Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 172402 **Date: 22/11/2011**

Subject Name: Industrial Drives and Control-II

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) Draw the Block Diagram of Power Electronics Motor Drive and Explain functionality and working of each block in detail. **07**

(b) Explain the operation of Induction Motor with unbalanced source voltage and single phasing. **07**

Q.2 (a) Explain Static Closed Loop Rotor Resistance Control for induction motor with necessary block diagram and equation. **07**

(b) Explain the difference between FCCSI and LCCSI in view of motor type, power, speed range and maximum speed, accuracy, performance, advantages & disadvantages and application. **07**

OR

(b) Explain the difference between Kramer drive and PWM-VSI in view of motor type, power, speed range and maximum speed, accuracy, performance, advantages & disadvantages and application. **07**

Q.3 (a) Explain four quadrant operation of closed loop speed control for Stator Voltage control method for induction motor drive. **07**

(b) A Y connected SCIM has following parameter : **07**
400V, 50 Hz, 4 pole, 1370 rpm, R_s=2Ω , R'_r=3 Ω, X_s= X_r = 3.5Ω, X_m=55Ω. It is controlled by a current source inverter at a constant flux. Calculate Inverter Frequency and stator current for rated motor torque and motor speed of 1200 rpm.

OR

Q.3 (a) Explain the Closed Loop Variable Frequency Drive with regeneration and minimum loss control. **07**

(b) A Y connected SCIM has following parameter : **07**
400V, 50 Hz, 4 pole, 1370 rpm, R_s=2Ω , R'_r=3 Ω, X_s= X_r = 3.5Ω, X_m=55Ω. It is controlled by a current source inverter at a constant flux. Calculate Motor torque, Speed and Stator current when operating at 30 Hz and rated slip speed.

Q.4 (a) Explain d-q axis modeling of Induction Motor and derive the necessary equation. **07**

(b) Explain difference between scalar voltage control and vector voltage control. **07**

OR

Q. 4 (a) Explain the difference between Rotor and Stator Reference Frame. **07**

(b) Explain the concept Vector Control of Scherbius Drive with cycloconverter. **07**

Q.5 (a) Explain the Block diagram of sinusoidal SPM Machine including field weakening region. **07**

(b) Explain in detail Direct Vector Control Block diagram with rotor flux orientation. **07**

OR

Q.5 (a) Explain the Block diagram of Synchronous Reluctance Motor drive with constant i_{ds} control. **07**

(b) Explain in detail Feed forward vector control block diagram with open loop flux control. **07**

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