Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) (FT/WP/S1PT) Examinations May/June 2026 (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 Marks

1 Explain super node analysis. (3)

2 Explain different types of dependent sources in electrical network. (3)

3 Explain the steps for finding Norton's equivalent circuit. (3)

4 State and explain reciprocity theorem. (3)

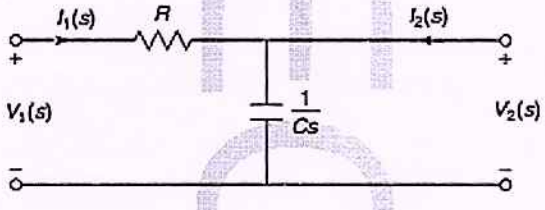
5 Find the initial and final values of the function whose Laplace transform is, (3)

$F(s) = \frac{(s+6)}{s(s+3)}$.

6 Mention the significance of poles and zeros of a network function. (3)

7 Obtain the expression for current when a unit step input is applied to a series RC circuit. (3)

8 Obtain voltage transfer function of the following network. (3)



9 The impedance parameters of a two-port network are given as $\begin{bmatrix} 4 & 2 \\ 2 & 6 \end{bmatrix}$. Find the admittance parameters. (3)

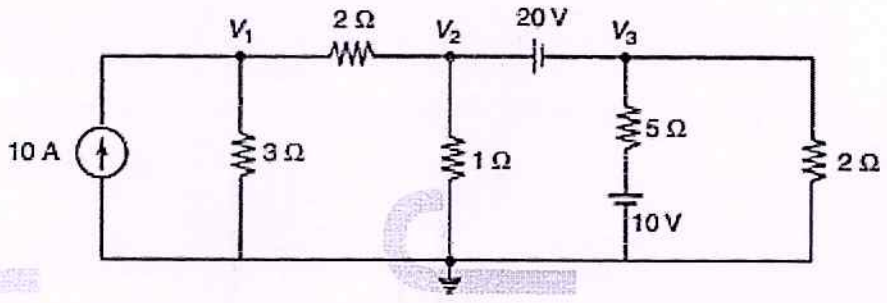
10 Describe image parameters in connection with two port network. (3)

PART B

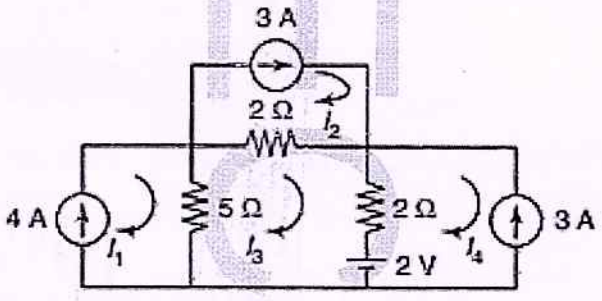
Answer any one full question from each module. Each question carries 14 marks

Module 1

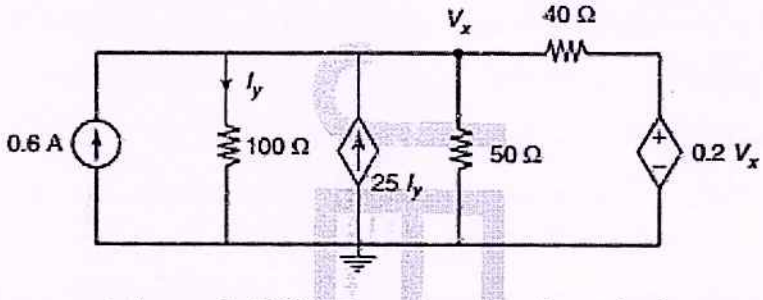
11 (a) Find the current through 5Ω using super node analysis. (7)



