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

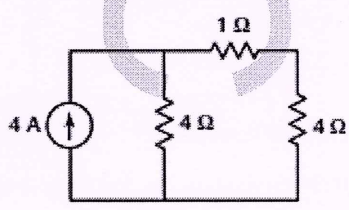
Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each question carries 3 marks Marks

1 State and explain Kirchhoff's voltage and current law. (3)

2 Find the current through 1Ω resistor in the network given below. (3)



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)

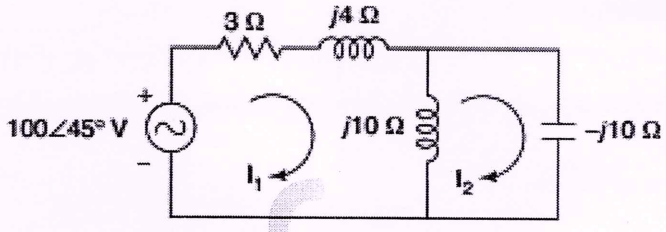
10 Obtain short circuit admittance parameters in terms of open circuit impedance parameters. (3)

PART B

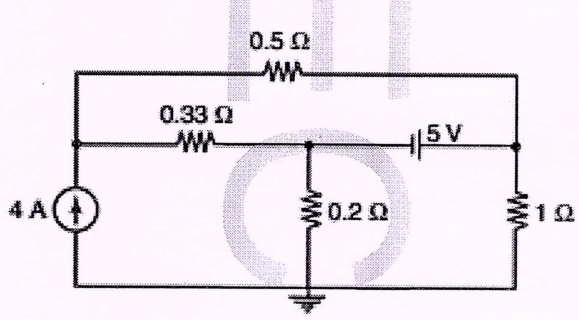
Answer any one full question from each module. Each question carries 14 marks

Module 1

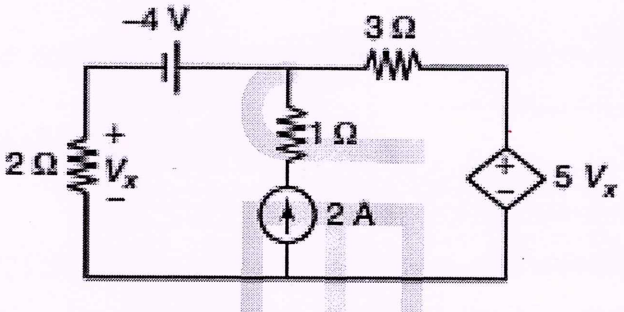
11 (a) Find the current through 10j Ω in the given network using mesh analysis. (7)



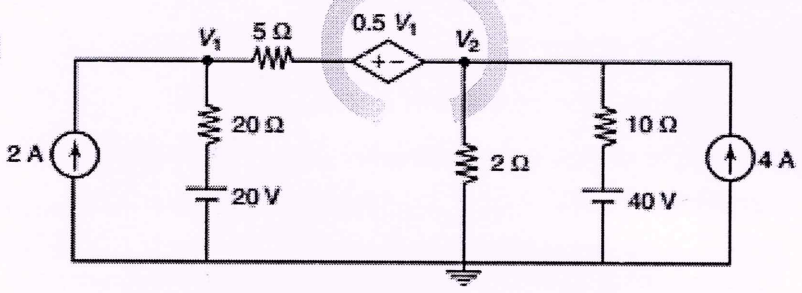
(b) Find the current through 0.2Ω using super node analysis. (7)



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

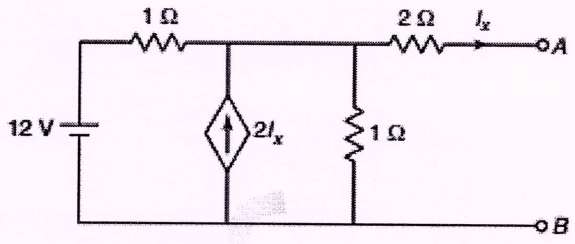


(b) Find the current through 5Ω using node analysis. (7)

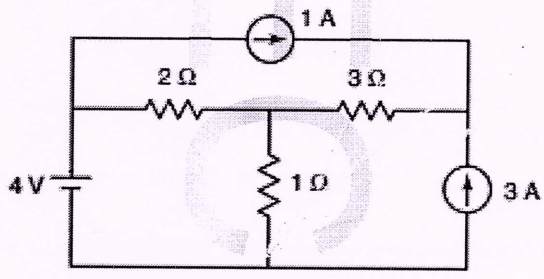


Module 2

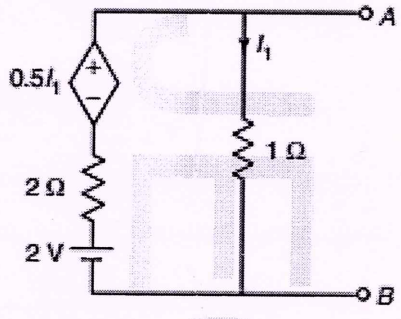
13 (a) Obtain the Thevenin equivalent of the given network. (7)



