

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER 2013****Subject Code: 162003****Date: 28-05-2013****Subject Name: Control of 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) State essential parts of electrical drives. What are the functions of power modulator, control unit, sensor unit? **07**
(b) Explain the advantage of electrical drives as compared to other prime movers. **07**
- Q.2** (a) Explain the Multi quadrant operation of electrical drives with suitable conventions and example. **07**
(b) Derive the Equivalent values of drive parameter. **07**
- OR**
- (b) Describe the component of load torque and classification of load torque. **07**
- Q.3** (a) A drive has following parameters: **07**
 $J=10 \text{ kg-m}^2$, $T=100-0.1N$, N-m, Passive load torque $T_l=0.05N$, N-m. Initially the drive is operating in steady state. Now it is to be reversed. For this motor chara. T is changed to $T= - 100-0.1N$, N-m. Calculate the time of reversal.
(b) Derive the Fundamental motor torque and motor-load dynamic system equation. **07**
- OR**
- Q.3** (a) Explain the single phase fully wave controlled converter with R-L-E load with necessary waveform and conduction table. **07**
(b) Explain the Chopper circuit principle, operation and its classification. **07**
- Q.4** (a) Explain the control strategy of chopper circuit with pulse width modulation and state its advantage and disadvantage. **07**
(b) Explain the Type A & Type B chopper circuit. **07**
- OR**
- Q.4** (a) Derive the steady state analysis of step up chopper with Min. and Max value of current. **07**
(b) Explain the three phase fully wave controlled converter with R-L-E load with necessary waveform and conduction table. **07**
- Q.5** (a) Explain the Universal motor construction, operation and control strategy. **07**
(b) Describe the operation of a variable reluctance motor stepper motor. What is micro stepping? **07**
- OR**
- Q.5** (a) Explain the speed control of single phase induction motor. **07**
(b) Deduce the expression for armature current and speed during transient analysis of separately excited motor with Armature control. **07**