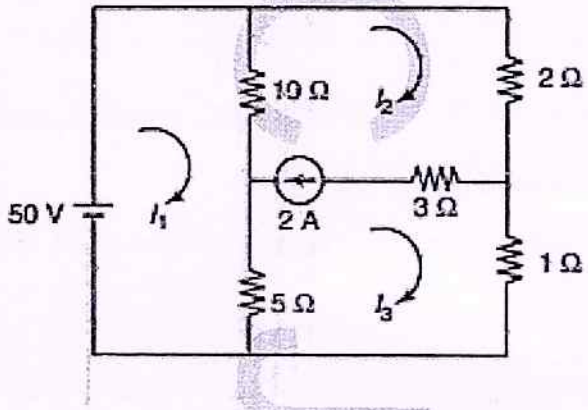
(b) Determine the current through 5Ω in the given network using mesh analysis. (7)



12 (a) For the given network, find V_x using node analysis. (7)

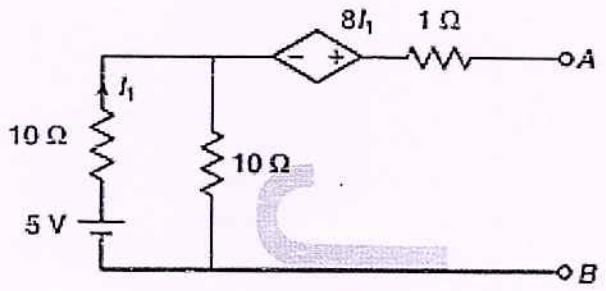


(b) Find the current through 10Ω using super mesh analysis. (7)

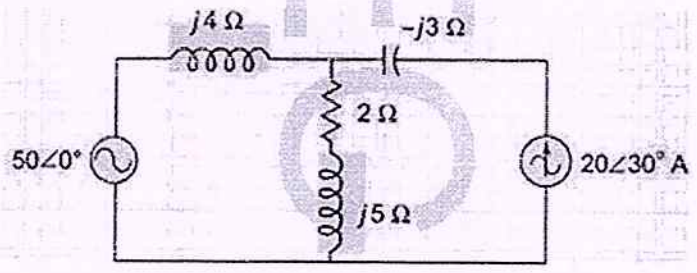


Module 2

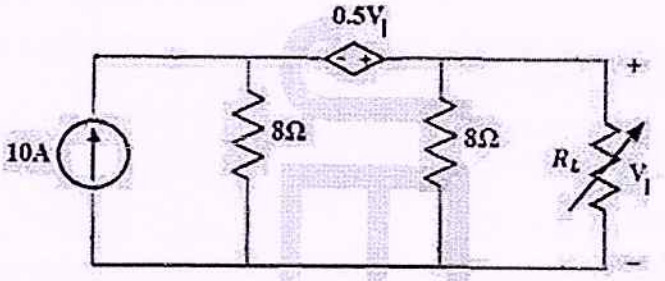
13 (a) Find the Thevenin equivalent of the given network. (7)



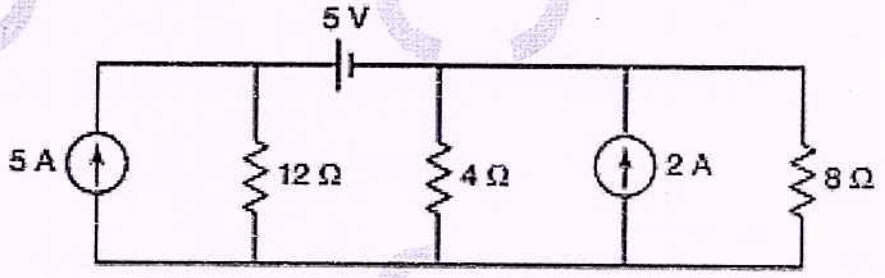
(b) Determine the voltage across (2+5j) Ω for the network given below using superposition theorem. (7)



14 (a) Determine the value of R_L for obtaining maximum power in the given network. Also evaluate the maximum power across the load. (7)



(b) Apply Norton's Theorem to find the current through 8Ω resistor in the given network. (7)



