



Roll No.															
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

PRESIDENCY UNIVERSITY

BENGALURU

Make Up Examinations – December 2025

Date: 26 – 12- 2025

Time: 1.00pm to 04.00pm

School: SOE	Program: B. Tech	
Course Code: ECE2004	Course Name: Network Theory	
Semester: MK	Max Marks: 100	Weightage: 50%

CO - Levels	C01	C02	C03	C04	C05
Marks	20	35	45	-	-

Instructions:

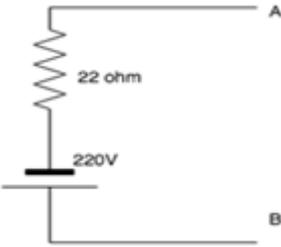
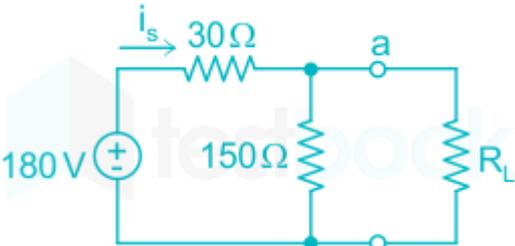
- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

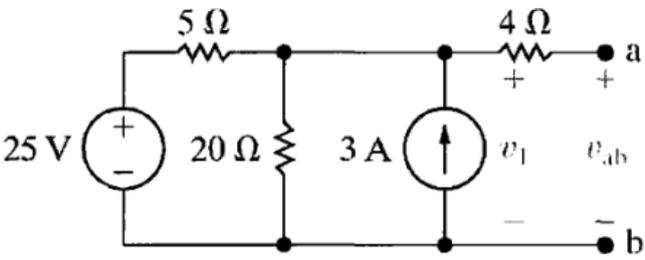
1.	Thevenin's theorem is used in electrical engineering to simplify circuit analysis. It is used to analyse circuits with multiple sources and resistors. Define Thevenin's Theorem.	2 Marks	L1	C01
2.	Superposition theorem can be used when trying to analyze a linear circuit with multiple voltage and current sources. Define super position theorem.	2 Marks	L1	C01
3.	Voltage and current sources are the active elements in networks. They provide energy to the network elements. Sometimes it may be necessary to transform voltage sources into current sources and vice versa. Mr Ram is having a current source of 150 amperes with a shunt resistance of 1000 ohms. Calculate the voltage?	2 Marks	L1	C01
4.	Star and Delta are the two basic types of three phase connection. If a balanced star connection of 40 ohm in each branch. Find the equivalent delta resistance.	2 Marks	L2	C02
5.	We know that the current in a closed loop is a function of voltage and resistance pertaining to that loop. Define Kirchoff's voltage law along with the mathematical equation by taking 2 loop network as an example.	2 Marks	L2	C02

6.	 <p>what will the value of the current in amperes once source transformation is applied to the circuit?</p>	2 Marks	L2	CO2
7.	In determining open circuit impedance parameters or Z Parameters, among V_1 , V_2 , I_1 , I_2 , which of them are dependent variables? Mention the equations for the Z Parameters.	2 Marks	L2	CO2
8.	In determining open circuit Admittance parameters or Y Parameters, among V_1 , V_2 , I_1 , I_2 , which of them are dependent variables? Mention the equations for the Y Parameters.	2 Marks	L3	CO3
9.	<p>A voltage divider is a simple electrical circuit that produces an output voltage that is a fraction of its input voltage. It typically consists of two resistors connected in series across a voltage source, and the output voltage is taken from the connection point between the resistors. Calculate voltage across 150 ohm by using voltage divider</p> 	2 Marks	L1	CO1
10.	What are the sequential steps involved in determining the Thevenin equivalent resistance and Thevenin equivalent voltage of a complex electrical circuit?	2 Marks	L2	CO2

Part B

Answer the Questions.

