

GANPAT UNIVERSITY**M. TECH SEM- II (Electrical Engineering) REGULAR EXAMINATION- APRIL-JUNE 2015
3EE204: Electric Drives**

TIME: 3 HRS

TOTAL MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions.

SECTION: I

- Q.1 (a)** Draw and explain block diagram of variable speed DC drive using armature control method. (5)
(b) An 80 kW, 440 V, 800 rpm DC motor is operating at 600 rpm and developing 75 % rated torque is controlled by 3-ph, six pulse thyristor converter. If the back e.m.f. at rated speed is 410 V, find the triggering angle of the converter. The input to the converter is 3-ph, 415 V, 50 Hz a.c. supply. (5)
- OR**
- Q.1 (a)** Give the classification of electric drive. Discuss fundamental torque equation. (5)
(b) A small separately excited d.c. motor is supplied via a half controlled, single phase bridge rectifier. The supply is 240 V, the thyristors are triggered at 110° and armature current is continuous for 500 beyond the voltage zero. Find the motor speed at a torque of 1.8 N-m, given that the motor torque characteristics is 1.0 N-m/A and its armature resistance is 6 Ω. Neglect all converter losses. (5)
- Q.2 (a)** Discuss close loop control of d.c. drive. (5)
(b) Discuss chopper fed d.c. drive with discontinuous armature current. (5)
- OR**
- Q.2 (a)** Discuss braking operation of rectifier controlled separately excited motor. (5)
(b) Explain principle of microcomputer control of d.c. drives. (5)
- Q.3** Attempt any two (10)
(a) Write short notes on stability of electric drive.
(b) Explain transient analysis of separately excited d.c. motor.
(c) List advantages offered by d.c. chopper drives over line commutated converter controlled d.c. drives.

SECTION: II

- Q.4 (a)** Draw the torque and speed characteristics of poly-phase induction motor. Also explain the following operating regions: (5)
 (1) Motoring region (2) Generating region and (3) Braking region.
(b) List various techniques to obtain super synchronous speed control of induction motor. Explain any one. (5)
- OR**
- Q.4 (a)** Draw the circuit diagram and explain the working of slip power recovery system using solid state Scherbius system (5)
(b) Discuss concept of direct torque control of induction motor. (5)
- Q.5 (a)** Discuss torque/ load angle characteristics of synchronous motor. (5)

(b) Discuss BLDC motor drive. (5)

OR

Q.5 (a) Discuss vector controlled PMSM drive. (5)

(b) Derive expression for torque angle and developed torque in case of salient pole synchronous motor. (5)

Q.6 Attempt any two (10)

(a) Write short notes on UPF control.

(b) Discuss static Kramer drives.

(c) Explain constant power and constant torque drives for slip power recovery system.

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