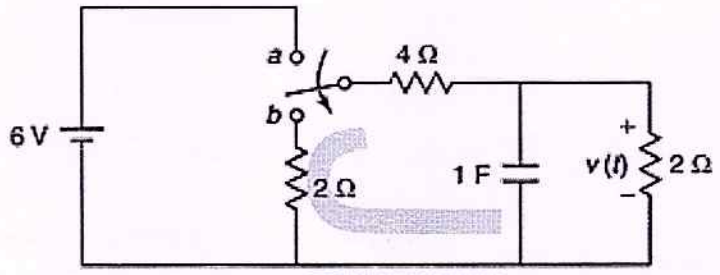
Module 3

15 (a) Verify initial and final value theorems for the following function, (7)

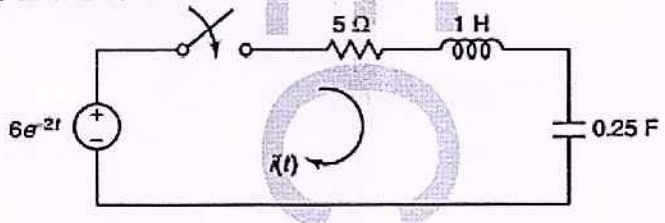
$f(t) = e^{-t}(t+1)^2$.

(b) In the given network, the switch is moved from position a to b, at t = 0. (7)

Find v(t) for t > 0.



16 (a) For the network shown, the switch is closed at t = 0. Determine the current i (t) assuming zero initial conditions in the network elements. (7)



(b) Find the expression for current through a series RL circuit when a pulse input of width 1s and amplitude 1V is applied across it. (7)

Module 4

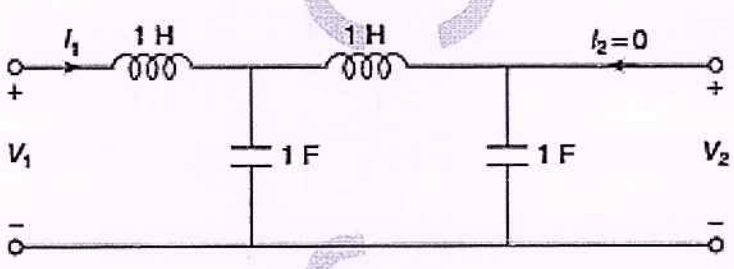
17 (a) Draw the pole zero diagram of the following function and deduce the time domain response from it. (8)

$$V(s) = \frac{3s}{(s+2)(s^2+2s+2)}$$

(b) What are the necessary conditions for transfer functions. (6)

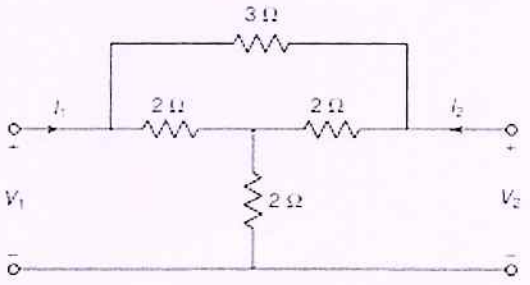
18 (a) Sketch amplitude and phase response for $V(s) = \frac{s}{s+10}$. (8)

(b) Find the network functions $\frac{V_1}{I_1}, \frac{V_2}{V_1}$ and $\frac{V_2}{I_1}$, for the network given below. (6)



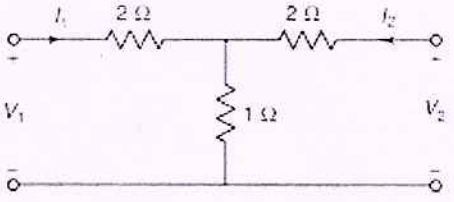
Module 5

19 (a) Find Y parameters for the given network. (8)



(b) Obtain ABCD parameters in terms of Z parameters (6)

20 (a) Two identical sections of the given network are connected in series. Obtain the Z parameters of the overall connection. (6)



(b) Derive the conditions for reciprocity and symmetry for Z parameters and for ABCD parameters. (8)

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