

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018****Subject Code:2160913****Date:04/12/2018****Subject Name:Control of Electrical Drives****Time: 02:30 PM TO 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.

MARKS

- Q.1** (a) Draw speed torque characteristic of DC separately excited, shunt and series motor with proper labeling. **03**
- (b) Give classification of load torque with their characteristics. **04**
- (c) Explain the concept of steady state stability with proper example. Also derive the condition for steady state stability of a drive. **07**
- Q.2** (a) Give functions of a drive system for given load. **03**
- (b) List and explain various component of electric drive system. **04**
- (c) Discuss operation of dual converter for DC motor drives. **07**
- OR**
- (c) A 200V, 500 rpm 100A 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, 50Hz. Assuming continuous conduction, calculate (a) firing angle for rated motor torque and 250 rpm.(b) firing angle for rated motor torque and -250 rpm (c) motor speed for $\alpha = 150^\circ$ and rated torque. **07**
- Q.3** (a) Draw the modified speed-torque characteristics of DC shunt motor with phase controlled converters with proper labeling. **03**
- (b) Explain the meaning of constant torque and constant power operation of induction motor with respect to V/f control of induction motor. **04**
- (c) Explain chopper controlled DC shunt motor drive operation for motoring mode and regenerative mode. **07**
- OR**
- Q.3** (a) List the advantages of electrical braking. **03**
- (b) Explain close loop control speed control of DC motor in brief. **04**
- (c) Derive basic modeling of DC motor with necessary assumptions. Draw block diagram from the derived functions. **07**
- Q.4** (a) Give the advantages of VSI based induction motor drive. **03**
- (b) Draw and explain the block diagram of close loop control of induction motor using current limit control. **04**
- (c) Explain various operating modes of doubly fed induction motor. **07**
- OR**
- Q.4** (a) Give the advantages of CSI based induction motor drive. **03**
- (b) Draw static Scherbius drive for induction motor. List its advantages. **04**
- (c) Explain dynamic model of induction motor using stationary reference frame. **07**
- Q.5** (a) What is the difference between scalar and vector control of induction motor. **03**
- (b) Compare direct torque control method and field oriented control method. **04**
- (c) Write a short note on BLDC motor drive. **07**

- Q.5** (a) List the various characteristics required of drives used in traction. **03**
(b) Write a short note on servomotor drives. **04**
(c) Write a short note on solar drives. **07**

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