(b) Discuss the principle of working of 3 phase bridge inverter with appropriate circuit diagram. Draw phase and line voltage waveform on assumption that each thyristor conducts for $180°$ and resistive load is star connected.   10

SECTION – D

8. (a) What is slip power recovery scheme ? Explain working of static Scherbius drive.   10

   (b) Explain volt/hertz method of speed control of 3 phase induction motor.   10

9. Discuss why 3-phase to 1-phase Cycloconverter requires positive and negative group phase-controlled converters ? Under what condition group works as inverter and rectifier ? How should the firing angles of two converters be controlled ?   20

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Roll No.

24229

B. Tech. 5th Semester (EE) (Common with Special Chance) Examination – December, 2019

POWER ELECTRONICS

Paper : EE-317-F

Time : Three Hours]   [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. **1** is _compulsory_. Attempt any _one_ question from each Section.

1. (a) Mention few drawbacks of self-commutation.   4

   (b) Define Cycloconverter. Give some of its industrial applications.   4

   (c) Define electric drive. How electric drives can be classified ?   4

(d) What are the effects of poor power factor ? How this can be improved ? 4

(e) Define holding current and latching current of SCR. 4

SECTION – A

2. (a) Describe the working of IGBT and its switching characteristics. 10

(b) Draw output and transfer characteristics of MOSFET and explain the terms (i) pinch off voltage (ii) threshold voltage and (iii) trans-conductance. 10

3. (a) Explain turn-on methods of thyristor. 10

(b) Define commutation techniques and explain any *two* of them in detail. 10

SECTION – B

4. (a) Explain the working principle of single phase ac voltage controller. What is the effect of load inductance on the performance of ac voltage controller ? 10

(b) A single phase half wave controlled rectifier with = 10 Ω is supplied from 230 V, 50 Hz supply. Assume rms voltage is 50% of maximum possible rms voltage, determine (i) firing angle (ii) average dc output voltage (iii) average and rms current of SCR. 10

5. (a) Describe the operation of three phase full converter showing rectification and inversion mode of operation. https://www.mdustudy.com 10

(b) Explain the working of dual converter with the help of circuit diagram. Also obtain, waveform for voltage generating circulating current. 10

SECTION – C

6. Explain operation of four quadrant chopper with neat and clean diagram. 20

7. (a) Describe McMurray-Bedford half bridge single phase inverter with relevant voltage and current waveform. 10