APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree Examination December 2021 (2019 scheme)

Course Code: ECT205

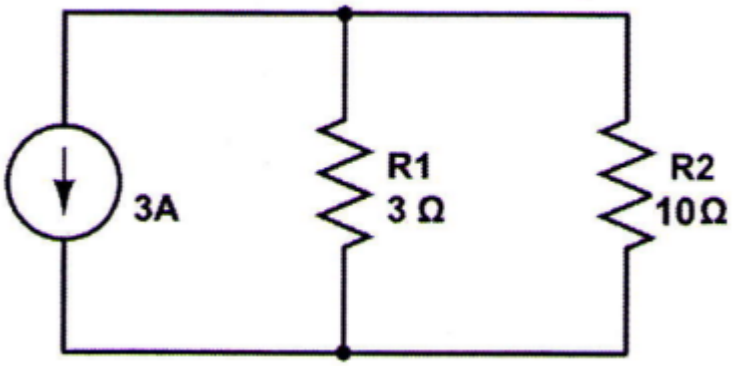
Course Name: NETWORK THEORY

Max. Marks: 100 Duration: 3 Hours

PART A

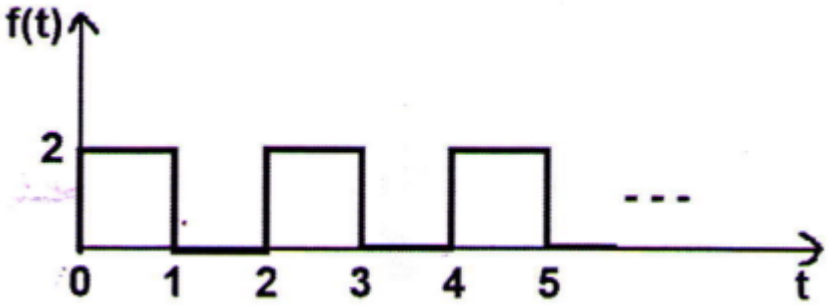
Answer all questions. Each question carries 3 marks

1. **Determine the voltage across 10Ω resistor by applying suitable source transformation.**



2. **Explain the different types of sources in electrical network.**
3. **Write the steps for finding the Norton equivalent circuit of a given network having only dependent sources with model equivalent circuit.**
4. **Explain Superposition theorem with the help of an example.**

5. Obtain the Laplace Transform of the following signal.



6. Derive the time domain response of the RL circuit with step input.
7. Describe the significance of poles and zeros of a network function.
8. Write the necessary conditions for the transfer functions.
9. Derive the condition of symmetry and reciprocity in terms of open circuit impedance parameters.
10. Deduce open circuit impedance parameters in terms of transmittance parameters.

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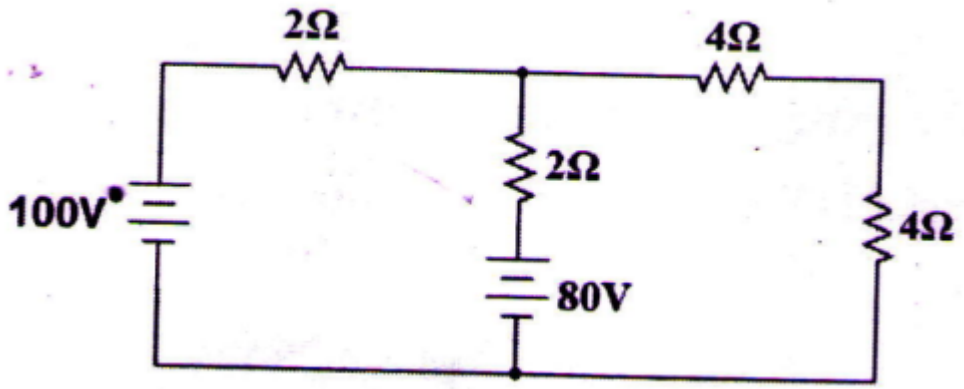
PART B

