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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 04- 01- 2025 **Time:** 1:00 pm – 04:00 pm |

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| **School:** SOE | **Program:** B.Tech - EEE | |
| **Course Code :** EEE2024 | **Course Name :** Electrical Machines-1 | |
| **Semester**: III | **Max Marks**:100 | **Weightage**:50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **19** | **19** | **31** | **31** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. 10 x 2 Marks=20 Marks** | | | | |
| **1** | Comment on How iron losses varies with the reversal magnetic field in a generator? | **2 Marks** | **L1** | **CO1** |
| **2** | Compare the Carbon & Copper brushes, Suggest the reliable one? | **2 Marks** | **L1** | **CO1** |
| **3** | Draw the characteristics of DC series motor and list out the industrial applications ? | **2 Marks** | **L1** | **CO2** |
| **4** | Write the relevant equations to control the speed of dc compound motor? | **2 Marks** | **L1** | **CO2** |
| **5** | Mention the various losses in a transformer and write the condition for maximum efficiency. | **2 Marks** | **L1** | **CO3** |
| **6** | What are parameters that can be computed from S.C. Test of a Transformer? | **2 Marks** | **L1** | **CO3** |
| **7** | Mention the list of cooling methods employed for transformer and write the role of Buchholz relay relay in Transformer? | **2 Marks** | **L1** | **CO3** |
| **8** | What is the purpose of Scott connection and applications of Scott connection? | **2 Marks** | **L1** | **CO4** |
| **9** | Define transformation ratio(K) of a transformer and compute the value of K for Teaser and Main Transformer in Scott Connection, if the Primary voltage is 1100V and Secondary is 220V. | **2 Marks** | **L1** | **CO4** |
| **10** | Write down the Line to Line and Phase Voltage relationships in case of DELTA to STAR connections? | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions. Total Marks 80** | | | | | |
| **11.** | **a.** | Describe the method of calculating the regulation and efficiency of a single phase transformer by OC and SC tests with relevant circuit diagrams? | **25 Marks** | **L2** | **CO3** |
| **or** | | | | | |
| **12.** | **a.** | A single phase transformer 200V/400V, 50 Hz from the following test data.  O.C.test: 1100V, 0.5A, 55W – on primary Side, secondary being open circuited  S.C. test: 10V, 80A, 400 W – on LV side, high voltage side being short circuited.  i) Compute the voltage regulation and efficiency for the above transformer when supplying 100A at 0.8 p.f. lagging.  ii) Compute the maximum efficiency transformer. | **25 Marks** | **L2** | **CO3** |
|  |  |  |  |  |  |
| **13.** | **a.** | Two single phase electric furnaces A and B are supplied at 230V from a three phase 1100V supply by means of a Scott connected transformer combination. If the the output of main transformer is 300kW at 0.6 power factor lagging and teaser transformer is 400kW at UPF.   1. Compute the currents in the winding and transformation ratio of each transformer. 2. Comment on phase angle between teaser and main transformer secondary voltages | **25 Marks** | **L3** | **CO4** |
| **or** | | | | | |
| **14.** | **a.** | A three phase step down transformer takes 15A when connected to 4400V mains. The turns ratio per phase is 10. Neglecting losses find the secondary line voltage , line current and the output of the transformer if the windings are connected in (i) star/delta (ii) delta/star. | **25 Marks** | **L2** | **CO4** |

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| **15.** | **a.** | Draw the circuit diagram of different types of generators and Explain the Internal and External Characteristics with relevant graphs. | **15**  **Marks** | **L2** | **CO1** |
| **Or** | | | | | |
| **16.** | **a.** | A 6-pole DC Generator has 150 slots. Each slot has 8 conductors and each conductor has resistance of 0.01Ω. The armature terminal current is 15 A. Compute the current per conductor and the drop in  armature for Lap and Wave winding connection. | **15 Marks** | **L2** | **CO1** |

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| **17.** | **a.** | With neat diagram explain the principle, construction and working of DC Motor and its characteristics. | **15**  **Marks** | **L2** | **CO2** |
| **Or** | | | | | |
| **18.** | **a.** | A DC Series Motor runs at 500 rpm on 220 V supply drawing a current of 50A. The total resistance of the machine is 0.15Ω, Computing the value of the extra resistance to be connected in series with the motor circuit that will reduce the speed to 300 rpm. The load torque being then half of the previous to the current. | **15**  **Marks** | **L2** | **CO2** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***