Roll No. ..... Total Pages : 03

# BT-7/D-19 37134

## POWER ELECTRONICS
## ECE-405N (Option I)

Time : Three Hours] [Maximum Marks : 75

**Note :** Attempt exactly *Five* questions by selecting at least *one* question from each of the four Sections A, B, C and D.

### Section A

1. Explain the static and switching characteristics of IGBT & MOSFET and critically compare the two. **15**

2. (a) What do you mean by the following terms and write down the purpose of each ?
   (i) Converter
   (ii) Inverter
   (iii) Chopper
   (iv) Cycloconverter
   (v) AC Controller **2×5=10**
   (b) Define the following :
   (i) firing angle
   (ii) commutation **5**







### Section B

3. (a) Draw the cross sectional structure of general purpose Thyristor. Explain the latching and holding currents of SCR. **10**
   (b) Comment on the statement : 'When subjected to standby increasing over voltages, the thyristor needs over current protection but not overvoltage protection.' **5**

4. (a) Discuss briefly the voltage commutation and current commutation techniques used for the commutation of thyristors. **10**
   (b) Compare GTO and general purpose thyristor. Give typical applications of GTO. **5**

### Section C

5. (a) How are choppers classified ? Briefly explain the operation of a type-C chopper. **10**
   (b) Explain voltage control in single phase inverters. **5**

6. (a) Explain time ratio control (TRC) and current limit control strategies employed for d.c. choppers. Also, enumerate applications and limitations of individual strategies. **10**
   (b) Explain, with a diagram, how a step-up chopper works. **5**

## Section D

7. (a) Explain the principle of load commuted Cycloconverter and discuss its advantages and disadvantages over line commuted converters. **10**

   (b) Briefly explain the operation of a single-phase Cycloconverter which accepts 230 V/50 Hz a. c. and provides output voltage at 16.6 Hz. **5**

8. (a) Explain the operation of a single-phase to single phase step-down Cycloconverter with suitable sketches. Assume resistive load.. **12**

   (b) What are the applications of Cycloconverter ? **3**