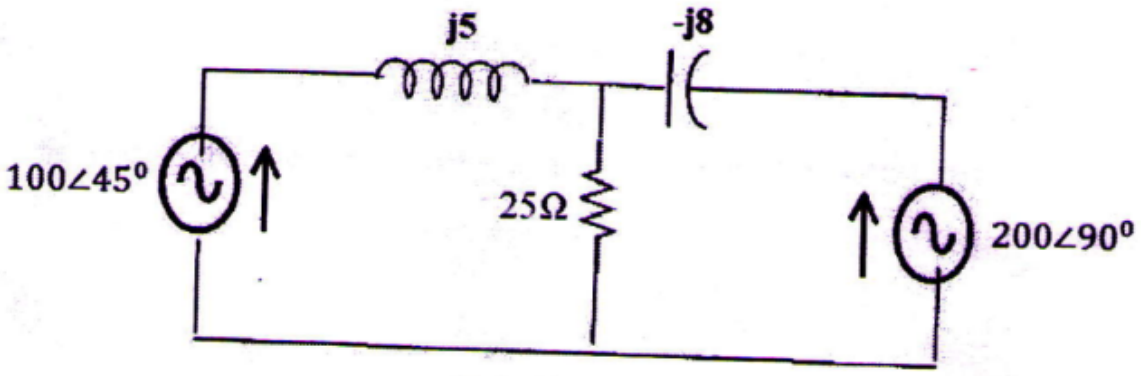
Answer any one full question from each module. Each question carries 14 marks

Module 1

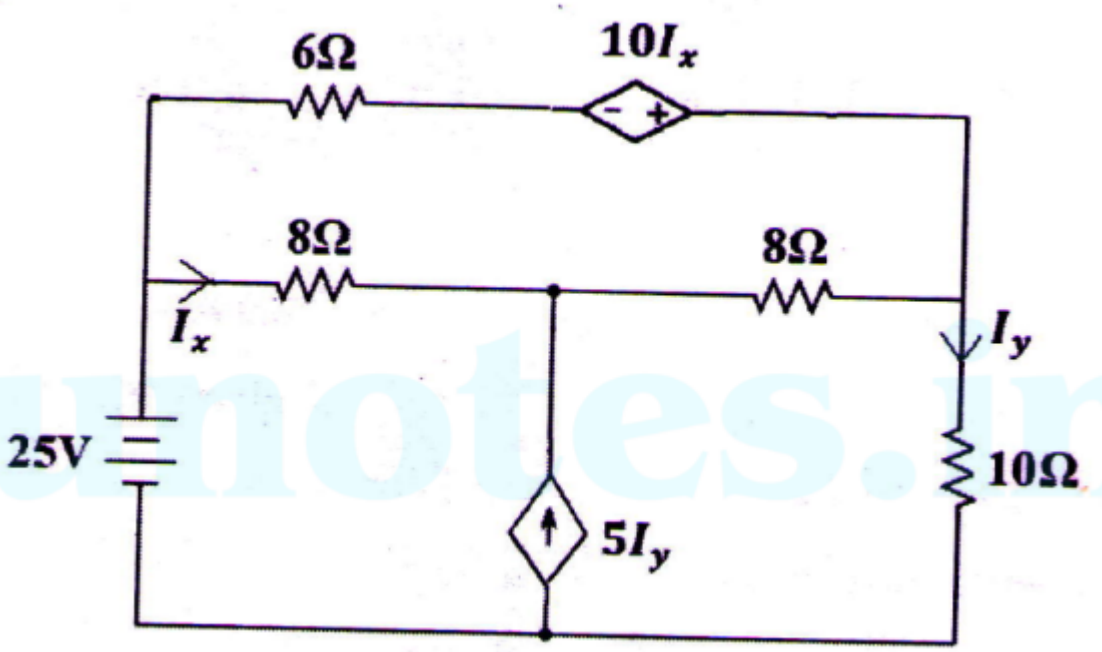
11. (a) Find the current through the 2Ω resistors using mesh analysis. (6 marks)



