Student Exam No:-\_\_

## **GANPAT UNIVERSITY B.TECH SEM-VII (ELECTRICAL) REGULAR EXAMINATION NOV-DEC-2014 2EE722:-SPECIAL ELECTRICAL MACHINES**

Time: 3 Hours

**Total Marks:-70** 

Instructions: - 1. Attempt all questions.

Make suitable assumptions wherever necessary.
Answer to two sections must be written in separate answer books.

4. Figures to the right indicate full marks.

## **SECTION-I**

| Que1 | (A)        | List out power converter circuits used for supplying SRM & explain one of them.       | [06] |
|------|------------|---|------|
|      | <b>(B)</b> | A four phase eight-pole switched reluctance motor has six rotor teeth. Find the step  | [06] |
|      |            | angle and Commutation frequency for a speed of 6000rpm.                               |      |
|      |            | OR  |      |
| Que1 | (A)        | Describe the L-θ Profile of SRM.  | [06] |
|      | <b>(B)</b> | Write short note on: Sensor used in SRM.  | [06] |
| Que2 | (A)        | Sketch and explain the static characteristics of stepper motor,                       | [05] |
|      | <b>(B)</b> | A stepper motor has a resolution of 200steps/rev. Find the pulse rate required to run | [06] |
|      |            | the motor at 2400 rpm.  |      |
|      |            | OR  |      |
| Que2 | (A)        | Explain the construction and working of hybrid stepper motor.                         | [05] |
|      | <b>(B)</b> | Define the following terms:   | [06] |
|      |            | 1.Holding Torque 4.Detent torque  |      |
|      |            | 2.Pull in Curve 5.Step angle  |      |
|      |            | 3.Slewing Mode 6.Pull out Torque  |      |
| Que3 |            | Attempt any two:  | [12] |
|      | (A)        | What is Servo Motor? Explain parts of servo motor.                                    |      |
|      | <b>(B)</b> | Describe the construction of ac servo motor of different types.                       |      |
|      | (C)        | What are the Advantages and Disadvantages of Stepper motor?                           |      |
| 4    |            | SECTION-II  |      |
| Que4 | (A)        | Compare conventional synchronous motor and PMSM.                                      | [06] |
|      | <b>(B)</b> | Sketch and explain torque-speed characteristics of PMSM.                              | [06] |

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| Que4 | (A)        | With a block diagram, explain about microprocessor-based power control of PMSM.    | [06] |
|------|------------|--|------|
|      | <b>(B)</b> | Derive the EMF equation of Permanent Magnet Synchronous Motor (PMSM).              | [06] |
| Que5 | (A)        | Explain working principle of PMDC motor and Mention their merits and applications. | [05] |
|      | <b>(B)</b> | Derive torque and emf equation of PMDC motor with equivalent circuit.              | [06] |
|      |            | OR   |      |
| Que5 | (A)        | What is Permeance co-efficient (PC)? Explain their related factors and Self        | [05] |
|      |            | demagnetization with neat sketch.  |      |
|      | <b>(B)</b> | Derive the EMT equation of Permanent Magnet Synchronous Motor (PMSM).              | [06] |
| Que6 |            | Attempt any two:   | [12] |
|      | (A)        | What is standard motor efficiency?   |      |
|      | <b>(B)</b> | Explain Segregation loss method for evaluation of motor efficiency.                |      |
|      | (C)        | Differentiate between a stepper motor and a conventional motor.                    |      |

END OF PAPER

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OR