[Total No. of Questions - 9] [Total No. of Printed Pages - 2]

Dec.-22-0213

EC-505 (Power Electronics)

B.Tech. 5th (CBCS)

Time : 3 Hours Max. Marks : 60

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

Note : Attempt all questions from each section attempt one question. Section E will be compulsory and attempt all question. The marks assigned to each question are indicated at question itself.

SECTION - A

1. Define latching and holding currents as applicable to an SCR. Show these currents on its I-V characteristics. (10)

OR

2. Draw synchronised UJT triggering circuit using a Zener diode, describe briefly with relevant voltage and current waveforms. Explain how synchronisation of the trigger circuit with the supply voltage across SCR is achieved. (10)

SECTION - B

3. For a 3-Phase half wave diode rectifier, derive an expression from the average output voltage Vo in terms of maximum value of source voltage from line to neutral. If the rectifier feeds RL load with R=5 ohm and L=3mH, find the average load current for 3-phase input voltage 400 V, 50 Hz. (10)

OR

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)

OR

6. Explain the three-phase to three-phase cyclo-converters with resistive load. (10)

SECTION - D

7. Discuss the main types of DC choppers. Which of these is most commonly employed and why? (10)

OR

8. Explain the basic concept of switch mode inverters. Also, analyse the performance of single-phase half bridge Voltage Source Inverters (VSI). (10)

SECTION - E

9. Give the answer of the following questions. Each carry 5 marks.

   1. Analyse the working of TRIAC and compare it with the GTO.
   2. What is the role of freewheeling diode, explain it with comparative analysis through waveforms?
   3. Explain the principle of step down cyclo-converters.
   4. What do you understand by Uninterrupted power supply? Explain the difference between Online UPS and Offline UPS.

(4×5=20)