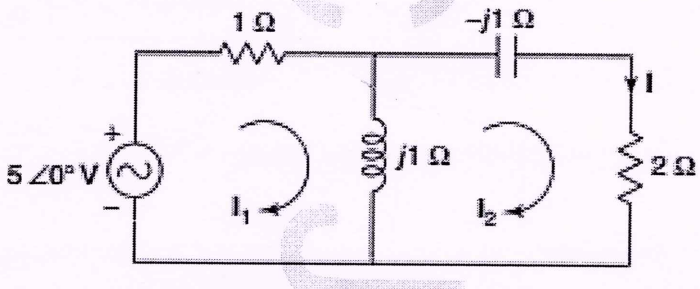
(b) Determine the current through 1Ω for the network given below using superposition theorem. (7)



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



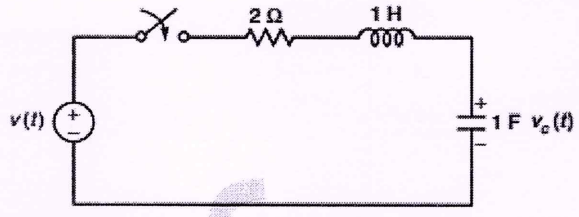
(b) Verify Reciprocity Theorem for the given network. (8)



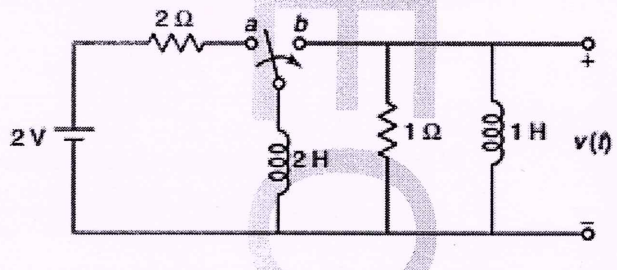
Module 3

15 (a) In the given network, determine the response $v_c(t)$ for (8)

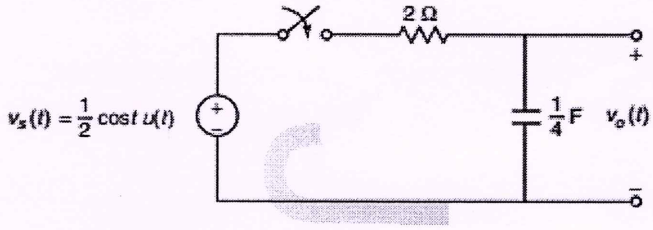
i) δ(t) ii) u(t)



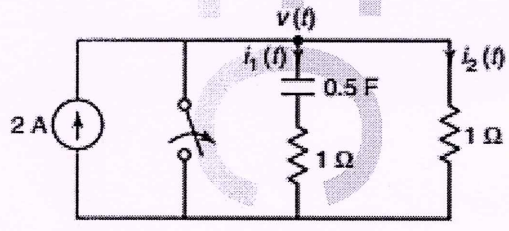
(b) The network was initially in steady state with the switch in position a. The switch is moved from a to b, at t = 0. Find v(t) for t > 0. (6)



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



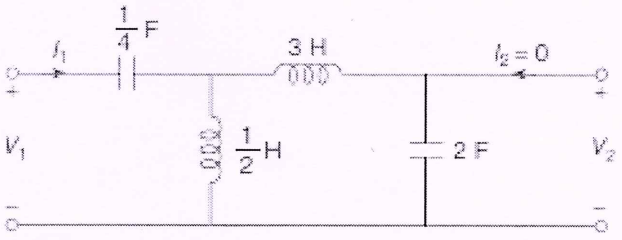
(b) In the given network, the switch is closed for a long time, and at t= 0 switch is opened. Determine the current through the capacitor. (6)



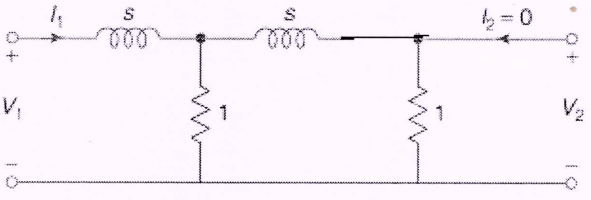
Module 4

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)

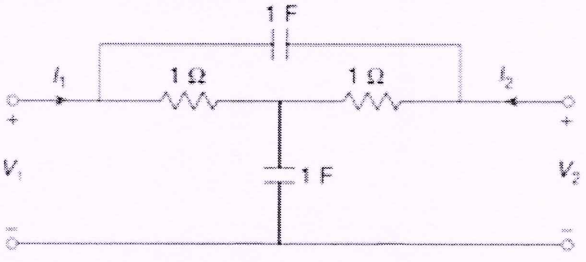


(b) Draw the pole zero diagram of the following function and deduce the time domain response from it. (8)

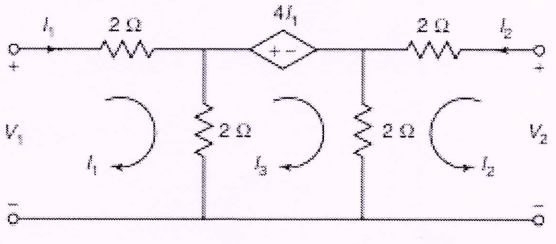
$$V(s) = \frac{(s+7)(s+1)}{(s+2)(s+3)}$$

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)

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