**20EE205**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular\Supplementary) DEGREE EXAMINATION** | | | |
| **September, 2022** | **Electrical & Electronics Engineering** | | |
| **Second Semester** | **Circuit Theory** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

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|  |  |  | CO | BL | M |
| 1 | a) | Define Current. | CO1 | L1 | 1M |
|  | b) | Draw the V-I characteristics of practical voltage source. | CO1 | L1 | 1M |
|  | c) | Draw the phasor diagram of a pure Capacitor. | CO1 | L1 | 1M |
|  | d) | Define Active Power. | CO2 | L1 | 1M |
|  | e) | Draw power triangle | CO2 | L1 | 1M |
|  | f) | Define Mesh. | CO2 | L1 | 1M |
|  | g) | Write the statement of Reciprocity theorem. | CO3 | L1 | 1M |
|  | h) | Write statement of Thevenin’s theorem. | CO3 | L1 | 1M |
|  | i) | Draw the Norton’s equivalent circuit. | CO3 | L1 | 1M |
|  | j) | What is meant by short circuit? | CO4 | L1 | 1M |
|  | k) | What is the condition for parallel resonance? | CO4 | L1 | 1M |
|  | l) | Draw the impedance versus frequency curve in a series resonant circuit. | CO4 | L1 | 1M |
|  | m) | Define quality factor. | CO2 | L1 | 1M |
|  | n) | Draw the current locus diagram in a series RL circuit with Fixed L and variable R? | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | State and Explain KCL and KVL with an Example. | CO1 | L2 | 7M |
|  | b) | Find the power loss in 1Ω resistor shown in figure using Star-Delta transformation. | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Derive an expression for energy stored in inductor. | CO1 | L3 | 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 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Write the mesh equation for the circuit shown below and determine the currents I1, I2 and I3. | CO2 | L3 | 7M |
|  | b) | Compute the power absorbed by the2 Ω resistor in the circuit shown below by using Nodal Analysis. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Determine the drop across 2Ω resistor in the network shown in figure using mesh analysis. | CO2 | L2 | 7M |
|  | b) | Derive an expression for current through a series RL circuit excited with impulse input. | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | State and derive the condition for maximum power transfer theorem. | CO3 | L2 | 7M |
|  | b) | Find the current through 3 Ω resistor using superposition theorem. | CO3 | L3 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Determine the current through the 24 ohm resistor in Fig. by Thevenin,s theorem. | CO3 | L2 | 7M |
|  | b) | Find Norton’s equivalent network across terminals A and B in Fig. | CO3 | L2 | 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. | CO4 | L2 | 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. | CO4 | L3 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Derive resonant frequency of a parallel AC circuit. | CO4 | L2 | 7M |
|  | b) | Describe the procedure to draw the current locus diagram of series RC circuit with R as variable. | CO4 | L3 | 7M |



**\*\*\* Remove the border lines after typing the QP**