

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) (FT/WP) / S1 (PT) Examination November/December 2025 (2019 Scheme)

Course Code: ECT205**Course Name: NETWORK THEORY**

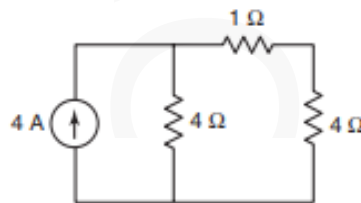
Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions. Each question carries 3 marks*

Marks

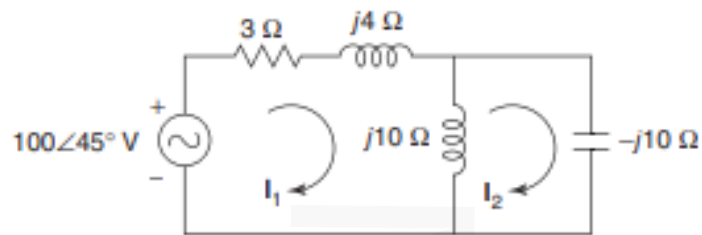
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|---|---|-----|
| 1 | State and explain Kirchhoff's voltage and current law. | (3) |
| 2 | Find the current through 1Ω resistor in the network given below. | (3) |



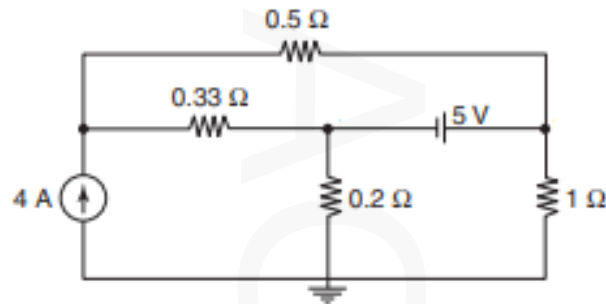
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| 3 | With necessary diagrams, explain the steps for finding Thevenin equivalent circuit. | (3) |
| 4 | State maximum power transfer theorem and derive the condition for maximum power transfer. | (3) |
| 5 | Find the Laplace transform of $x(t) = \sin 10t, t \geq 0$ | (3) |
| 6 | State and prove initial value theorem. | (3) |
| 7 | Check whether the given function represent transfer function | (3) |
| | $G_{21} = \frac{3s+2}{(5s^3+4s^2+1)}$ | |
| 8 | Discuss different types of network functions. | (3) |
| 9 | Represent the series interconnection of two port networks. | (3) |
| 10 | Obtain short circuit admittance parameters in terms of open circuit impedance parameters. | (3) |

PART B*Answer any one full question from each module. Each question carries 14 marks***Module 1**

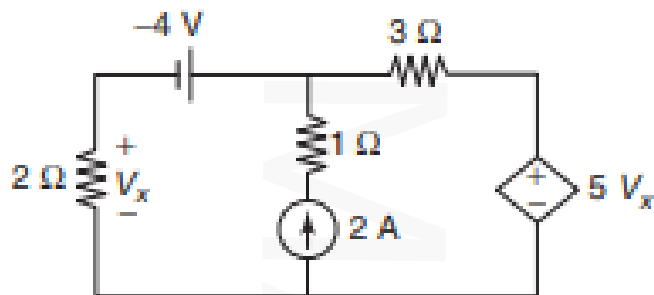
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|----|--|-----|
| 11 | (a) Find the current through $10j\Omega$ in the given network using mesh analysis. | (7) |
|----|--|-----|



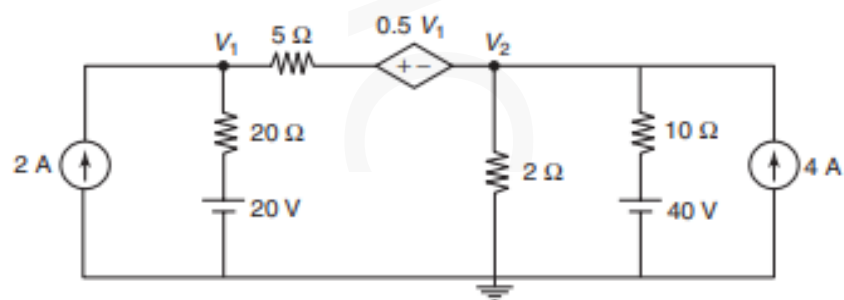
- (b) Find the current through 0.2Ω using super node analysis. (7)