(b) Evaluate the current through 25Ω resistor using node analysis. (8 marks)

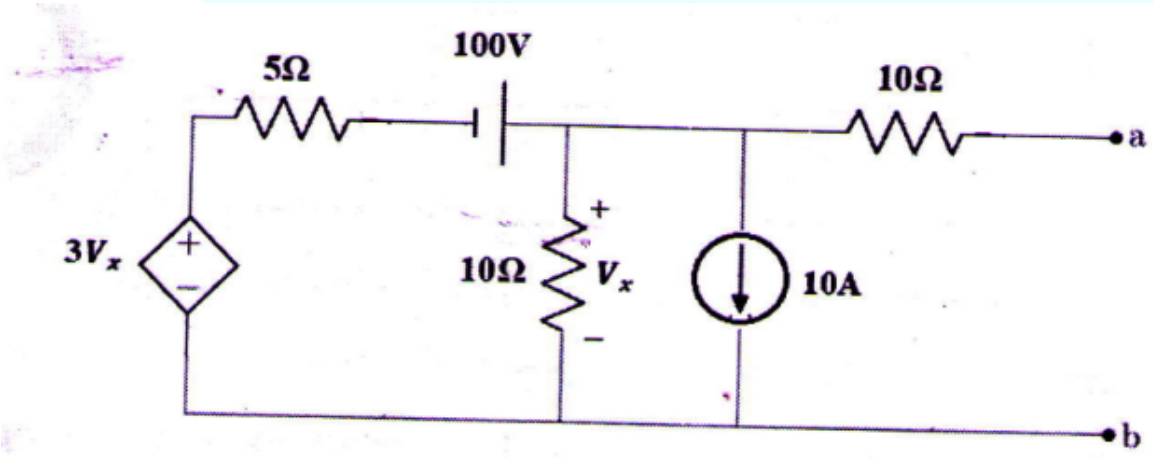


12. Evaluate the voltage across 10Ω resistor in the following network. (14 marks)

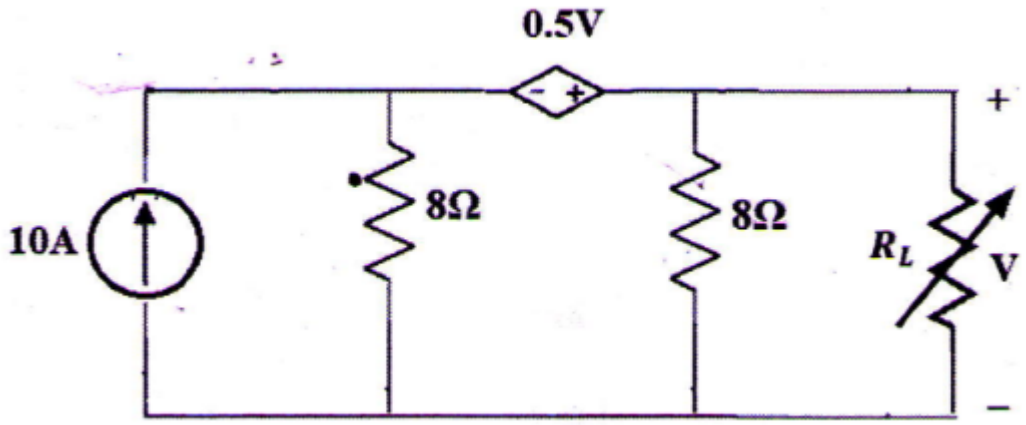


Module 2

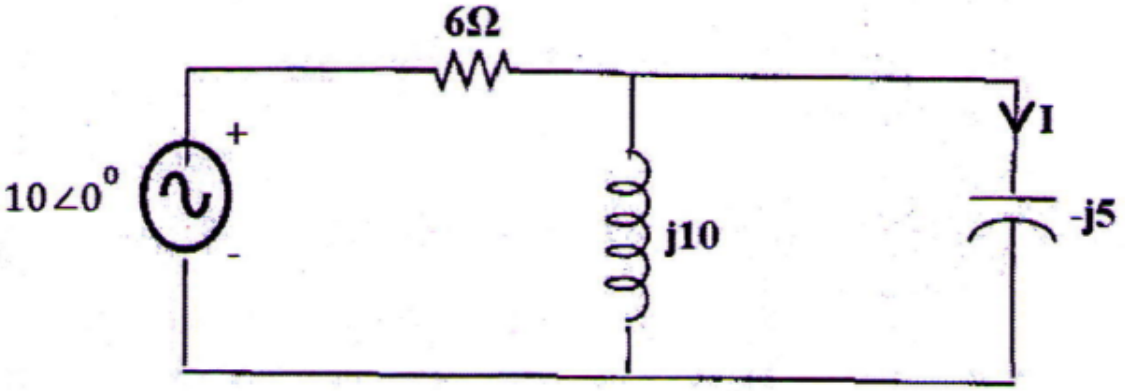
13. (a) Obtain the Thevenin equivalent circuit across the terminal a-b. (8 marks)



(b) Evaluate the value of R_L for maximum power. Also evaluate the maximum power across the load. (6 marks)



14. Evaluate I and verify Reciprocity theorem for the following network. (14 marks)

