Printed Pages : 3

EEC604

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 131604

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

INTRODUCTION TO ELECTRIC DRIVES

Time : 2 Hours] [Total Marks : 50

1 Attempt any two parts : 2×5=10

(a) Explain the various terms involved in turn on and turn off time of SCRs in dynamic characteristics. Why circuit turn off time is kept larger ?

(b) Define di/dt and dv/dt protection of SCRs. What are the components used to protect SCR ?

(c) Give various triggering methods in SCR. Explain in detail pulse triggering method and requisite method.

2 Attempt any two parts of the following : 2×5=10

(a) Derive the expressin of a 1-phase full wave bridge rectifier fully controlled for RLE load and also draw the requisite waveforms.

(b) Explain the operation of three phase half controlled full wave rectifier with desired waveforms.

(c) Explain control strategies of chopper with respect to step down chopper. Also classify and explain the choppers according to quadrant operation.

3 Attempt any two parts of the following : 2×5=10

(a) Give the difference between 180^{o} and 120^{o} modes of three phase inverter with relevant waveforms of phase and line voltages.

(b) Explain the basic principle of step down cycloconverter.

(c) Write short notes on following :

(i) Series inverter

(ii) Jones chopper

(iii) 3-ϕ to 3-ϕ step down cycloconverter.

(iv) Power factor improvement in dc drives.

(v) Self control scheme of synchronous motor drive.

4 Attempt any two parts of the following : 2×5=10

(a) The speed of separately-excited dc motor is controlled through 1-phase half wave controlled from 230 V mains. The motor armature resistance is 0.5 Ohm and motor constant is K = 0.4 V-s/rad/for load torque of 20 Nm at 1500 rpm and for constant armature current, calculate :

(i) Firing angle of converter.

(ii) RMS value of thyristor current.

(iii) I/P power factor of the motor.

(b) Describe the regenerative breaking of chopper fed separately excited dc motor. Illustrate the answer with circuit diagram and relevant waveforms.

(c) Define the basic principle of operation of cyclo-converter. Explain the working of 1-phase and 3-phase cycloconverter.

5 Attempt any two parts of the following : 2×5=10

(a) Explain four quadrant chopper drives. Explain three phase semiconductor drives.

(b) Enumerate the various methods of speed control of 3-phase induction motor when fed through semiconductor devices.

(c) Describe the Kramer drive and show that steady state torque is not influenced by whether a transformer is used or not ?

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