Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2023
ELECTRONICS AND COMMUNICATION ENGINEERING
(2020 SCHEME)

Course Code : **20ECT205**

Course Name: **Network Theory**

Max. Marks : **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

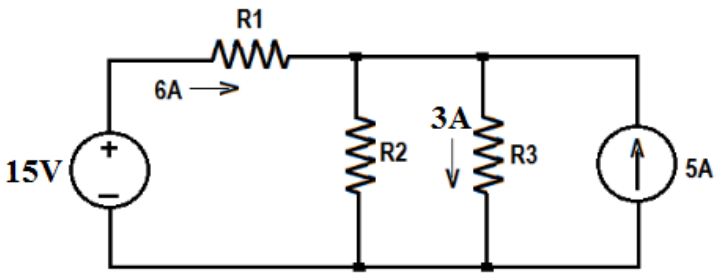
1. In a network with a voltage source and three resistors 1K, 3K and 6K all connected in series with the voltage source, if current flow through the circuit is 1mA, find source voltage.
2. What is the significance of current division rule in network analysis?
3. State Thevenin's theorem.
4. State Norton's theorem with necessary diagram.
5. What is the implication of initial value theorem and final value theorem?
6. Draw s-domain equivalents of (i) inductor (ii) capacitor.
7. State the properties of driving point functions of a two port network.
8. Comment on the usage of poles and zeros to analyze the response of a network function.
9. Define h-parameters of a network with necessary equations.
10. What do you mean by propagation constant of a two port network?

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) In the following network, find power dissipated by resistor R1, value of resistor R3 and voltage drop across resistor R2 if R2 = 1Ω. (9)

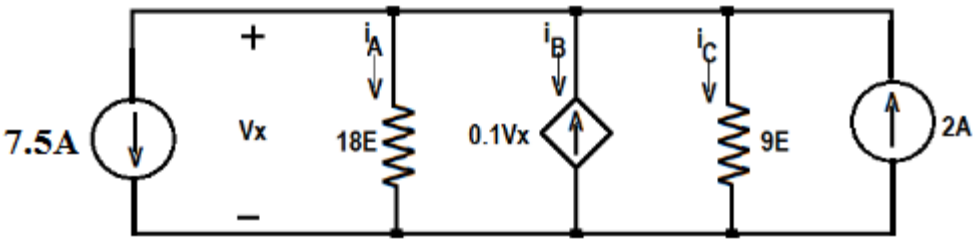


b) Justify the concept of super node with appropriate example. (5)

OR

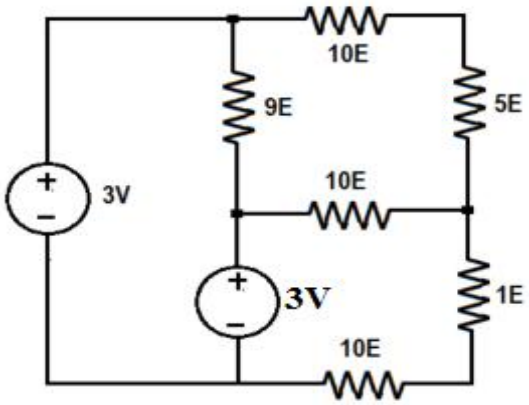
12. a) With proper example, define cut set matrix of a network. (4)

b) In the following network, find power supplied by 18 Ω resistor. Consider E as Ohm. (10)



MODULE II

13. a) For the following network, find V_{th} and R_{th}, considering 5Ω as the load. Consider E as Ohm. (10)

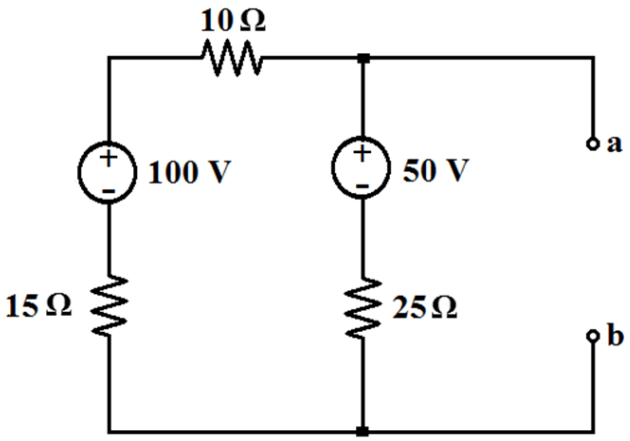


b) State superposition theorem for linear networks with necessary diagrams. (4)

