**Code No.ES203EE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E(ECE) II-Semester (AICTE) Examination, SEPTEMBER-2023**

**Subject: ELEMENTS OF ELECTRICAL ENGINEERING**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.(10X2M=20M)**

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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| 1. a | Define ideal voltage source and practical voltage source. | 2 | 1 | 1 |
| b | State ohm’s law | 2 | 1 | 2 |
| c | What are steps involved to find Thevenin’s equivalent voltage? | 2 | 2 | 2 |
| d | State and explain Millman’s theorem. | 2 | 2 | 2 |
| e | Define selectivity and bandwidth of a series resonant circuit. | 2 | 3 | 1 |
| f | A series RLC circuit has the following parameter values R = 10 C = 10 µF. Find the Q factor of the circuit at resonance. | 2 | 3 | 3 |
| g | List out the essential parts of DC machine. | 2 | 4 | 2 |
| h | Define back emf. | 2 | 4 | 1 |
| i  j | Define the voltage regulation of transformer.  Explain various losses of induction motor. | 2  2 | 5  5 | 1  2 |

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**PART-B**

**Answer Any Five questions. (5X8M=40M)**

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| 2. | a | Describe different types of active elements and passive elements in the circuit analysis. | 4 | 1 | 2 |
| b | By using the mesh analysis determine the loop currents in the following circuit. | 4 | 1 | 3 |
| 3. | a | Explain about dependent and independent sources with examples. | 4 | 1 | 2 |
| b | Explain Kirchoff's laws in detail | 4 | 1 | 2 |
| 4. | a | Find Current in 15 Ohm resistor using Thevenins theorm. | 4 | 2 | 3 |
| b | State and explain Norton’s Theorem. | 4 | 2 | 2 |
| 5. | a | Draw and explain various parts those occur in DC machines with neat diagram | 8 | 2 | 2 |
| 6. | a | A series R–L–C circuit has a supply input of 5 volts. Given that inductance, L = 5 mH, resistance, R = 75 ohms and capacitance, C = 0.2 F, determine (i) the resonant frequency, (ii) the value of voltage across the capacitor at the resonant frequency. | 4 | 3 | 3 |
| b | At resonance, the current is maximum in a series circuit and minimum in a parallel circuit. Why? | 4 | 3 | 2 |
| 7. | a | Derive the emf equation of DC generator. | 4 | 4 | 2 |
| b | Explain a) STAR-STAR b) STAR-DELTA connections in three phase transformers | 4 | 4 | 3 |

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| 8. | a | Explain working principle of DC motor with neat diagrams. | 4 | 4 | 2 |
| b | Compare squirrel cage and slip ring induction motors with neat diagrams. | 4 | 5 | 2 |
| 9. | a | Explain about production of RMF in a 3-Phase induction motor | 4 | 5 | 3 |
| b | Explain the construction and working principle of single-phase transformer with neat diagram. | 4 | 5 | 2 |

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