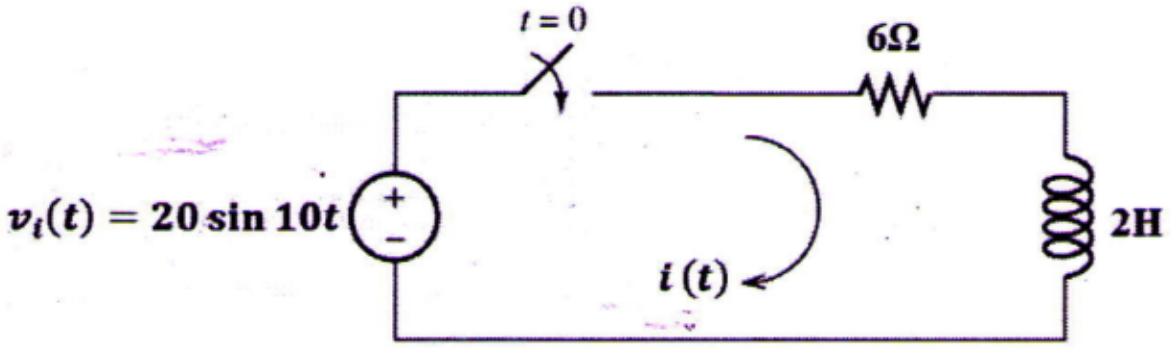


Module 3

15. (a) Verify initial and final value theorems of Laplace Transform for the following function: $f(t) = e^{-t}(t^2 + t^3 + \sin 2t)$ **(8 marks)**

(b) Derive the time domain response of an RC network for unit ramp input by assuming the initial condition as zero. (6 marks)

16. Evaluate i(t) in the network for $v_i(t) = 20 \sin 10t$**. Switch is closed at t=0. Assume that the initial value of current through the inductor is zero. (14 marks)**

