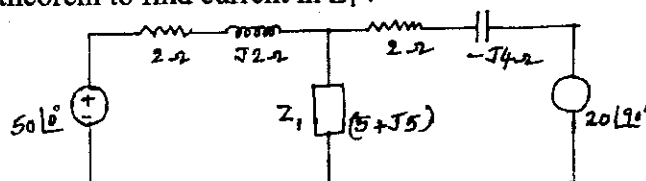


Fig.Q3(c)

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.

- 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)

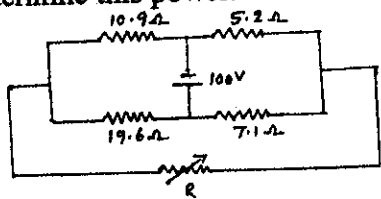


Fig.Q4(a)

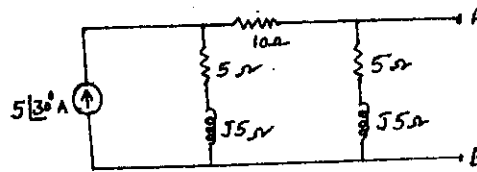


Fig.Q4(b)

- 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).

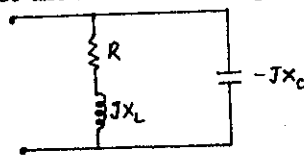


Fig.Q5(b)

(08 Marks)
(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)

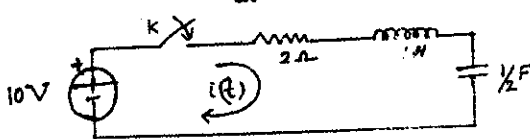


Fig.Q6(a)

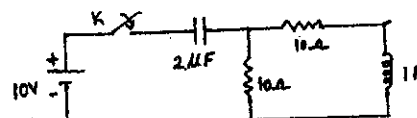


Fig.Q6(b)

- 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.
 b. For the network shown, find Z and Y parameters.

(06 Marks)
(14 Marks)

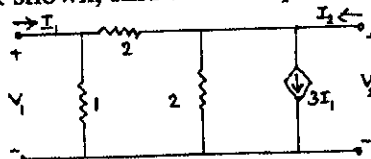


Fig.Q8(b)