Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec– 2018**

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| **Code :** | **09EI220/ 12EI202** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ELECTRICAL MACHINES** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | The purpose of a armature is \_\_\_\_\_\_\_\_\_\_. | 1 |
| 2. | Draw the speed torque characteristics of DC shunt motor. | 1 |
| 3. | The advantage of sandwich type of winding in a step-up transformer is \_\_\_\_\_\_\_\_\_\_\_. | 1 |
| 4. | The transformer open circuit test should be conducted on \_\_\_\_\_\_\_\_\_\_ (low / high) voltage side. | 1 |
| 5. | Slip ring induction motors have \_\_\_\_\_\_\_\_\_\_\_\_\_ (higher/ lower) starting torque than squirrel cage induction motors. | 1 |
| 6. | At which excitation condition the synchronous motor operates as synchronous condenser? | 1 |
| 7. | Single phase induction motors are \_\_\_\_\_\_\_\_\_\_ self starting motors. | 1 |
| 8. | \_\_\_\_\_\_\_\_\_\_\_\_ (Linear Induction / Universal) motor can operate in both AC and DC supply. | 1 |
| 9. | List the method of heating can be used for a non conducting material. | 1 |
| 10. | Give two properties of an ideal traction system. | 1 |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Justify: Iron / core losses are constant and will not vary with load change. | 3 |
| 12. | List the applications of transformer equivalent circuits. | 3 |
| 13. | Why is the 3 phase induction motors widely used in many applications? | 3 |
| 14. | Write any three applications of stepper motors. | 3 |
| 15. | Mention the important characteristics of welding generators. | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | Draw the electrical characteristics of a compound generator and explain the compound generator operation in terms of windings connected (short and long) and resultant flux (differential and cumulative). | 15 |
| (OR) | | | |
| 17. |  | What is the necessity of starters in motors? Draw the 3 point starter circuit and explain the operation of two protection coils in it. | 15 |
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| 18. | a. | Derive the EMF equation of the transformer. | 5 |
| b. | Explain the power electronics based armature voltage control in DC motors. | 10 |
| (OR) | | | |
| 19. |  | A 25-kVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000-V, 50-Hz supply. Find the full-load primary and secondary currents, the secondary e.m.f. and the maximum flux in the core. Neglect leakage drops and no-load primary current. | 15 |
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| 20. |  | The O.C and S.C test data are given below for a single phase, 5 kVA, 200V/400V, 50Hz transformer. O.C test from LV side: 200V, 1.25A, 150 W. S.C test from HV side: 20V, 12.5A, 175W. Draw the equivalent circuit of the transformer:  a. referred to LV side b. referred to HV side inserting all the parameter values. | 15 |
| (OR) | | | |
| 21. |  | Explain the different regions of operations in torque slip characteristics of a 3 phase induction motor. | 15 |
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| 22. |  | Explain the operation of synchronous motor at constant load with different field excitation. Draw the phasor diagram (normal, under and over excitation), V and inverted V curves of the same. | 15 |
| (OR) | | | |
| 23. |  | Describe the principles and operation of a universal motor with suitable diagrams. | 15 |
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| 24. |  | Explain the operation of single phase shaded pole induction motor with suitable diagrams. | 15 |
| (OR) | | | |
| 25. |  | Discuss the recent trends in electrical traction. | 15 |