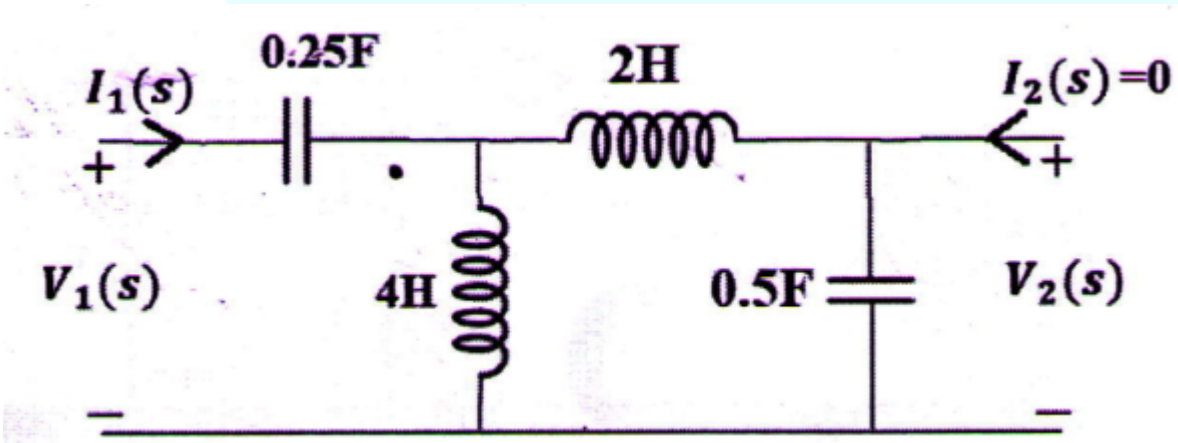


Module 4

17. Draw the pole zero diagram of the following function and deduce the time domain response from it:

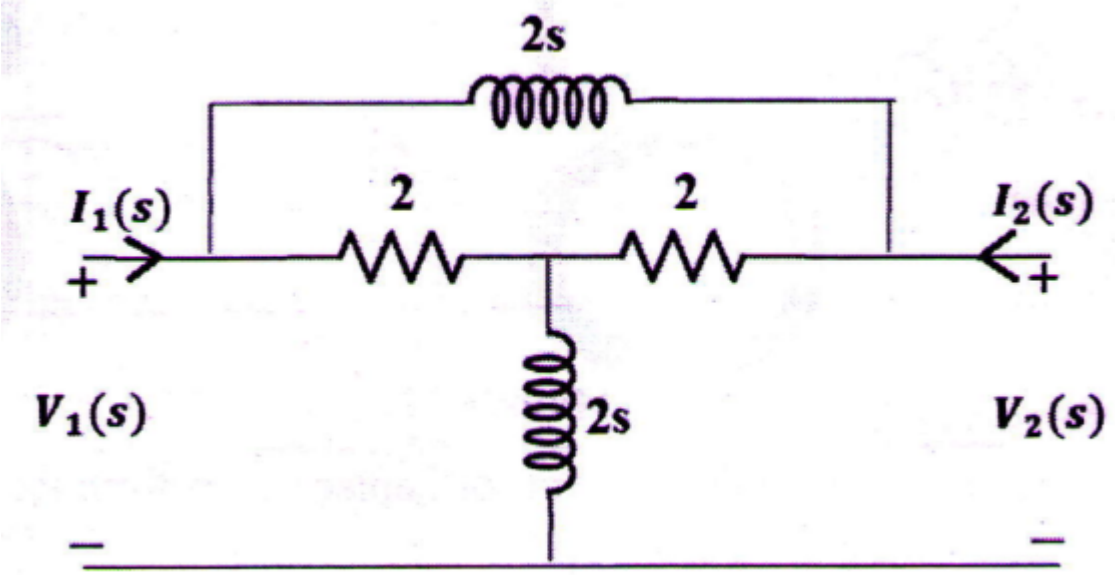
$$V(s) = \frac{(s+3)(s+5)}{s(s+1)(s+4)}$$ **(14 marks)**

18. Determine the driving point impedance in the input side of the following network. Also determine voltage gain transfer function. (14 marks)



Module 5

19. Determine the Y-parameters of the following network. (14 marks)



20. Two identical sections of the following network are connected in series-parallel combination. Determine the hybrid parameters. (14 marks)