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B. E. (Eighth Semester) Examination, 2020
APR-MAY
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(New Scheme)

(ET & T Engg. Branch)

POWER ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d). Draw neat sketch & waveforms with proper labelling wherever required.

Unit-I

1. (a) Compare GTO & SCS. 2

- (b) With help of proper sketch, explain Mesa type construction of SCR. What are its advantages. 7
- (c) Explain two transistor analogy of SCR. Derive the expression of anode current in two transistor analogy. What is the condition of conducting SCR. 7
- (d) What is the difference between Symmetric & Asymmetric IGBT. Explain the working of Asymmetric IGBT. 7

Unit-II

2. (a) Compare natural commutation & forced commutation. 2
- (b) What is the need of series & parallel operation of SCR. Discuss the importance of series equalization circuit in static condition & find out the value of resistance connected across each SCR. 7
- (c) With help of neat waveforms, explain dynamic turn on & turn off switching characteristics of SCR. 7
- (d) With help of neat sketch & waveforms, explain the working of single phase full wave converter using RLE load. 7

Unit-III

3. (a) Differentiate between Symmetric & Asymmetric semiconverter. 2
- (b) With help of neat sketch & waveforms, explain three phase fully controlled Bridge convertor for firing angle 30° & 90° . 7
- (c) A half controlled Bridge converter feeds a load with ripple free current $\alpha = 60^\circ$, input voltage is 240 V, 50 Hz, $R_L = 10\Omega$. 7
- Find :
- (i) Average load voltage
- (ii) Average Power dissipated in load
- (iii) RMS input current
- (d) Difference between circulating current type & non circulating current type modes of Dual converter. Explain how single phase dual converter works in all four quadrants. 7

Unit-IV

4. (a) Define constant frequency mode & variable frequency mode of chopper. 2

- (b) With help of neat sketch & waveforms. Explain single phase full bridge inverter using R (Resistive) load. 7
- (c) With help of neat sketch & waveforms, explain working of Jone's chopper. 7
- (d) With help of neat sketch & waveforms and explain working of 3 phase bridge inverter using 180° conduction mode. 7

Unit-V

5. (a) What is step down cycloconverter. 2
- (b) Explain the TRIAC based AC voltage controller. 7
- (c) With help of circuit diagram & waveforms explain working of three phase to single phase cycloconverter. 7
- (d) Write short notes on following : 7
- (i) Integral cycle control in AC voltage controller.
 - (ii) Single phase to single phase cycloconverter using bridge configuration.