- 12 (a) Find the current through 3Ω using super mesh analysis. (7)

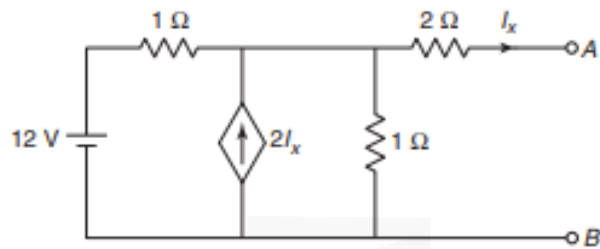


- (b) Find the current through 5Ω using node analysis. (7)

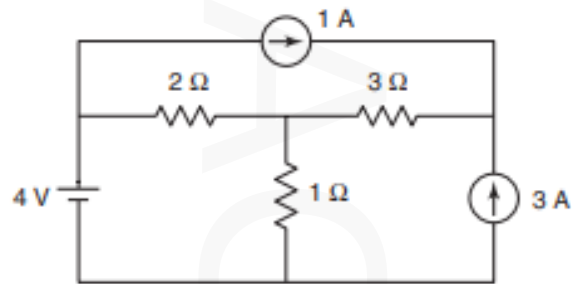


Module 2

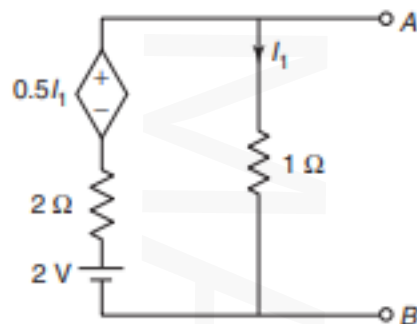
- 13 (a) Obtain the Thevenin equivalent of the given network. (7)



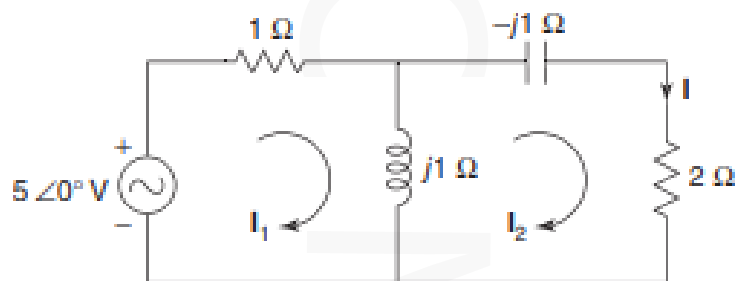
- (b) Determine the current through 1Ω for the network given below using superposition theorem. (7)



- 14 (a) Find the Norton's equivalent of the given network. (6)

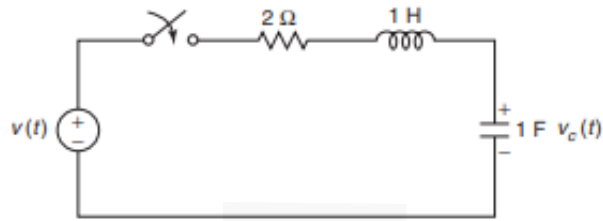


- (b) Verify Reciprocity Theorem for the given network. (8)

