Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (EE) PT (Sem.–6)

POWER ELECTRONICS

Subject Code : BTEE-504

Paper ID : [72789]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1 Answer briefly :

a. Write the names of the members of Thyristor family.

b. Draw and explain why snubber circuit is required?

c. What is the full form of SCR? Why it is known so? Explain.

d. Why internal over voltage is generated in a SCR?

e. Differentiate between AC and DC choppers.

f. Draw the Symbol and characteristics of LASCR.

g. What is the purpose of connecting diodes in antiparallel with Thyristors in inverter circuits?

h. Classify the inverters and differentiate them.

i. What are the different types of cycloconverters? Discuss.

j. Define holding and latching current.

SECTION-B

2. List the various triggering methods of the thyristor and explain in detail gate triggering or dv/dt triggering.

3. Describe the working of a single phase half bridge inverter. What is its main drawback? Explain how this drawback can be taken care off.

4. Describe the principle of step up chopper. Derive an expression for the average output voltage in terms of input voltage and duty cycle. State the assumptions made.

5. Explain the need of commutation in a thyristor circuit. Discuss Class B commutation technique in detail.

6. A single phase half wave converter is operated from 230V, 50 Hz source and the load resistance is R=12Ω. For a firing angle delay of 300, determine :

   a. The rectification efficiency.

   b. Form factor.

   c. Voltage ripple factor.

   d. Transformer utilization factor.

   e. PIV of thyristor.

SECTION-C

7 What is the need of cycloconverter? Explain the operating principle of single phase to single-phase step up cycloconverter with the help of midpoint and bridge type configurations.

8 Discuss the problems associated with series & parallel operation of SCRs and how these are overcome. Also show that the string efficiency for two series/parallel connected SCRs is usually less than one.

9 Discuss :

   a. Unijunction Transistor.

   b. Field controlled thyristors.