

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – WINTER • 2014****Subject Code: 162404****Date: 05-12-2014****Subject Name: Industrial Drives and Control-I****Time: 02:30 pm - 05:00 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) Discuss in brief, Phase Locked Loop (PLL) control of the dc motor drive using block diagram. **07**
- (b) Explain phase controlled 6-pulse converter in discontinuous conduction mode for separately excited DC motor with $\alpha = 60^\circ$. **07**
- Q.2** (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) With the use of neat diagram discuss Ward – Leonard Control of DC Machine. **07**
- OR**
- (b) Enlist various requirements for DC drive & Explain concept of DC drive with block diagram. **07**
- Q.3** (a) Derive the fundamental torque equation indicating dynamics of electric drives. **07**
- (b) Write a short note on 1 – Phase half controlled drive with series excited DC motor in continuous conduction mode. **07**
- OR**
- Q.3** (a) With the use of typical application explain four quadrant operation of DC machine in detail. **07**
- (b) Discuss operation of 1 – Phase semi controlled drive with discontinuous conduction mode with freewheeling diode for separately excited DC Machine. **07**
- Q.4** (a) Explain regenerative operation of DC – DC converter fed DC Machine with necessary diagrams. **07**
- (b) Compare circulating & non-circulating current mode for 1 – Phase Dual converter. **07**
- OR**
- Q.4** (a) Discuss four quadrant operation of DC – DC converter for separately excited DC Machine. **07**
- (b) Explain inversion mode operation of 1-Phase controlled rectifier with DC Motor as a load. **07**
- Q.5** (a) Enlist various requirements for implementation of servo motor drive. **07**
- (b) With the use of block diagram explain closed operation of armature control using flux weakening mode. **07**
- OR**
- Q.5** (a) Write a short note on permanent magnet drive. **07**
- (b) Compare P, PI & PID controller & give application of each. **07**
