

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: 17**Date: 31/12/2012****Subject Name: Industrial Drives and Control - II****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

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

- Q.1** (a) Draw the Block Diagram of Power Electronics Motor Drive and Explain functionality and working of each block in detail. **07**
- (b) Explain why stator voltage control is suitable for speed control of IM in fan and Pump drives. Draw a neat circuit diagram for speed control of 3- Φ IM using ac voltage controller. **07**
- Q.2** (a) Describe the performance of cycloconverter drive versus VSI drive for Synchronous Motor in detail and state their advantages and disadvantages. **07**
- (b) Explain the principle behind the variation of the speed of a 3- Φ IM by v/f method. Discuss this for the following two different modes: 1. Operation below rated frequency 2. Operation above rated frequency. **07**
- OR**
- (b) Draw and Explain speed torque curves with variable frequency control for the following two different modes: 1. Operation at constant flux 2. Operation with v/f ratio constant. **07**
- Q.3** (a) Draw and Explain a closed loop operation of Static Kramer Controlled Drive. **07**
- (b) Compare the conventional scherbius system with Scherbius Drive. **07**
- OR**
- Q.3** (a) Draw and Explain operation of IM using Rotor Resistance Control employing semiconductor converter. **07**
- (b) Explain operation of Closed Loop control of Static Scherbius Drive. **07**
- Q.4** (a) Explain d-q axis modeling of Induction Motor and derive the necessary equation. **07**
- (b) Draw the block diagram of a closed loop synchronous motor drive fed from VSI and explain its functioning. **07**
- OR**
- Q. 4** (a) Explain the difference between Rotor and Stator Reference Frame. **07**
- (b) Explain the operation of a synchronous motor fed from an adjustable frequency current source with circuit diagram and characteristics curve. **07**
- Q.5** (a) Explain in detail Direct Vector Control Block diagram with rotor flux orientation. **07**
- (b) Explain the Block diagram of sinusoidal SPM Machine including field weakening region. **07**
- OR**
- Q.5** (a) Explain in detail Feed forward vector control block diagram with open loop flux control. **07**
- (b) Explain the Block diagram of Synchronous Reluctance Motor drive with constant i_{ds} control. **07**
