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Total Pages : 03

**July-22-00324**

**B. Tech. EXAMINATION, 2022**

Semester V (CBCS)

POWER ELECTRONICS

EC-505

*Time : 3 Hours*

*Maximum Marks : 60*

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*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

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

**Section A**

1. Explain the constructional details and working of low power MOSFET and power MOSFET and bring out the differences between the two. 10

2. Discuss the two-transistor model of a thyristor. Derive an expression for the anode current and discuss therefrom the turn-on mechanism of the thyristor. 10

### Section B

3. A single-phase one-pulse SCR controlled converter feeds a RL load with a freewheeling diode across the load. Discuss how the freewheeling diode comes into play when the supply voltage is passing through zero and becoming negative. 10
4. Describe the operation of a single-phase two pulse midpoint converter with relevant voltage and current waveforms. Discuss how each SCR is subjected to a reverse voltage equal to double the supply voltage in case turns ration from primary to each secondary is unity. 10

### Section C

5. What is cyclo-converter ? Enumerate some of its industrial applications. Also describe the operating principle of single-phase to single-phase step-up cyclo-converters with the help of mid-point and bridge configurations. 10

6. Explain the three-phase to single-phase cyclo-converter with the resistive and inductive load. 10

### Section D

7. Discuss the main types of DC choppers. Which of these is most commonly employed and why ? 10
8. Explain the principle of operation of choppers and describe different control strategies of choppers. 10

### (Compulsory Question)

9. Give the answer of the following questions. Each carries 5 marks : 4×5=20
- (i) Analyse the working of TRIAC and compare it with the GTO.
  - (ii) What is the role of freewheeling diode ? Explain it with comparative analysis through waveforms.
  - (iii) Explain the principle of step down cyclo-converters.
  - (iv) What do you understand by Uninterrupted power supply ? Explain the difference between Online UPS and Offline UPS.