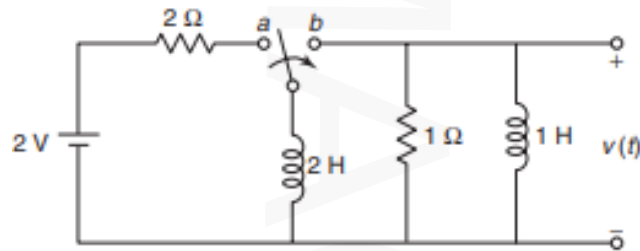


Module 3

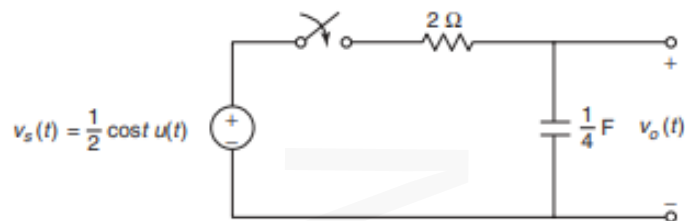
- 15 (a) In the given network, determine the response $v_c(t)$ for
i) $\delta(t)$ ii) $u(t)$ (8)



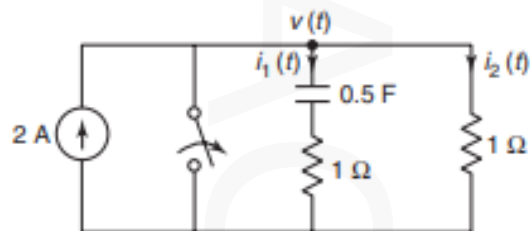
- (b) The network was initially in steady state with the switch in position a. The switch is moved from a to b, at $t = 0$. Find $v(t)$ for $t > 0$. (6)



- 16 (a) For the network given below, find $v_0(t)$. (8)



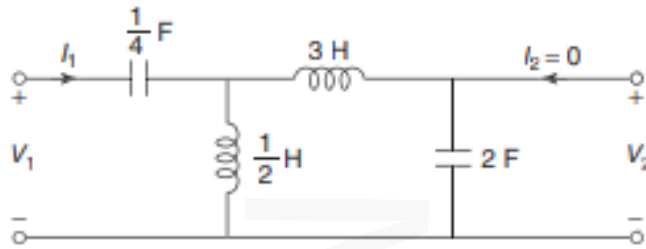
- (b) In the given network, the switch is closed for a long time, and at $t = 0$ switch is opened. Determine the current through the capacitor. (6)



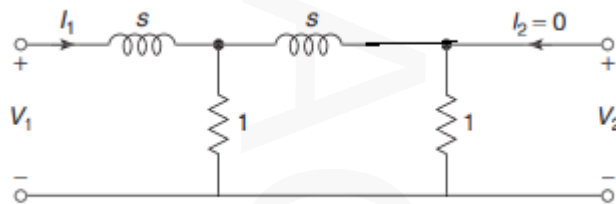
Module 4

- 17 (a) Sketch magnitude and phase response for $F(s) = \frac{s+5}{s-5}$. (6)

- (b) Determine driving point impedance and voltage transfer function for the given network. (8)



- 18 (a) 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)

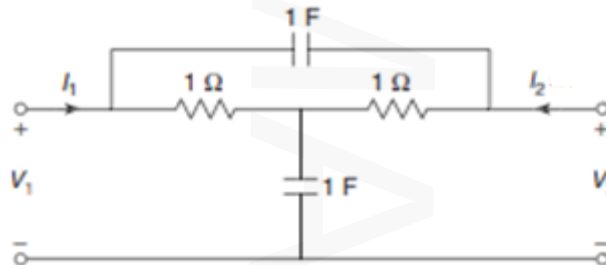


- (b) Draw the pole zero diagram of the following function and deduce the time domain response from it. (8)

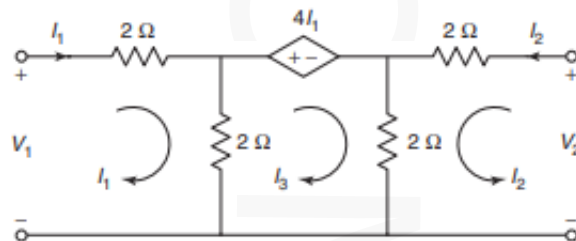
$$V(s) = \frac{(s+7)(s+1)}{(s+2)(s+3)}$$

Module 5

- 19 Find Y parameters for the given network. (14)



- 20 (a) Find open circuit impedance parameters of the given network. (7)



- (b) Derive the conditions for reciprocity and symmetry for ABCD parameters. (7)
