Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTERB.TECH DEGREE EXAMINATION (S), MAY 2022
ELECTRONICS AND COMMUNICATION ENGINEERING
(2020 SCHEME)

Course Code: **20ECT205**

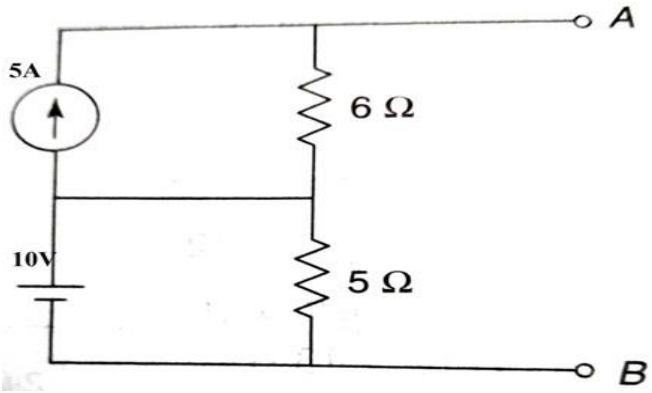
Course Name: **Network Theory**

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

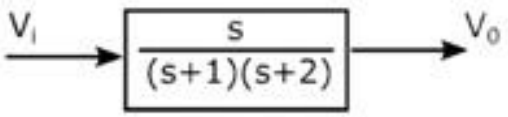
PART A

(Answer all questions. Each question carries 3 marks)

1. State Kirchhoff's Laws.
2. Replace the given network with a single current source and a resistor.



3. State Norton's theorem. What are the steps to be followed in finding Norton's equivalent network when a dependent source is present in the network?
4. State and prove maximum power transfer theorem.
5. Find the Laplace transform of $4\,t^2 + \sin 3t + e^{2t}$.
6. List any five properties of Laplace transform with necessary equations.
7. Obtain the pole- zero plot for $F(s) = \frac{s(s+2)}{(s+1)(s+3)}$.
8. Find the steady state output voltage $V_0(t)$, given the input voltage is $V_i(t) = 10 \cos (2t + 40^0)V$.



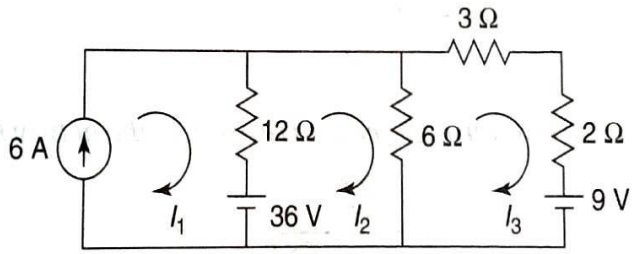
9. Deduce Z-parameter in terms of Y-parameter.
10. Specify the open-circuit impedance parameters with its equivalent circuit.

PART B

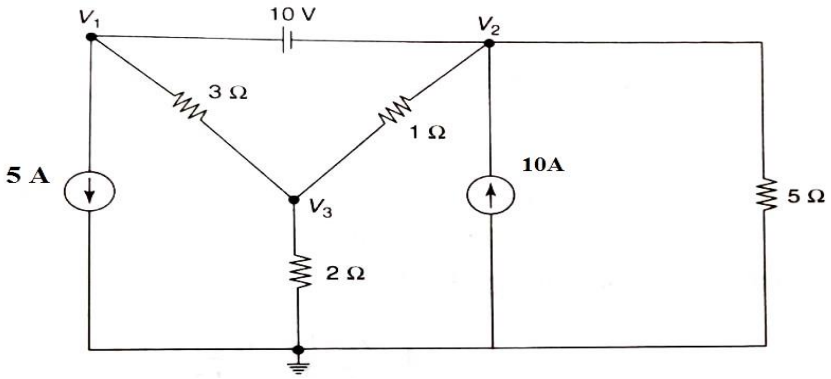
(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Find the current flowing through 3 ohm resistor using mesh analysis. (7)

