

ANURAG Engineering College

(An Autonomous Institution)

I B.Tech I Semester Supplementary Examinations, Jan/Feb- 2024

ELECTRICAL CIRCUITS (COMMON TO EEE & ECE)

Time: 3 Hours

Max. Marks: 75

Section – A (Short Answer type questions)

(25 Marks)

Answer All Questions

1. What are the dependent and independent sources?
2. Illustrate Kirchoff's Laws with examples
3. What is Self-inductance and Mutual inductance?
4. Define Co-efficient of coupling with formula
5. Define RMS value, Average value of a periodic sine wave form.
6. Define power factor, real power, and reactive power.
7. What do you mean by Locus Diagram?
8. Explain series resonance and parallel resonance.
9. State Super position theorem
10. State Milliman's theorem

Course Outcome	B.T Level	Marks
CO1	L1	2M
CO1	L2	3M
CO2	L1	2M
CO2	L1	3M
CO3	L1	2M
CO3	L1	3M
CO4	L1	2M
CO4	L2	3M
CO5	L1	2M
CO5	L1	3M

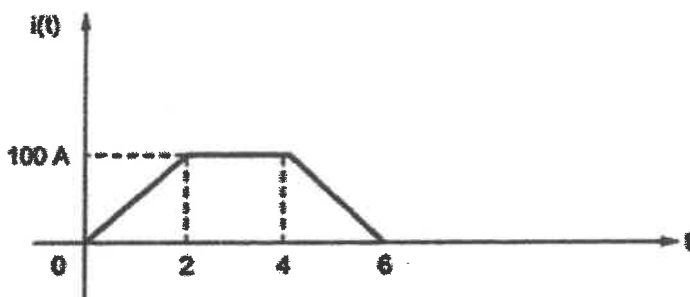
Section B (Essay Questions)

Answer all questions, each question carries equal marks.

(5 X 10M = 50M)

11. A) A current waveform flowing through an inductor of 1mH is shown in the figure. Solve and sketch the waveform of voltage across the inductor.

CO1 L3 10M

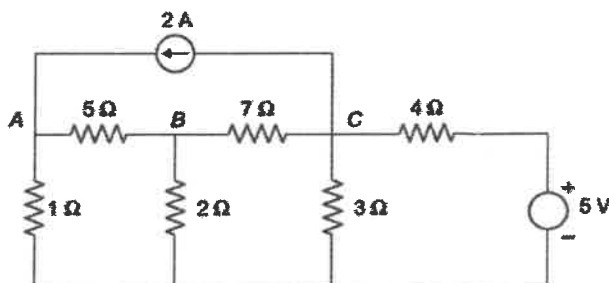


OR

- B) i) Derive the expression for the resistances of a Star to delta transformation network
 ii) Solve the node voltages of the circuit shown.

CO1 L2 5M

CO1 L3 5M

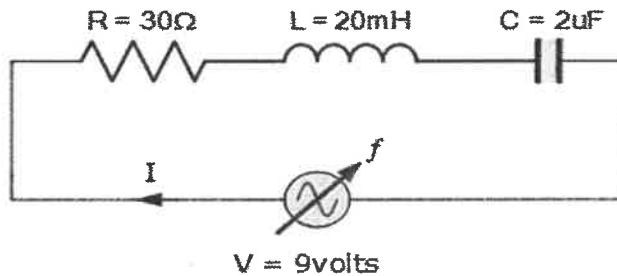


12. A) State and Explain Faraday's law of electromagnetic induction

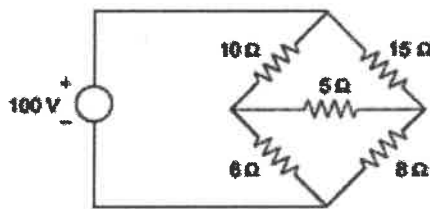
CO2 L2 10M

OR

- B) Two inductors are connected in parallel, their Equivalent inductance when the mutual inductance aids the self-inductance is 6 mH and it is 2 mH when the mutual inductance opposes the self-inductance. If the ratio of self-inductances is 1:3 and the mutual inductance between the coils is 4 mH. Find the self-inductances. CO2 L1 10M
13. A) Explain the steady state analysis of RL series circuit with sinusoidal input CO3 L2 10M
- OR**
- B) In a series circuit consisting of pure resistance and a pure inductance, the current and the voltage are expressed as $i(t)=5\sin(314t + 2\pi/3)$ and $v(t)=15\sin(314t + 5\pi/6)$. Determine the
 i) active power ii) reactive power iii) apparent power
 iv) average power v) instantaneous power in the circuit CO3 L3 10M
14. A) Explain the Locus Diagram of series RL Circuit with varying Resistance 'R'. CO4 L2 10M
- OR**
- B) Solve the resonant frequency, the current at resonance, the voltage across the inductor and capacitor at resonance, the quality factor and the bandwidth of the given circuit. CO4 L3 10M



15. A) Solve the current through the 5Ω resistor as shown in figure using Thevenin's Theorem. CO5 L3 10M



OR

- B) Solve the current passing through the branch AB using Compensation theorem when 3Ω resistance is changed to 9Ω. Also Prove Compensation Theorem. CO5 L3 10M