OR

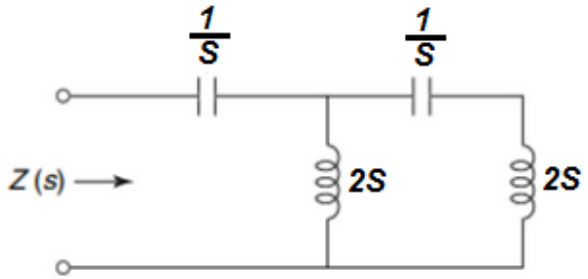
14. a) State and prove maximum power transfer theorem used in network analysis. (6)

b) Find the value of R_{ab} so that maximum power is transferred. (8)

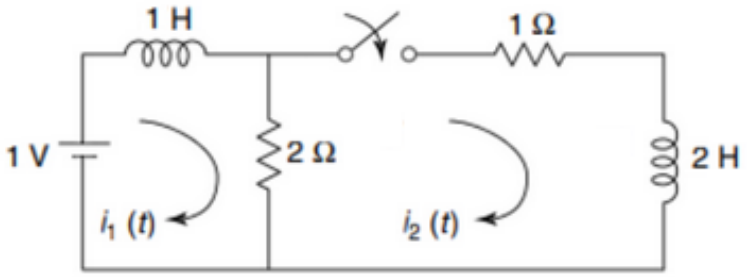


MODULE III

15. a) Find the driving point impedance of the following network. (5)



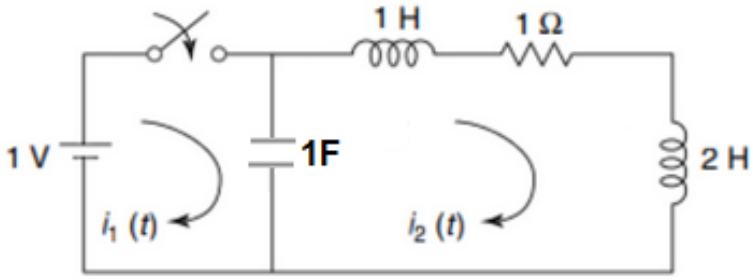
b) For the following network, if switch is closed at t=0, find current flow through 2H inductor for t >0. (9)



OR

16. a) Derive the expression for current through a series RL circuit for a unit step input. (7)

b) Transform the circuit from time domain to frequency domain, with necessary assumptions if required. Calculate the current through the network. (7)



MODULE IV

17. a) For the network function given below, sketch the pole-zero diagram $V(s) = \frac{3s}{(s+1)(s^2+5s+6)}$. (8)

b) Find the Laplace transform of the function given below (6)
i(t) = u(t-2) + 2u(t-1) + 3 u(t).

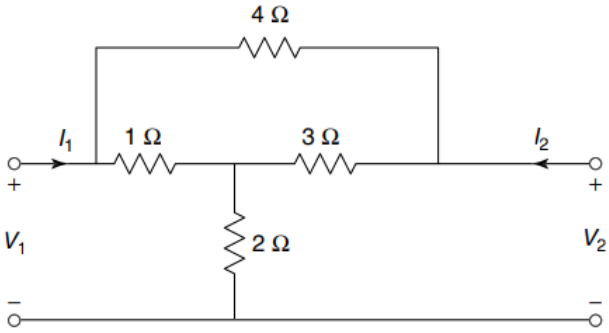
OR

18. a) State and explain any four properties of a driving point function. (8)

b) Explain about the transfer function of a network. Mention the significance of transfer function in the analysis of a network. (6)

MODULE V

19. a) Find the open-circuit impedance parameters for the network shown. Check for symmetricity and reciprocity. (9)



b) Derive the expression for z parameters in a two-port network. (5)

OR

20. Derive Y parameters in terms of Z-parameters. (14)

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