**20EE205**

Hall Ticket Number:

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| **I/IV B.Tech (Regular\Supplementary) DEGREE EXAMINATION** | | | |
| **September, 2022** | **Electrical and Electronics Engineering** | | |
| **Second Semester** | **Circuit Theory** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Questions No.1 compulsorily* | | | (1X14 = 14 Marks) |
| *Answer* ***One*** *question from each unit* | | | (4X14=56 Marks) |

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| 1. | Answer all questions | | | (1X14=14 Marks) | |
|  | a) | | Define Current. | | CO1, L1 |
|  | b) | | Draw the V-I characteristics of practical voltage source. | | CO1, L1 |
|  | c) | | Draw the phasor diagram of a pure Capacitor. | | CO2, L1 |
|  | d) | | Define Active Power. | | CO2, L1 |
|  | e) | | Draw power triangle | | CO2, L1 |
|  | f) | | Define Mesh. | | CO3, L1 |
|  | g) | | Write the statement of Reciprocity theorem. | | CO3, L1 |
|  | h) | | Write statement of Thevenin’s theorem. | | CO4, L1 |
|  | i) | | Draw the Norton’s equivalent circuit. | | CO4, L1 |
|  | j) | | What is meant by short circuit? | | CO4, L1 |
|  | k) | | What is the condition for parallel resonance? | | CO5, L1 |
|  | l) | | Draw the impedance versus frequency curve in a series resonant circuit. | | CO5, L1 |
|  | m) | | Define quality factor. | | CO5, L1 |
|  | n) | | Draw the current locus diagram in a series RL circuit with Fixed L and variable R? | | CO1, L1 |
| **UNIT-I** | | | | | |
| 2. | a) | State and Explain KCL and KVL with an Example. | | | CO1, 7M |
|  | b) | Find the power loss in 1Ω resistor shown in figure using Star-Delta transformation. | | | CO1, 7M |
| (OR) | | | | | |
| 3. | a) | Derive an expression for energy stored in inductor. | | | CO2, 7M |
|  | b) | A series RL circuit has R = 25Ω and XL = 32Ω and the combination is connected across a 200V, 50Hz supply. Find the Impedance, current and power factor also draw the vector diagram. | | | CO1,7M |
| **UNIT-II** | | | | | |
| 4. | a) | Write the mesh equation for the circuit shown below and determine the currents I1, I2 and I3. | | | CO3, 7M |
|  | b) | Compute the power absorbed by the2 Ω resistor in the circuit shown below by using Nodal Analysis. | | | CO3, 7M |
| (OR) | | | | | |
| 5. | a) | Determine the drop across 2Ω resistor in the network shown in figure using mesh analysis. | | | CO3, 7M |
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|  | b) | Derive an expression for current through a series RL circuit excited with impulse input. | | | CO3, 7M |
| **UNIT-III** | | | | | |
| 6. | a) | State and derive the condition for maximum power transfer theorem. | | | CO4, 7M |
|  | b) | Find the current through 3 Ω resistor using superposition theorem. | | | CO4,7M |
| (OR) | | | | | |
| 7. | a) | Determine the current through the 24 ohm resistor in Fig. by Thevenin,s theorem. | | | CO4,7M |
|  | b) | Find Norton’s equivalent network across terminals A and B in Fig. | | | CO4, 7M |
| **UNIT-IV** | | | | | |
| 8. | a) | Show that the resonant frequency ωo of an RLC series circuit is the geometric mean of ω1 and ω2, the lower and upper half-power frequencies respectively. | | | CO5, 7M |
|  | b) | For a given series RLC circuit with R=5Ω, L=0.5H and C=50µF, Calculate the resonance frequency, Quality Factor and Band width. | | | CO5, 7M |
| (OR) | | | | | |
| 9. | a) | Derive resonant frequency of a parallel AC circuit. | | | CO5, 7M |
|  | b) | Describe the procedure to draw the current locus diagram of series RC circuit with R as variable. | | | CO2, 7M |

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