Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71633

M.E. DEGREE EXAMINATION, JUNE/JULY 2013.

Second Semester

Power Electronics and Drives

PE 9221/PE 921/10233 PE 201 — SOLID STATE DC DRIVES

(Regulation 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Draw speed -torque characteristics of various DC motor.

2. What is the principle in speed control of DC motor by ward-Leonard control method?

3. What is the effect of current ripple in continuous armature current operation?

4. What are the performance parameters in three-phase converter control of separately excited DC motor?

5. Draw the circuit diagram of class C chopper controlled DC separately excited motor.

6. What is the principle of variable frequency time ratio control strategies of DC drive?

7. Draw the equivalent circuit of DC motor.

8. Compare PI and PID controller-speed response in control of DC motor drive.

9. What is phase locked loop control of DC drive?

10. What is the effect gate firing in control of DC drive?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain constant torque operation of DC motor. (8)

(ii) List and explain standard classes of motor duty. (8)

Or

(b) (i) Describe how to put selection of motor rating for continuous duty load. (8)

(ii) Describe four multi – quadrant operation of DC motor drive. (8)

12. (a) (i) With waveform and performance characteristics explain phase control of series DC motor with single-phase converter. (8)

(ii) Describe continuous ripple free armature current operation for DC separately excited DC motor load. (8)

Or

(b) (i) With circuit and waveform explain principle of operation of three phase controlled converter in free wheeling operation. (8)

(ii) Describe with waveform principle of working of DC drive with dual converter. (8)

13. (a) (i) Explain the principle of operation of class A chopper control separately excited DC motor. (8)

(ii) Describe the constant frequency time ratio control strategies of chopper Controlled DC drive. (8)

Or

(b) (i) With circuit diagram explain the working of four quadrant operation of DC Motor. (8)

(ii) How to implement dynamic braking of DC motor using chopper. (8)

14. (a) (i) Obtain transfer function of separately excited DC motor. (8)

(ii) With block diagram explain speed controlled DC motor chopper drive. (8)

Or

(b) (i) Obtain the linear transfer function model of power converter. (8)

(ii) With block diagram explain speed controlled DC motor drive with PI speed Controller. (8)

15. (a) Explain with a program flow chart for constant horse power micro computer control of DC drive. (16)

Or

(b) With a flow chart for load distributed operation of micro computer control of DC drive. (16)
