

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2171707**Date:18/11/2016****Subject Name:Industrial Drives and Control****Time:10.30 AM to 1.00 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 a block diagram of an electrical drive and explain each block function. **07**
 (b) Explain theory of operation of separately excited DC machines and derive expression of induced emf. **07**
- Q.2** (a) Explain various methods of field excitation of DC machine. **07**
 (b) A 200 V, 10.5 A, 2000 rpm shunt motor has the armature and field resistances of 0.5 and 400Ω respectively. It drives a load whose torque is constant at rated motor torque. Calculate motor speed if the source voltages drops to 175V. **07**
- OR**
- (b) Explain the closed loop speed control of multi-motor drive. **07**
- Q.3** (a) Explain fully-controlled rectifier control of DC motor. **07**
 (b) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of 0.06Ω. It is fed from a single phase fully-controlled rectifier with an ac source voltage of 220V, 50 Hz. Assuming continuous conduction, Calculate
 (1) Firing angle for rated motor torque and 750 rpm.
 (2) Firing angle for rated motor torque and (-500) rpm. **07**
- OR**
- Q.3** (a) With waveform explain second-quadrant chopper operation. **07**
 (b) Explain PWM (pulse width modulation) current controller of chopper controlled DC drive. **07**
- Q.4** (a) Explain the operation of half-bridge modified McMurray inverter. **07**
 (b) Derive relationship between voltage and frequency in a constant voltage/Hz control strategy of induction motor. **07**
- OR**
- Q.4** (a) Discuss single-pulse modulation and multi-pulse modulation of PWM inverter. **07**
 (b) What are advantages and factors of choice of electrical drive? **07**
- Q.5** (a) Explain basic working theory of brushless DC motor. **07**
 (b) Explain basic working theory of DC servo motor. **07**
- OR**
- Q.5** (a) Explain the operation of a variable reluctance stepper motor. **07**
 (b) Explain unipolar drive circuit for stepper motor. **07**
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