



**B.Tech III Semester Supplementary Examinations, December 2024**

**ELECTRICAL CIRCUIT ANALYSIS**  
**(Electrical and Electronics Engineering)**

**Maximum Marks: 70**

**Date:04.12.2024**

**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 which carries 10M.  
 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		CO	Bloom Tx
1	Differentiate Self-induced emf and mutually induced emf?	1	L1
2	Define time constant and write the time constant for RC and RL circuit?	1	L1
3	Define average value and RMS value.	2	L1
4	Define Tree and Co-tree.	2	L1
5	Define Quality Factor.	3	L1
6	Define the term form factor, peak factor and Time period.	3	L1
7	Draw the phasor diagram for AC through series RL circuit and derive the impedance.	4	L1
8	State Superposition theorem.	4	L1
9	Give the Laplace transform for the signal step, ramp, Impulse and sine inputs?	5	L1
10	Write the types of parameters in two port networks?	5	L1

**Part-B**

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Explain Basic incidence matrix and Basic cut set matrix with an example? [10M]	1	L2
OR			
12	Determine the node voltages and the current through the resistors using mesh method for the network given below. [10M]	1	L2
13	a) Write the transient free condition for series RL circuit with AC excitation. [2M] b) A 5μF capacitor is initially charged with 500μC. At t=0, the switch K is closed. Determine the voltage drop across the resistor at t=0 and t=∞. [8M]	2	L2

OR			
14	<p>a) When does transients occur in a circuit? Explain. [2M]</p> <p>b) Derive the Transient state response for Current in first order RL series circuit. [8M]</p>	2	L2
15	<p>a) Derive the RMS and Average value for the pure sinusoidal signal? [8M]</p> <p>b) Calculate Form factor and peak factor for pure sinusoidal signal? [2M]</p>	3	L2
OR			
16	<p>a) What is ideal transformer and explain the term perfect coupling? [2M]</p> <p>b) Find the Equivalent inductance for the following circuit? [8M]</p>	3	L2
17	<p>Find <math>v_o(t)</math> in the circuit using Laplace transform. [10M]</p>	4	L2
OR			
18	<p>Derive the expression for current using Laplace transform in series RL circuit with DC excitation. [10M]</p>	4	L2
19	<p>Express the relationship of Z Parameters in terms of Y-parameters. [10M]</p>	5	L2
OR			
20	<p>A typical two port network is characterized by equations [10M]</p> <p><math>2V_1 + 4I_2 = I_1</math> and</p> <p><math>V_2 + 6V_1 = 8I_2</math></p> <p>Determine i) <math>Y_{11}</math> ii) <math>Z_{21}</math> iii) <math>h_{21}</math></p>	5	L2