Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 162404 Date: 03-06-2013

Subject Name: Industrial Drives and Control-I

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.**
4. **Notations used have usual meaning.**

Q.1	**(a)**	What is drive? Explain basic block diagram of DC drive system.	**07**
	(b)	Discuss the speed/torque and torque/current characteristics of DC series motor.	**07**
Q.2	**(a)**	Discuss types of motor duty. And write brief note on selection of DC motor.	**07**
	(b)	A half wave controlled rectifier connected to a 150 V, 50 Hz source is supplying a resistive load of 10 ohm. If the delay angle Ŭis 30 ,-find (i) the maximum load current (ii) average load voltage (iii) RMS load current.	**07**
		OR	
	(b)	A step down chopper operates at a fixed frequency of 100 Hz from a 220 Vdc source supplying a load with 1 ohm and 10 mH inductance. If the output voltage is 60 V, find (i) t_{on} (ii) the average output current (iii) Draw the waveforms for output current and diode current.	**07**
Q.3	**(a)**	Explain speed control of separately excited DC motor through full controlled converter.	**07**
	(b)	Explain three phase controlled converter with neat diagram. Also draw appropriate waveforms.	**07**
		OR	
Q.3	**(a)**	Discuss PLL based control of DC motor with block diagram.	**07**
	(b)	Write brief note on permanent magnet motor drive.	**07**
Q.4	**(a)**	Discuss modeling of DC motor controlled through armature voltage control.	**07**
	(b)	Explain the need of PI control for DC drive system.	**07**
		OR	
Q.4	**(a)**	Draw and Explain class A chopper circuit for DC motor.	**07**
	(b)	Derive an expression for average output voltage of boost chopper circuit.	**07**
Q.5	**(a)**	Discuss closed loop speed control of DC motor. Why current loop is to be introduced as an inner loop in closed loop operation.	**07**
	(b)	Explain multi-phase chopper circuit. Discuss its merits and demerit.	**07**
		OR	
Q.5	**(a)**	Explain two quadrant chopper circuit with neat diagram.	**07**
	(b)	Explain dual converter circuit for DC motor. Also draw the relevant waveforms.	**07**

****