

Ajay Kumar Garg Engineering College, Ghaziabad
Department of Electrical & Electronics Engineering

Sessional Test -2

Course: B.Tech
 Session: 2017-18
 Subject: Power Electronics
 Max. Marks: 50

Semester: V
 Section: EN1, EN2
 Sub. Code: NEE 502
 Time: 2 hours

Note: Attempt **all** sections.

SECTION-A

A. Attempt **all** the parts.

(5*2=10)

1. Give classification of SCR commutation techniques. What is load commutation?
2. Draw and label the complete protection circuit for SCR.
3. Define string efficiency for a string of series connected SCRs. Why is it less than one.
4. What do you understand by phase control in context with phase controlled converters/rectifiers?
5. What are the advantages of using freewheeling diode in phase controlled rectifier circuits.

SECTION – B

B. Attempt **all** the parts.

(5*5=25)

6. In a power circuit four SCRs are to be connected in series. Permissible difference in their blocking voltage is 20V for a maximum difference in their blocking currents of 1mA. Difference in recovery charge is 10 μ C. Design suitable equalizing circuit.
7. With the help of relevant circuit and waveforms explain class C commutation circuit.
8. A single phase one pulse SCR controlled converter is feeding an RL type of load with freewheeling diode connected across the load. Discuss the operation circuit with the help of relevant waveforms.
9. A single phase full converter bridge is connected to RLE load. The source voltage is 230V, 50Hz. The average load current of 10A is constant over the working range. For $R=0.4\Omega$ and $L=2\text{mH}$, compute the firing angle delay and input power factor of converter if $E = 120\text{V}$.

10. With the help of relevant circuit and waveforms of output voltage and output current explain the operation of a three phase half wave rectifier. Assume the firing angle delay of 15° .

SECTION-C

(7.5*2=15)

C. Attempt all parts

11. Describe the operation of type -E chopper with relevant circuit diagrams and its operation in all the four quadrants.
12. A single phase controlled converter is feeding an RLE type of load. With the help of relevant circuit and the waveforms explain its operation in rectification mode. Also derive the equation for average output voltage.