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Total No. of Questions : 09]

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**B.Tech. (Sem. - 5<sup>th</sup>)**  
**POWER ELECTRONICS**  
**SUBJECT CODE : EE - 309**

**Paper ID : [A0417]**

[Note : Please fill subject code and paper ID on OMR]

**Time : 03 Hours**

**Maximum Marks : 60**

**Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

**Section - A**

**Q1) (10 × 2 = 20)**

- a) What is a LASCR?
- b) Draw turn on characteristics of a thyristor.
- c) What is the importance of Surge current rating of a thyristor?
- d) Differentiate between thyristor and TRIAC.
- e) Give significance of holding and latching current in a thyristor.
- f) Draw snubber circuit.
- g) State importance of parallel connection of thyristors.
- h) Mention significance of duty cycle in choppers.
- i) Give importance of series inverter.
- j) State working principle of cycloconverter.

**Section - B**

**(4 × 5 = 20)**

**Q2) Draw the static V-I characteristics of SCR and explain its mode of operation.**

**Q3) Discuss the working of single phase full wave ac-dc converter taking into account the effect of source inductance. Draw the output voltage waveform for firing angle 30°.**

- Q4)** Describe the working of step up chopper and derive expression for output voltage.
- Q5)** Explain operation of a single phase full bridge inverter. Draw waveshapes of output current, when load is purely inductive.
- Q6)** Discuss operation of single phase midpoint cycloconverter with R-L load for continuous conduction with relevant circuit diagram and necessary output waveforms.

### Section - C

(2 × 10 = 20)

- Q7)** (a) Why does unequal voltage sharing take place among series connected thyristors during steady state and dynamic state? How is equal voltage sharing obtained in both cases?
- (b) A single phase fully controlled converter is connected to a load comprised of 2 ohms resistance and 0.3H inductance. The supply voltage is 230 V at 50 Hz. Estimate the average load voltage, average load current and input power factor for a firing angle of 20°. Assume continuous and ripple free load current. Draw load voltage waveform.
- Q8)** What are the methods for voltage control within the inverters. Explain in detail with waveforms.
- Q9)** Write short notes on any two of the following :
- (a) Regenerative chopper.
- (b) Line commutation.
- (c) Thyristor specifications.



### Section - B