

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Semester Examination – Summer 2022

Course: B. Tech. Branch : Electrical Engineering Semester : VII

Subject Code & Name: BTEEE704A Special Purpose Electrical Machines

Max Marks: 60

Date: 24/08/2022

Duration: 3.45 Hrs.

Instructions to the Students/:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

Q. 1 Solve Any Two of the following.

- | | | |
|---|-------------|----------|
| A) Explain construction and working of single stack type variable reluctance stepper motor. | CO 1 | 6 |
| B) Examine the torque speed characteristics of synchronous reluctance motor. | CO2 | 6 |
| C) Explain shaft position sensing in switched reluctance motor. | CO1 | 6 |

Q.2 Solve Any Two of the following.

- | | | |
|---|------------|----------|
| A) Explain electronic commutator in permanent magnet brushless dc motor. | CO2 | 6 |
| B) Discuss in detail various types of rotors in permanent magnet synchronous motor. | CO2 | 6 |
| C) Define stepping angle. Calculate stepping angle for 3 phase 24 pole variable reluctance motor. | CO1 | 6 |

Q. 3 Solve Any Two of the following.

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|--|------------|----------|
| A) Explain with neat diagram construction of axially laminated and radially laminated synchronous reluctance motor. | CO1 | 6 |
| B) Explain two power semiconductor switching devices per phase and two diodes type of power controller used for switched reluctance motor. | CO2 | 6 |
| C) Derive the torque equation for permanent magnet BLDC square wave motor. | CO2 | 6 |

Q.4 Solve Any Two of the following.

- | | | |
|---|------------|----------|
| A) Explain working of unipolar drive circuit used for stepper motor. | CO2 | 6 |
| B) Draw magnetic equivalent circuit and explain magnetic circuit analysis of permanent magnet BLDC motor. | CO1 | 6 |
| C) Explain microprocessor based control of switched reluctance motor. | CO2 | 6 |

Q. 5 Solve Any Two of the following.

- | | | |
|---|------------|----------|
| A) Discuss optical position sensor and hall effect position sensor used in permanent magnet BLDC motor. | C02 | 6 |
| B) Explain construction and working of linear induction motor. | C03 | 6 |
| C) Explain air gap permeance distribution of Vernier motor. | C02 | 6 |

***** End *****