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

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

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| **Code :** | **17EE3007** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SPECIAL MACHINES AND CONTROLLERS** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Derive the mechanism of torque production of variable reluctance stepper motor. | CO1 | 10 |
| b. | Formulate the role of stepper motor in closed loop operation using microprocessor. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Investigate the static and dynamic characteristics of a VR stepper motor with a neat sketch. | CO1 | 10 |
| b. | Calculate the step angle of a single-stack, 3-phase, 6/4 pole VR Stepper motor. Find its resolution? | CO2 | 10 |
|  |  |  |  |  |
| 3. | a. | Discuss about any four converter topologies of a switched reluctance motor for industrial application. | CO2 | 10 |
| b. | Investigate the operation of a ‘C’ dump converter used for the control of switched reluctance motor with a neat sketch. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Derive the expression for instantaneous torque of a switched reluctance motor. | CO3 | 10 |
| b. | Sketch and explicate the general torque-speed characteristics of switched reluctance motor with special consideration on the type of control strategy used for different regions of the curve. | CO3 | 10 |
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| 5. | a. | Outline the structure of controller for permanent magnet brushless dcmotor and explain the functions of various blocks. | CO3 | 10 |
| b. | Differentiate the BLDC motor and Brushed DC motor. | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Compare the mechanical and electronics commutator. | CO4 | 10 |
| b. | Generalize the construction and principle of operation of permanent magnet brushless motor drives. | CO4 | 10 |
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| 7. | a. | Discuss briefly about self control used in synchronous motor. | CO4 | 10 |
| b. | Explain in detail about vector control used in synchronous motor with the help of phasor diagram. | CO5 | 10 |
| (OR) | | | | |
| 8. |  | List out the various torque associated with the permanent magnet synchronous motor and derive its torque equation. | CO5 | 20 |
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|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss briefly about linear induction motor and its applications. | CO6 | 10 |
| b. | Explain the concept of current sheet and Goodness factor of linear induction motor. | CO6 | 10 |