Question Paper Code: R15A11EE01

R15

# ANURAG Engineering College

## (An Autonomous Institution)

## I B.Tech I Semester Supplemantary Examinations, June/July– 2024

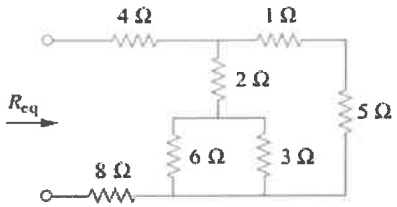
## ELECTRICAL CIRCUITS

## (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. What are the properties of an inductor and capacitor? | CO1 | L1 | 2M |
| 2. Find the Equivalent Resistance $R_{eq}$ from the given circuit | CO1 | L1 | 3M |

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|---|---|---|---|
| 3. What is MMF, Magnetic flux, Reluctance? | CO2 | L1 | 2M |
| 4. What is Composite magnetic circuit? What are the uses of Dot convention? | CO2 | L1 | 3M |
| 5. Define form factor of a periodic sine wave form. | CO3 | L1 | 2M |
| 6. Define reactance, impedance, susceptance and admittance | CO3 | L1 | 3M |
| 7. Draw the Locus diagram of series RC circuit with varying resistance R | CO4 | L1 | 2M |
| 8. Explain concept of bandwidth and quality factor | CO4 | L1 | 3M |
| 9. State Norton's theorem | CO5 | L1 | 2M |
| 10. State Maximum power transfer theorem | CO5 | L1 | 3M |

### Section B (Essay Questions)

**Answer all questions, each question carries equal marks.** **(5 x 10M = 50M)**

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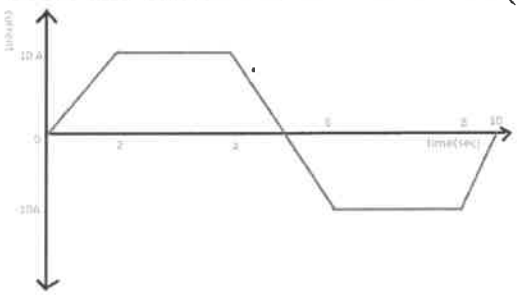
|---|---|---|---|
| 11. A) A Pure Inductance Of 3mh Carries A Current Of The Waveform Shown in Fig. Solve and Sketch The Waveform Of V(t) | CO1 | L3 | 10M |



**OR**

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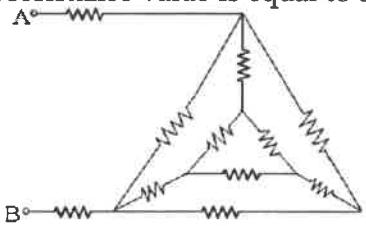
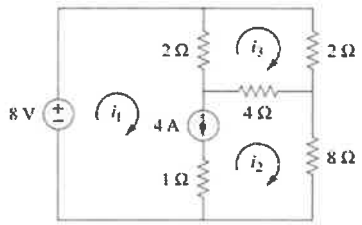
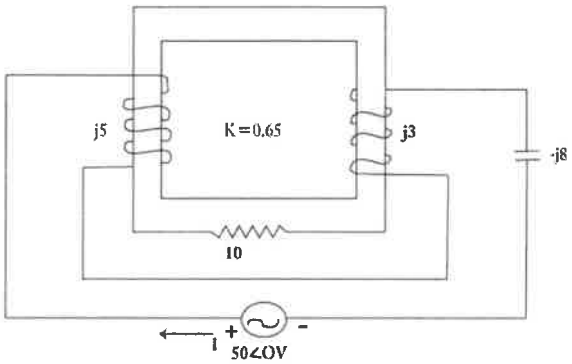
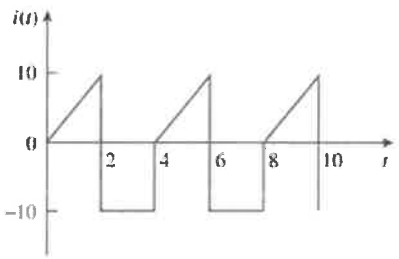
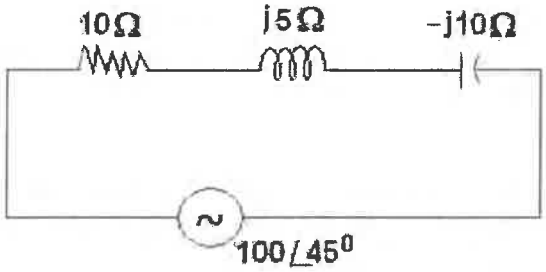
|---|---|---|---|---|
| B) | i) Find the equivalent resistance across AB for the circuit shown in below Figure. Each resistance value is equal to 3Ω   | CO1 | L2 | 5M |
| | ii) Solve current $i_1$, $i_2$ and $i_3$ from the given circuit using mesh analysis   | CO1 | L3 | 5M |
| 12. A) | Explain the concept of self and mutual inductance. Relate coefficient of coupling and self, mutual inductance. | CO2 | L2 | 10M |
| | **OR** | | | |
| B) | What is a series magnetic circuit? Sketch the dotted equivalent circuit for the coupled coils shown in figure and find the current I?   | CO2 | L1 | 10M |
| 13. A) | Explain the steady state analysis of RC parallel circuit with sinusoidal input | CO3 | L2 | 10M |
| | **OR** | | | |
| B) | i) Solve the average and rms value for the given waveform   | CO3 | L3 | [5+5]M |
| | ii) The circuit, having two impedances of $Z_1 = (8+ j15)\ \Omega$ and $Z_2 = (6 - j8)\ \Omega$ in parallel, is connected to a single-phase ac supply and the current drawn is 10 A. Solve each branch current, both in magnitude and phase, and also the supply voltage. | | | |

| | | | | |
|---|---|---|---|---|
| 14. A) | Explain the Locus Diagram of parallel RC Circuit with varying Resistance 'R'. | CO4 | L2 | 10M |
| | **OR** | | | |
| B) | The circuit shown in the figure. Solve (i) resonant frequency (ii) current at resonance (iii) voltage across L and C at resonance (iv) Q factor. | CO4 | L3 | 10M |

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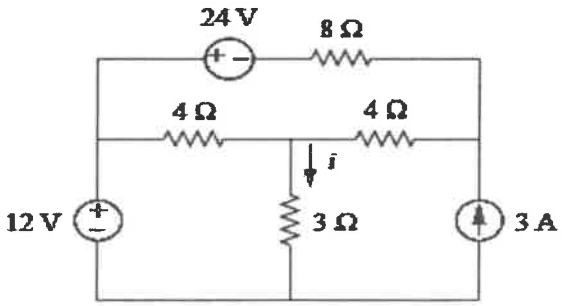
|---|---|---|---|---|
| 15. A) | For the circuit given below Figure, use superposition theorem to Solve current I flowing through 3Ω resistor. | CO5 | L3 | 10M |




| | | | | |
|---|---|---|---|---|
| | **OR** | | | |
| B) | State and Explain Milliman's Theorem. Find the current flowing (6+j8) Ω impedance using Milliman's Theorem | CO5 | L2 | 10M |