**Code No.ES203EE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E(ECE) II-Semester (Supplementary) Examination, FEB-2024**

**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 current source and practical current source. | 2 | 1 | 1 |
| b | State Kirchhoff’s voltage law. | 2 | 1 | 1 |
| c | What are the steps involved to find Norton’s equivalent current? | 2 | 2 | 2 |
| d | State and explain Maximum power transfer theorem. | 2 | 2 | 2 |
| e | A series RLC circuit has a resonant frequency of 12 kHz. If R=5 ohms and XL=300  ohms at resonance, what is the bandwidth. | 2 | 3 | 3 |
| f | What is the significance of quality factor in series resonant circuit? | 2 | 3 | 1 |
| g | Draw the open circuit characteristics of separately excited dc generator. | 2 | 4 | 2 |
| h | Draw no load phasor diagram of single-phase transformer. | 2 | 4 | 2 |
| i  j | A 100 kVA transformer operating at full load at 0.8 p.f lagging. Its efficiency is 96%. Calculate total losses of transformer.  List various applications of three phase slip ring induction motor | 2  2 | 5  5 | 3  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 | Draw and explain Various 3- Phase transformer connections with neat table which shows the relation between primary and secondry quantities. | 8 | 1 | 2 |
|  |  |  |  |  |
| 3. | a | By using the mesh analysis determine the loop currents in the following circuit. | 4 | 1 | 3 |
| b | Explain about dependent and independent sources with examples. | 4 | 1 | 2 |
| 4. | a | Compute the current in the 23- ohm resistor by applying Super position theorem. | 4 | 2 | 3 |
| b | State and explain millman’s Theorem | 4 | 2 | 2 |
| 5. | a | Find the Thevenin’s equivalent for the circuit shown below: | 4 | 2 | 3 |
| b | State and explain maximum power transfer theorem. | 4 | 2 | 2 |
| 6. | a | An inductive coil of resistance 10 ohms and inductance 0.1 H is connected in parallel with a 150 μF capacitor to a variable frequency, 200 V supply. Find the resonant frequency at which the total current taken from the supply is in phase with thesupply voltage. Also find the value of this current. | 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 | Explain the internal characteristics of various types of DC generators. | 4 | 4 | 2 |
| b | A 4 pole DC shunt generator with lap connected armature having field and armature resistances of 50Ω and 0.1Ω respectively supplies sixty 100V, 40W lamps. Calculate total armature current, current per armature path and generated emf. Allow a contact drop of 2 volts. | 4 | 4 | 3 |
| 8. | a | Explain the working principle of DC motor with neat diagrams. | 4 | 4 | 2 |
| b | In a 25 kVA, 2000/200V transformer, the iron and copper losses are 350W and 400W respectively. Calculate the efficiency on unity power factor at (a) full load . | 4 | 5 | 3 |
| 9. | a | Compare auto transformer with two winding transformers. | 4 | 5 | 2 |
| b | Explain the working principle of three phase induction motor with neat diagrams | 4 | 5 | 2 |

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