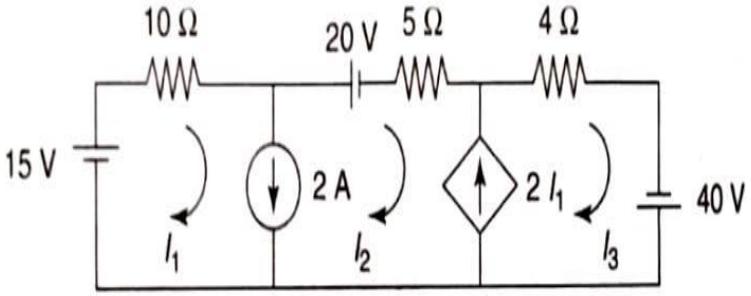


b) Solve for the node voltages V_1 and V_2. (7)

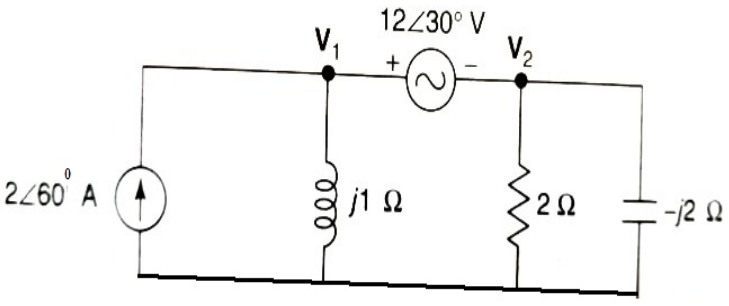


OR

12. a) For the network given, find the current flowing through 5 ohm resistor using mesh analysis. (6)

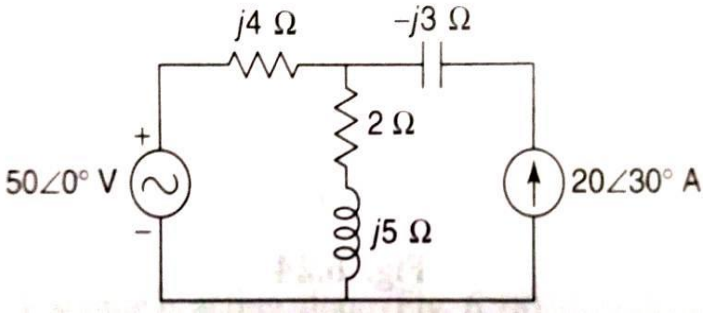


b) Calculate the voltage across the capacitor in the given network. (8)



MODULE II

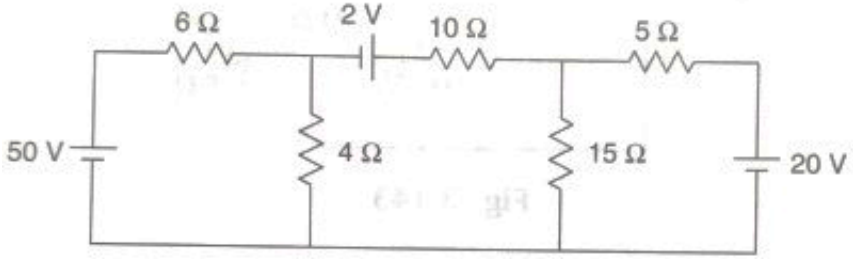
13. a) Determine the voltage across the (2+j5) ohm impedance for the network using superposition theorem. (10)



b) State Superposition theorem and Thevenin's theorem. (4)

OR

14. a) Find the current through the 10 ohm resistor and also obtain Thevenin's equivalent network. (12)



