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



**End Semester Examination – Nov / Dec – 2019**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **17EE2050** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ELECTRICAL MACHINES** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Discuss the construction and operating principle of a D.C machines. | CO1 | 10 |
| b. | Derive the EMF equation of a DC generator. | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | A Long Shunt Compound Generator delivers a load current of 100A at 500V, and hasarmature, series- field and shunt field resistances of 0.05 Ω, 0.02 Ω and 500Ωrespectively. Calculate the generated E.M.F and the armature current. Allow 1.0 v per brush for contact drop. | CO2 | 10 |
| b. | A 4 pole d.c.generator 20 A to a load of 10 Ω. If the armature resistance is 0.5 Ω and the shunt field resistance is 50 Ω, calculate the induced E.M.F and the efficiency of the machine. Allow a drop of 1V per brush. | CO2 | 10 |
|  |  |  |  |  |
| 3. | a. | Explain the operating principle and construction of a single phase transformer with neat sketch and derive the E.M.F equation for a transformer. | CO1 | 15 |
| b. | A 100 kVA, 4000V/200V, 50 Hz single phase transformer has 100 secondary turns. Determine the primary and secondary current, the number of primary turns, and the maximum value of the flux. | CO2 | 5 |
| **(OR)** | | | | |
| 4. | a. | The low voltage winding of a 300-kVA, 11000/2500 V, 50 Hz transformer has 190 turns and a resistance of 0.06 Ω. The high- voltage winding has 910 turns and a resistance of 1.6 Ω. When the low volatage winding is short-circuited, the full load current is obtained with 550 V applied to the high volage winding. Calculate the equivalent resistance and leakage reactance as referred to high voltage side and the leakage reactance of each winding. | CO2 | 10 |
| b. | Develop the equivalent circuit for a single phase loaded transformer and explain the performance characteristics. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Describe the working of any two types of starters used for squirrel cage type three phase induction motor. | CO3 | 15 |
| b. | Discuss the double field revolving theory with the neat sketch. | CO1 | 5 |
| **(OR)** | | | | |
| 6. | a. | Explain the various speed control schemes for three phase induction motor and its application. | CO4 | 10 |
| b. | Derive the torque equation under running condition and obtain the maximum torque for three phase induction motor. | CO2 | 10 |
|  |  |  |  |  |
| 7. | a. | With a neat diagram explain the construction and working of capacitor - start capacitor - run induction motors. | CO3 | 10 |
| b. | Describe the performance and working of the shaded pole motor with the neat sketch. | CO3 | 10 |
| **(OR)** | | | | |
| 8. | a. | Write a technical note on servomotor and its applications. | CO4 | 10 |
| b. | Illustrate the construction of universal motor can operate on either AC or DC power and its application. | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Discuss the real time control schemes for steel rolling mills. | CO5 | 15 |
| b. | Explain the criteria for selection of electric drivers for industrial applications. | CO5 | 5 |