Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2013**

**Subject code: 730704** **Date: 15-05-2013**

**Subject Name: Advanced Electrical Drives**

**Time: 10.30 am – 01.00 pm** **Total Marks: 70**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | Discuss the merits of sensorless speed control over the speed sensed vector control of induction motor | **07** |
| | **(b)** | Draw the block diagram of sensored vector control of PMSM. And explain the operation of this in detail. | **07** |
| **Q.2** | **(a)** | Explain the concept of vector flux oriented speed control using equivalent circuit and phasor diagram. | **07** |
| | **(b)** | Draw the inductance profile of Switched Reluctance Motor. Explain the each step of this profile in detail. | **07** |
| | | **OR** | |
| | **(b)** | Explain the concept of rotor flux oriented direct vector control Support your answer with necessary diagram. | **07** |
| **Q.3** | **(a)** | Explain the strategy of direct vector control of IM | **07** |
| | **(b)** | Explain the inverter control strategies of BLDC motor to work. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Developed the dynamic model of PMSM motor using proper assumption. | **07** |
| | **(b)** | Explain the sensorless vector control of an IM. What are the different methods employed for speed estimation. | **07** |
| **Q.4** | **(a)** | What is the constant torque strategy to control the speed of PMSM motor? Support your answer with proper characteristic curve. | **07** |
| | **(b)** | Draw the block diagram schematic of direct torque induction drive. Explain each block properly. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Develop the switching table to control BLDC motor in both the direction. Prove your logic with inverter control strategy. | **07** |
| **Q.4** | **(b)** | Explain the stator flux oriented direct vector control of IM | **07** |
| **Q.5** | **(a)** | Enlist the classification of PMSM motor and explain in view of construction of rotor. | **07** |
| | **(b)** | Explain the control strategy for Hysteresis motor. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Write the advantages and disadvantages of rotor flux oriented and stator flux oriented vector control. | **07** |
| | **(b)** | Show the control strategy for Stepper motor. Explain each block in detailed. | **07** |

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