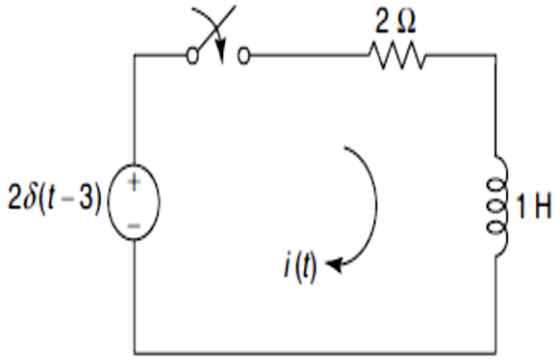
b) State reciprocity theorem. (2)

MODULE III

15. a) Obtain the transformed series RL and series RC circuit in s domain. (8)
b) Derive the response of a series RL circuit with step input. (6)

OR

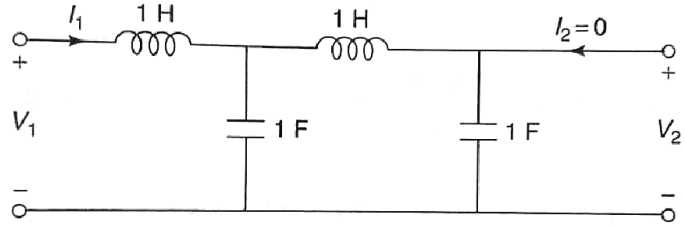
16. a) For the network shown in figure, determine the current i (t) when the switch is closed at t = 0. Assume that initial current in the inductor is zero. (8)



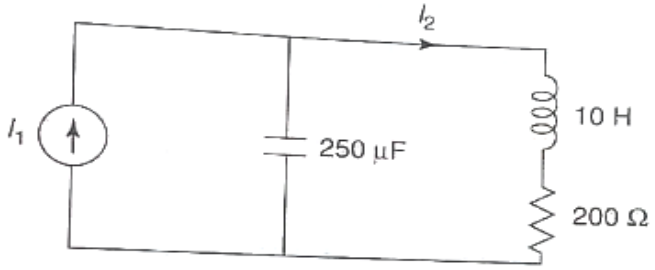
b) Find the Laplace transform of unit ramp function and sinusoidal function. (6)

MODULE IV

17. a) Compute the network functions V_1/I_1, V_2/V_1, V_2/I_1 for the given network. (7)



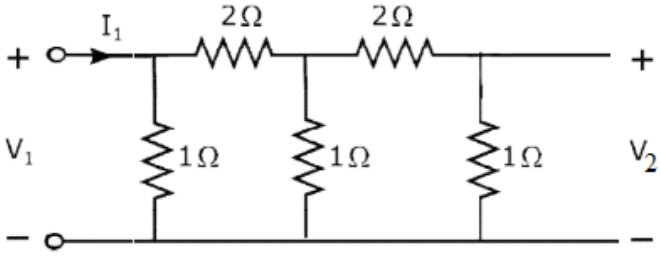
b) In the network shown, plot poles zero diagram of (I_2 / I_1). (7)



OR

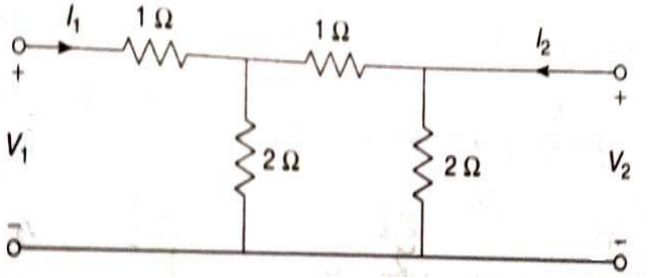
18. a) Write down the necessary conditions for driving point functions. (5)

b) Find Z_{11} and V_2/I_1 for the below network. (9)



MODULE V

19. a) Obtain the ABCD parameters for the given network. (9)



b) Define characteristic impedance and image impedance. (5)

OR

20. a) Explain the series and parallel connections of two port networks. (6)

b) Deduce the transmission parameters of two port network in terms of (i) Z-parameters, (ii) Y-parameters. (8)

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