

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 730704**Date: 26/12/2012****Subject Name: Major Elective _ IV 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) Obtain the generalized model of 3 phase induction motor in arbitrary reference frame | 07 |
| | (b) How does a BLDC motor works? Support your answer with proper switching table and explanation. | 07 |
| | | |
| Q.2 | (a) Explain the Optical Encoder to sense the rotor position of Permanent Magnet Synchronous Motor. | 07 |
| | (b) Derive the equation of torque for a three phase induction motor in terms of machine variable and phasor voltage and current. | 07 |
| | OR | |
| | (b) Describe difference between scalar and vector control method of electrical drive. Also explain the vector control principal for AC motor drive. | 07 |
| | | |
| Q.3 | (a) Draw and explain the schematic diagram of a voltage flux estimator | 07 |
| | (b) Draw the inductance profile of Switched Reluctance Motor. Explain the each step of this profile in detail. | 07 |
| | OR | |
| Q.3 | (a) Explain the model reference adaptive system for the speed estimation in speed control. | 07 |
| | (b) Explain the control strategy for Stepper motor. | 07 |
| | | |
| Q.4 | (a) Explain the principle of vector control using the space vector theory | 07 |
| | (b) Derive the dynamic model of PMSM motor with proper assumptions. | 07 |
| | OR | |
| Q.4 | (a) Explain the open loop flux control with indirect vector control with suitable block diagram. | 07 |
| Q.4 | (b) Explain the control strategy for Linear Induction motor. | 07 |
| | | |
| Q.5 | (a) Discuss the shortcomings of induction motor dynamic model from the view point of losses. Discuss the difference between steady state and dynamic model of Induction motor. | 07 |
| | (b) Explain the control strategy for Hysteresis motor. | 07 |
| | OR | |
| Q.5 | (a) Explain the concept of rotor flux oriented direct vector control Support your answer with necessary diagram. | 07 |
| | (b) Explain the different commutation techniques for permanent magnet motor. | 07 |
