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

PAPER ID : 131604 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VI) THEORY EXAMINATION 2013-14

INTRODUCTION TO ELECTRIC DRIVES

Time : 2 Hours *Total Marks : 50*

Note : Attempt **all** questions. All questions carry equal marks.

1. Attempt any **two** parts of the following : **(5×2=10)**
   (a) Explain why the inner two layers of an SCR are lightly doped & wide
   (b) What is meant by commutation of SCR ? What are the different types of forced commutation methods ?
   (c) Draw the turn-off characteristics of an SCR & explain its mechanism.
2. Attempt any **two** parts of the following : **(5×2=10)**
   (a) Explain the operation of a three-phase, half controlled bridge converter with suitable waveform.
   (b) A three phase half-wave controlled rectifier has a supply of 200 V/ phase. Determine the average load voltage for firing angle of 0° & 60° , assuming a thyristor voltage drop of 1.5 V & continuous load current.
   (c) Justify the statement "free wheeling diode improves the power factor of the system."
   (d) Explain the operation of single-phase bridge inverter with the help of load voltage & load current wave form.

3. Attempt any **two** parts of the following : **(5×2=10)**

(a) Explain the principle of chopper operation what are the types of control strategies in chopper ? Explain any of them.

(b) A chopper circuit is operating on TRC principle at a frequency of 2 KHz on a 220 V dc supply. If the load voltage is 170 V, compute the conduction of blocking period of thyristor in each cycle.

(c) Why does a three phase to single phase cycloconverter required positive & negative group phase controlled converter ? Explain.

4. Attempt any **two** parts of the following : **(5×2=10)**

(a) Explain in brief any one method of braking of a dc motor.

(b) Draw & explain the torque-speed characteristics of a separately excited dc motor at different firing angles for a full converter feeding.

(c) Explain with the associated wave form, how power factor can be improved with symmetrical angle control scheme.

5. Attempt any **two** parts of the following : **(5×2=10)**

(a) Explain the variable frequency control method of an induction motor. Also explain operation below the rated frequency mode.

(b) An invertor supplies a 4-pole, three phase cage induction motor rated at 220 V, 50 Hz. Determine the approximate output required of the inverter for motor speed of :

(i) 900 (ii) 1200 (iii) 1500 (iv) 1800 rpm.

(c) Draw a suitable diagram & explain working of slip power recovery system using commutator-less Kramer drive.