DEPARTMENT OF

**ELECTRICAL AND ELECTRONICS ENGINEERING**

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| Date | 21 Mar 2023 | Maximum Marks | 10 +50 |
| Course Code | 22ES14D | Duration | 110 Mins |
| Sem | I Semester | IMPROVEMENT CIE | |
| Basics of Electrical Engineering | | | |

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| **Q.No** | Part A – Quiz Questions | **Marks** | **COs** | **BT** |
|  | The core of a transformer is assembled with laminated sheets so as to reduce \_\_\_\_\_\_\_\_\_\_. | 1 | 3 | 1 |
|  | The copper loss of certain transformer at half full-load is measured as 200 W. Then the iron loss and copper loss at full load will be \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ respectively. | 2 | 3 | 2 |
|  | What is the voltage regulation of a transformer? | 1 | 2 | 1 |
|  | The speed of a 50 Hz, three-phase induction motor under full-load condition is 720 rpm. The number of pole in the motor is \_\_\_\_\_\_\_\_\_\_. | 2 | 2 | 1 |
|  | What is 'slip' in an induction motor? | 1 | 2 | 1 |
|  | Draw the torque slip curve for a three-phase induction motor. | 1 | 4 | 2 |
|  | A supply of 50 Hz is given to a 3 phase induction motor having 4 poles. If the induction motor runs at 1440 rpm, the slip is \_\_\_\_\_\_\_\_\_\_. | 2 | 4 | 2 |

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| **Q.No** | Part B – Test Questions | **Marks** | **COs** | **BT** |
| 1a. | Derive the condition for maximum efficiency of a transformer. | 4 | 3 | 3 |
| 1b. | A 10 kVA, 400/200 V, 50 Hz, single phase transformer has a full load copper loss of 200 W and has a full-load efficiency of 96% at 0.8 p.f. lagging. Determine the iron loss. What would be the efficiency at half of the full load and unity p.f.? | 6 | 3 | 3 |
|  | | | | |
| 2a. | Explain the different losses present in the transformer. | 4 | 2 | 3 |
| 2b. | A 10 kVA, 400/200 V, single phase transformer has a maximum efficiency of 98 % at 90 % of the full load at 0.8 p.f. Find its efficiency at full load and 0.6 p.f. | 6 | 3 | 3 |
|  | | | | |
| 3a. | Justify the Following:(i) DC supply should not be given to the transformers. (ii) The rotor slots in a three-phase induction motor are purposely given a slight skew. | 5 | 4 | 3 |
| 3b. | A 600 kVA transformer has an efficiency of 92 % at full-load, unity p.f. and half full load, 0.9 p.f. Determine its efficiency at 75 % of full load and 0.9 p.f? | 5 | 3 | 3 |
|  | | | | |
| 4a. | Explain the principle of operation of a three phase induction motors? | 5 | 3 | 3 |
| 4b. | A 4 pole, 50 Hz induction motor has a slip of 1% at no load. When operated at full load, the slip is 2.5%. Find the change in speed from no load to full load. | 5 | 4 | 3 |
|  | | | | |
| 5a. | Elaborate the phenomenon of production of rotating field by a three-phase supply. | 5 | 2 | 3 |
| 5b. | A 3-phase, 12-pole alternator is driven by an engine running at 500 rpm. The alternator supplies an induction motor which has a full-load speed of 1455 rpm. Find the slip and the number of poles of the motor. | 5 | 4 | 3 |

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

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| Marks Distribution | Particulars | | CO1 | CO2 | CO3 | CO4 | L1 | L2 | L3 | L4 | L5 | L6 |
| Test | Max Marks | - | 13 | 29 | 18 | 5 | 5 | 50 | - | - | - |

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