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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12EC202** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **ELECTRIC CIRCUIT ANALYSIS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Find the equivalent current source for a voltage source of 200V with series resistance of 2Ω. | (1) |
| 2. | The total power supplied by the source in any series resistive circuit is equal to the ------ | (1) |
| 3. | Two wattmeter method of power measurement can be used to measure power in-------------circuits. | (1) |
| 4. | Obtain the frequency of the signal defined by v(t) = 50sin(20t). | (1) |
| 5. | Coefficient of coupling of an ideal transformer is \_\_\_\_\_\_\_. | (1) |
| 6. | Dot convention in coupled circuits is used to determine -------------. | (1) |
| 7. | Superposition theorem can be applied only for linear circuits. (True/False). | (1) |
| 8. | Mention the condition for maximum power to be transferred to the load according to maximum power transfer theorem. | (1) |
| 9. | The time constant of a series RL circuit is------------------ | (1) |
| 10. | What is meant by transient time? | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11 | Three resistors 13 Ω, 12 Ω and 14 Ω are connected in delta network. What are the equivalent star resistors? | (3) |
| 12 | Show that the resonance frequency is the geometric mean of two half power frequencies. | (3) |
| 13 | Two inductively coupled coils have self inductances L1=20 mH, L2=250 mH. If the coefficient of coupling is 0.5.   1. Find the value of mutual inductance between coils. 2. What is the maximum possible mutual inductance? | (3) |
| 14 | In the Circuit shown, determine the value of load resistance when the load resistance draws maximum power. Also find the value of maximum power. | (3) |
| 15 | Derive the DC response of series RL circuit. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | Determine the current delivered by the source in the circuit shown in below | (15) |
| (OR) | | | |
| 17. | a. | State Kirchoff’s laws. | (3) |
| b. | Derive the equivalent resistances RAB,RBC &RCA of Star-Delta Electric Network | (12) |
| 18. |  | A series RLC circuit consists of a 50 Ω resistance, 0.2 H inductance and 10 μF capacitor with an applied voltage of 20 V. Determine the resonant frequency. Find the Q factor of the circuit. Compute the lower and upper frequency limits and also find the bandwidth of the circuit | (15) |
| (OR) | | | |
| 19. | a. | How to measure the total power in three phase circuits using two wattmeter methods? | (8) |
| b. | A series circuit of two pure elements has the following applied voltage and current  V=15 cos (200t-30o) v  ` I=8.5 cos (200t+15o) A  Find the elements comprising the circuit. | (7) |
| 20. |  | In the coupled circuit shown in Figure find the voltage across 5Ω resistor. | (15) |
| (OR) | | | |
| 21. |  | Determine the current through the 5 Ω resistor using super node analysis for the circuit  shown in the figure. The units of all the resistors are in ohm | (15) |
| 22. |  | Apply Thevenin theorem to determine the current through 5Ω resistor in the circuit  shown | (15) |
| (OR) | | | |
| 23. |  | Verify the reciprocity theorem for the circuit shown in the figure. The units of all resistors are in ohm. | (15) |
| 24. |  | Derive the DC response of an R-L-C Circuit with appropriate diagrams. | (15) |
| (OR) | | | |
| 25. |  | A series RC circuit consists of resistor of 10 ohm and capacitor of 0.1 farad. A constant voltage of 20 V is applied to the circuit at t = 0. Obtain the current equation and determine the voltage across the resistor and the capacitor | (15) |

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