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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM

END TERM EXAMINATION - AUG 2024

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| **Semester : III** | **Date : 07-08-2024** |
| **Course Code : EEE 2016** | **Time : 1.00 PM to 4.00 PM** |
| **Course Name : Electrical Machines I** | **Max Marks :100** |
| **Program : B Tech** | **Weightage : 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | 1. Define Fleming’s Left - Hand Rule and Right -Hand Rule . Specify the machine that uses this rule. | (CO 2) | [Knowledge] |
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| 2 | In Electrical Machine lab, it is observed that the self-excited D C Generator fails to generate the voltage across the terminals. Identify the reasons for this failure | (CO 1) | [Knowledge] |
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| 3 | State the functions of Commutator and brushes in a DC Generator | (CO 1) | [Knowledge] |
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| 4 | Draw the approximate equivalent circuit of a transformer referred to the primary side. Mention the units of each parameter. | (CO 3) | [Knowledge] |
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| 5 | Draw the Star-Star configuration of 3 phase transformers. What is transformation ratio in this type of transformer connection. | (CO 4) | [Knowledge] |
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| 6 | List the conditions to be satisfied for parallel operation of transformers | (CO 3) | [Knowledge] |

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| **PART B** | | | |  |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |  |
| 7 | When current flows in armature conductors of DC Machines, there exists combined action of main flux and armature flux. Mention the effects due to this action. Explain in brief the cause of this effects and list the methods to limit these. | (CO 1) | [Comprehension ] |  |
| 8 | A DC shunt Motor is considered as a constant speed Motor. Explain with necessary characteristics and equations. | (CO 2) | [Comprehension ] |  |
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| 9 | Draw the Constructional details of a D.C. Machine and mention one function of each part | (CO 1) | [Comprehension |  |
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| 10 | With suitable tests explain how to predetermine different losses in a Single-phase Transformer. What all the other parameters that can be found from these tests. Draw relevant diagrams. | (CO 3) | [Comprehension |  |
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| 11 | 1. Classify D C Motors with suitable diagrams. Write the related equations for any 2 types of Motors. | (CO 2) | [Comprehension |  |
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| 12 | Mention the method that connect two 1-phase transformers to perform the 3- phase to 2-phase conversion. Draw the necessary diagrams and briefly explain. | (CO 4) | [Comprehension |  |
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| 13 | There are four principal applications of transformers, list those and briefly explain any 2 types with proper diagrams | (CO 4) | [Comprehension |  |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | 1. An 8-pole D.C. Generator has 500 armature conductors, and a useful flux of 0.03Wb per pole. Calculate the e.m.f. generated if it is lap-connected when runs at 1200 rpm? At what speed it is to be driven to produce the same e.m.f. if it is wave-wound? | (CO 1) | [Application] |
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| 15 | 1. A 220 V DC motor takes 6-amp line current on no load and runs at 1000 rpm. The resistance of the field winding and the armature are 220 ohm and 0.5 ohm respectively. If the full load line current is 26 amp, calculate the full load speed. Assume constant flux. Calculate all the details that can be found out with the given data. | (CO 2) | [Application] |
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| 16 | Consider a 22 KVA, single phase transformer. The copper loses is 300 W and the Wattmeter reads 225 W while doing OC test. Calculate the efficiency of the transformer at half load with UPF. | (CO 3) | [Application] |
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