(e) What are the various methods of firing circuits for line commutated converter ?

(f) What is meant by input power factor in controlled rectifier ?

(g) Write down the expression for average output voltage of a step up chopper. Define duty cycle.

(h) What are the types of control strategies ?

(i) Why thyristors are not preferred for inverters ?

(j) What are the applications of cycloconverters ?

1½×10=15

Roll No. ..... **Total Pages : 04**

J-21-0048

B. Tech. EXAMINATION, 2021

Semester V (CBCS)

POWER ELECTRONICS

EC-505

Time : 2 *Hours* *Maximum Marks :* 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. (a) Explain with the help of layer diagram the construction of TRIAC.

(b) Explain the terms : String efficiency, Derating factors. **7½×2=15**

2. (a) Discuss the operation of class C commutation in SCR along with waveforms.

(b) Draw and explain circuit diagram of synchronized UJT triggering. Also draw the associated waveforms. **7½×2=15**

Section B

3. Explain 3ϕ half wave controlled rectifier with RL load. Draw the current and voltage waveforms for $\alpha = 0^\circ$, $\alpha = 45^\circ$ and $\alpha = 135^\circ$. **15**

4. Discuss the operation of 3ϕ dual converter. Also derive the expression for circulating current. **15**

Section C

5. Describe the operation of single-phase to single-phase cycloconverter with RL load in continuous load current and discontinuous load current Also draw the current and voltage waveforms. **15**

6. Explain 3ϕ ring connected cycloconverter circuit along with current and voltage waveforms. Also derive the expression for output voltage. **15**

Section D

7. (a) Explain the operation of class-D Chopper along with the circuit diagram.

(b) Draw the neat diagram of parallel inverter employing feedback diodes. Explain the working of inverter with the help of voltage and current waveforms. **15**

8. Discuss the following :

(a) The operation of cuk converter. Derive the output voltage.

(b) The operation of UPS along with block diagram. **15**

(Compulsory Question)

9. Answer the following :

(a) What do you mean by latching current and holding current of a thyristor in operator ?

(b) Can power device be protected by a fuse ? Justify.

(c) Give the advantage of GTO over SCR.

(d) What are the advantages of free wheeling diode in a controlled rectifier ?