

ANURAG Engineering College

(An Autonomous Institution)

I B.Tech I Semester Supplementary Examinations, January – 2025

**ELECTRICAL CIRCUITS
(COMMON TO EEE & ECE)****Time: 3 Hours****Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

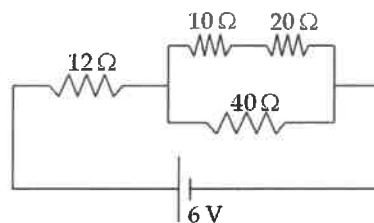
	Course Outcome	B.T Level	Marks
1. Write down the expressions for voltage across the inductor & capacitor.	CO1	L1	2M
2. What are the differences between series & parallel circuits?	CO1	L2	3M
3. State Faraday's laws of electromagnetic induction.	CO2	L1	2M
4. What is coefficient of coupling and write its importance in magnetic circuits.	CO2	L2	3M
5. The equation for an alternating current is given by $i = 77 \sin 314t$. Find the peak value, frequency.	CO3	L2	2M
6. Define RMS value, average values and form factor.	CO3	L1	3M
7. Draw the circuit for series R-L circuit.	CO4	L1	2M
8. What is the condition for series resonance? Write the equation for series resonance.	CO4	L1	3M
9. State Maximum power transfer theorem.	CO5	L1	2M
10. Draw the Thevenin's equivalent circuit.	CO5	L1	3M

Section B (Essay Questions)**Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) State and explain Kirchhoff's laws with an example. CO1 L2 10M

OR

B)



CO1 L3 10M

Using mesh analysis calculate current in 10Ω.

12. A) Two coupled coils with $L_1 = 0.01$ H and $L_2 = 0.04$ H and $k = 0.6$ can be connected in four different ways such as series aiding, series opposing, parallel aiding and parallel opposing. Find equivalent inductance in each case. CO2 L3 10M**OR**

B) Derive the expression for coefficient of coupling between pair of magnetically coupled coils. CO2 L2 10M

13. A) A Resistor of 100Ω in series with a capacitance of $50\mu\text{F}$ is connected to a supply of 200V, 50Hz. Find: (i) impedance (ii) current (iii) phase angle (iv) voltage across the resistor & capacitor. CO3 L3 10M**OR**

B) Derive the expression for average value and RMS value of a sinusoidal wave form. CO3 L2 10M

14. A) An RLC Series circuit consists of $R=1k\ \Omega$, $L=100mH$, $C=10\mu F$. If a voltage of 100V is applied across the combination, determine resonant frequency, quality factor and bandwidth.

CO4 L3 10M

OR

B) Explain the locus diagram of series R-C circuit and when C is variable.

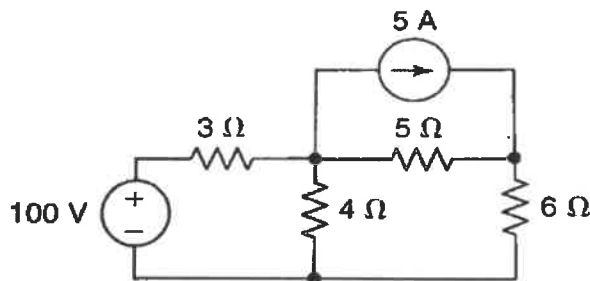
CO4 L2 10M

15. A) State and explain Millman's Theorem with an example.

CO5 L2 10M

OR

B)



CO5 L3 10M

Find the value of current in 4Ω using Superposition theorem.