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| **20EC205**  **Hall Ticket Number:**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |      |  |  |  | | --- | --- | --- | | **I/IV B.Tech( Regular/Supplementary) DEGREE EXAMINATION** | | | | **September,2022** | **Electronics and Communication Engineering** | | | **Second Semester** | **Circuit Theory** | | | **Time: Three Hours** | | **Maximum:70 Marks** | | | | | | | |  |
| |  |  | | --- | --- | | ***Answer question 1 compulsory.*** | **(14X1 = 14 Marks)** | | ***Answer one question from each unit.*** | **(4X14=56 Marks)** | | | | | | | |  |
| 1. | a) | State Kirchhoff’s current law. | CO1 |  |
|  | b) | Define the terms loop and branch | CO1 |  |
|  | c) | Define the following terms: i)Current ii) Voltage | CO1 |  |
|  | d) | A resistance of 10 ohms is connected to a voltage source of 25V DC supply. Calculate the current flowing through resistor. | CO1 |  |
|  | e) | **Which law is used in mesh analysis?** | CO2 |  |
|  | f) | Mention any two properties of super node. | CO2 |  |
|  | g) | Give the steps to apply Thevenin’s Theorem. | CO3 |  |
|  | h) | State the maximum power transfer theorem. | CO3 |  |
|  | i) | Find the equivalent star for the network shown in figure | CO3 |  |
|  | j) | State the Superposition theorem. |  |  |
|  | k) | Define super mesh. | CO2 |  |
|  | l) | What is meant by natural response? | CO4 |  |
|  | m) | Give an expression for current in R-C circuit. | CO4 |  |
|  | n) | What is time constant? What are the time constants of series R-L and R-C circuit? | CO4 |  |
| **Unit –I** | | | | |
| 2. | a) | A circuit consists of three resistances of 12Ω, 18Ω and 36Ω respectively joined in parallel is connected in series with a fourth resistance. The whole circuit is supplied at 60V and it is found that power dissipated in 12Ω resistance is 36 watts. Determine the value of fourth resistance and the total power dissipated in the group. | CO1 | 7M |
|  | b) | calculate the individual branch currents and total current using the current division rule | CO1 | 7M |
| **(OR)** | | | | |
| 3. | a) | State and explain Kirchhoff’s voltage and current law with an example. | CO1 | 7M |
|  | b) | In the circuit shown Vo=10V; R1=R3=R5=2Ω and R2=R4=R6=1Ω. Find the current delivered by the source and individual curents. | CO1 | 7M |
| **Unit –II** | | | | |
| 4. | a) | Using mesh analysis, determine the current across each resistor and potential difference. | CO2 | 7M |
|  | b) | Compare mesh and nodal analysis | CO2 | 7M |
| **P.T.O**    **20EC205**  **(OR)** | | | | |
| 5. | a) | Find the loop currents using super mesh analysis.. | CO2 | 7M |
|  | b) | Using Nodal method find the current through the resistors in the circuit configuration of figure. | CO2 | 7M |
| **Unit –III** | | | | |
| 6. | a) | State and prove the maximum power transfer theorem. | CO3 | 7M |
|  | b) | Find the resistance across terminal AB for the circuit shown in Figure. | CO3 | 7M |
| **(OR)** | | | | |
| 7. | a) | Simplify the circuit shown in figure using the Norton’s theorem and determine the current through 4 Ω resistor. | CO3 | 7M |
|  | b) | Apply the superposition theorem to the circuit shown in figure to find the current flowing through 6 Ω resistor. | CO3 | 7M |
| **Unit –IV** | | | | |
| 8. | a) | A series R-L circuit has R=20 ohms and L=8 H. The circuit is connected across a DC voltage source of 120 V at t=0. Calculate the time at which the voltage drops across R and L are the same. | CO4 | 7M |
|  | b) | Find the capacitor voltage for t < 0 and t > 0 for the circuit shown in fig. | CO4 | 7M |
| **(OR)** | | | | |
| 9. | a) | For the given Series RC Circuit, determine the current in the circuit when the voltage is applied by closing the switch at t=0. | CO4 | 7M |
|  | b) | Derive an expression for the DC response of a series Resistor–Inductor circuit. | CO4 | 7M |

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