



R20 Regulation

Subject code: 3P3BB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, December 2025

ELECTRICAL CIRCUIT ANALYSIS

(EEE)

Maximum Marks: 70

Date: 30.12.2025

Duration: 3 hours

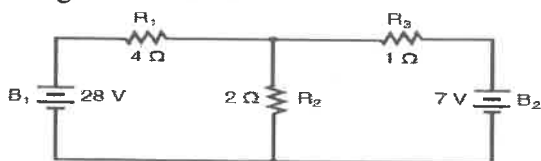
- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Write the properties of a Tree?	2M	1	L1
2	Write the duality principle.	2M	1	L1
3	Define bandwidth and selectivity.	2M	2	L1
4	Define Tree and Co-tree.	2M	2	L1
5	Define Quality Factor.	2M	3	L1
6	What is the main reason for the transients to occur in a circuit?	2M	3	L1
7	Write the transient conditions for the inductor and capacitor.	2M	4	L1
8	State Superposition theorem.	2M	4	L1
9	Give the Laplace transform for the signal step.	2M	5	L1
10	Write the types of parameter in two port network.	2M	5	L1

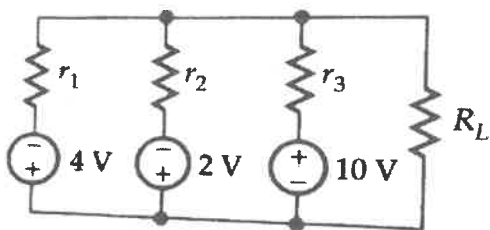
Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Draw graph, oriented graph, basic incident matrix and basic cut set matrix for a given network.	10M	1	L2

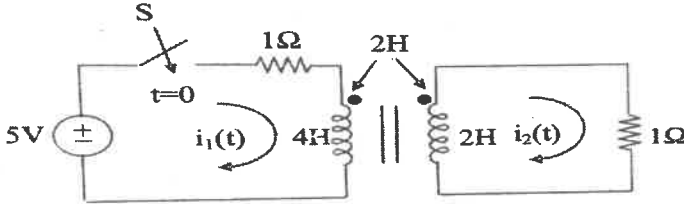


OR

12	Using Millman's theorem, find the current through R_L in the circuit.	10M	1	L2
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$$[r_1 = r_2 = r_3 = 4\Omega; R_L = 10\Omega]$$

13	<p>a) Write the transient free condition for series RL circuit with AC excitation.</p> <p>b) A $5\mu\text{F}$ capacitor is initially charged with $500\mu\text{C}$. At $t=0$, the switch K is closed. Determine the voltage drop across the resistor at $t=0$ and $t=\infty$.</p>	5M 5M	2	L2
OR				
14	<p>a) When does transients occur in a circuit? Explain.</p> <p>b) Derive the Transient state response for Current in first order RC series circuit.</p>	5M 5M	2	L2
15	Derive the expression for self and mutual inductance and also determine the coefficient of coupling.	10M	3	L2
OR				
16	<p>Consider the following circuit and determine the currents $i_1(t)$ and $i_2(t)$ for $t \geq 0$.</p>	10M	3	L2
				
17	<p>Find $v_o(t)$ in the circuit using Laplace transform.</p>	10M	4	L2
OR				
18	<p>a) Find the initial and final value of the function whose Laplace transform is $H(S)=20/(S+3)(S^2+8S+25)$</p> <p>b) Derive the expression for current using Laplace transform in series RL circuit with DC excitation.</p>	5M 5M	4	L2

19	Derive the condition of Reciprocity and symmetry for a two port Z-parameter.	10M	5	L2
OR				
20	A typical two port network is characterized by equations $2V_1 + 4I_2 = I_1$ and $V_2 + 6V_1 = 8I_2$ Determine: i) Y_{11} ii) Z_{21} iii) h_{21}	10M	5	L2

