**2014**
**B.E. (Electrical and Electronics Engineering)**
**Sixth Semester**
**PC-EE-602: Power Electronics**

Time allowed: 3 Hours                                              Max. Marks: 50

*NOTE: Attempt **five** questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.*

*x-x-x*

**Q.No.1** (i) Draw the turn-off characteristics of SCR.

(ii) What is meant by commutation? What are the types of commutation?

(iii) Give any two differences between single phase full and semi converters.

(iv) What is meant by FM control in a dc chopper?

(v) What is meant by input power factor in controlled rectifier?            (5x2=10)

## Part– A

**Q.No. 2** (a) What are the different methods for turning off an SCR? Explain all methods in detail.

(b) What is a UJT? Draw its characteristics and explain its working as a relaxation oscillator.

(5, 5)

**Q.No.3** (a) Explain with neat diagrams, the four modes of operation of a TRIAC.
(b) With proper diagrams, explain class A, B, C commutation in detail.            (5, 5)

**Q. No.4** (a) What are the problems in series and parallel operation of SCRs? How they are overcome.

(b) Explain the special features of thyristor, DIAC and TRIAC. Draw the relevant diagrams.

(5, 5)

## Part-B

**Q.No.5** (a) Explain the working of a three phase full converter with 'R' load for the firing angles of $60^\circ$, $90^\circ$ and $150^\circ$
(b) A 220V, 1 KW R load is supplied by 220 V, 50 Hz source through $1\varphi$ fully controlled converter. Determine the following for 800 W output.

(i) Average output voltage

(ii) rms value of input current

(iii) fundamental component of input current

(iv) Displacement factor            (6, 4)

P.T.O.

**Q.No.6** (a) Classify the basic topologies of switching regulators and explain the operation of buck regulators with continuous load current using suitable waveforms.

(b) A dc chopper input voltage of 200V and resistive load of R= 8 Ω resistance. Voltage drop across thyristor is 2V and chopping frequency is 800 Hz, the duty cycle is 0.5. Calculate:

(i) Average and rms value of output voltage

(ii) Chopper efficiency and input resistance by the source                     (6, 4)


**Q.No.7** (a) With relevant diagrams, explain two quadrant operation of a DC chopper.

(b) Explain in detail the working of current commutated chopper.                     (5, 5)


*x-x-x*