Total Marks 80M

11.	<p>a. Thevenin's Theorem and Norton's Theorems are fundamental principles in electrical circuit analysis that simplifies the analysis of complex linear circuits.</p> <p>a) Find out Thevenin's equivalent circuit for the given network.</p> <p>b) Find out Norton's equivalent circuit for the given network.</p> 	20 Marks	L2	CO2
-----	--	----------	----	-----

Or					
12.	a.	<p>The Z parameters, or impedance parameters, of a two-port network are represented by a 2×2 impedance matrix. This matrix is also known as the open-circuit parameter consisting of Z_{11}, Z_{12}, Z_{21} & Z_{22}.</p> <p>a) Derive the 4 equations for the same and also draw the circuit diagram.</p> <p>b) Identify and find the impedance parameters or Z parameters for the circuit shown below and also find out Z_{11}, Z_{12}, Z_{21} & Z_{22}. What is the matrix form of Z-parameters?</p>	20 Marks	L3	C03

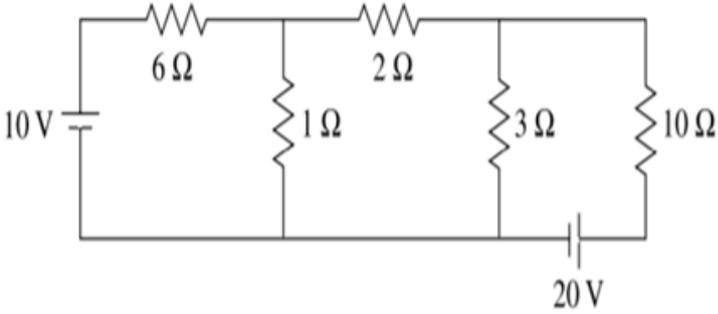
13.	a.	<p>Admittance is the reciprocal of impedance, and it is a measure of how easily a circuit allows the flow of current. Admittance Parameters are denoted by Y_{11}, Y_{12}, Y_{21}, and Y_{22}.</p> <p>a) Derive the 4 equations for the same and also draw the circuit diagram.</p> <p>b) Identify and find the Admittance or Y Parameters Y_{11}, Y_{12}, Y_{21}, and Y_{22} for the circuit shown below</p>	20 Marks	L3	C03

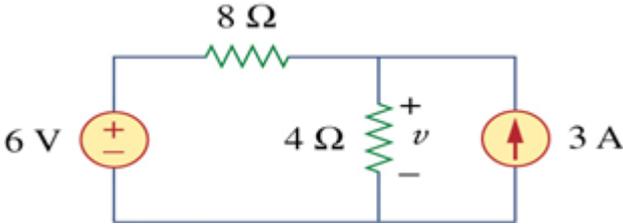
Or

14.	a.	<p>A Wheatstone bridge ABCD is arranged as follows AB is equals to 20 ohm BC is equal to 50 ohm and CD is equals to 60 ohm and DA is equals to 80 ohm. A 20 volt battery of internal resistance 25 ohm is connected between points A and C with A being positive. A galvanometer of resistance 40 ohm is connected between B and D. Find Galvanometer current.</p>	20 Marks	L1	C01
------------	-----------	--	-----------------	-----------	------------

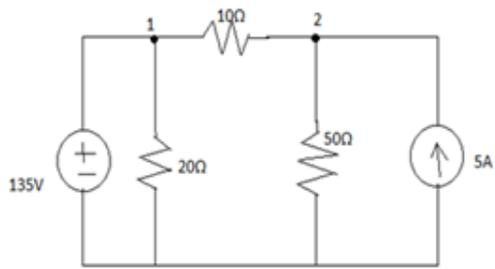
15.	a.	<p>The ABCD parameters, also known as transmission parameters, are another set of parameters commonly used in the analysis of two-port networks in electronics. Derive the 4 equations for A,B,C and D and also draw the circuit diagram.</p>	20 Marks	L3	C03
------------	-----------	---	-----------------	-----------	------------

Or

16.	a.	<p>In the context of mesh analysis for electrical circuits, imagine a circuit with multiple loops formed by interconnected resistors and other components. Each loop has a current flowing through it, and mesh analysis involves applying Kirchhoff's Voltage Law (KVL) to write equations for the voltage drops across each component in the loop. Calculate the current across 2Ω resistor using mesh analysis.</p> 	20 Marks	L1	CO1
-----	----	---	----------	----	-----

17.	a.	<p>Superposition theorem states that in any linear, bilateral network where more than one source is present, the response across any element in the circuit is the sum of the responses obtained from each source considered separately. Find out the value of 'v' using Superposition theorem.</p> 	20 Marks	L2	CO2
-----	----	--	----------	----	-----

Or

18.	a.	<p>Nodal analysis relies on Kirchhoff's current law (KCL) to write equations based on the sum of currents entering and leaving each node. Utilizing nodal analysis (or the node-voltage method), determine the voltages at nodes 1 and 2 in the electrical circuit. The approach involves identifying the currents at each node and formulating equations to solve for the desired node voltages.</p> 	20 Marks	L2	CO2
-----	----	---	----------	----	-----