

328833(28)

B. E. (Eighth Semester) Examination, April-May 2021

(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). Avoid unnecessary writing.

Unit-I

1. (a) Define the following : 2
- (i) Latching and Holding Current
 - (ii) Rise time & Spread time

[2]

- (b) Describe different modes of operation of a Thyristor with the help of its static I-V characteristics. 7
- (c) Discuss the two transistor model of Thyristor. Derive an expression for the anode current and discuss there from the turn-ON mechanism. 7
- (d) Explain in short : (any two) 7
- (i) IGBT
 - (ii) MCT
 - (iii) GTO

Unit-II

2. (a) Briefly explain Light Triggering method of Turning ON the SCR. 2
- (b) Discuss with relevant waveform : 7
- (i) Class B Commutation method
 - (ii) Class C Commutation method
- (c) SCRs with a rating of 1000 V and 200 A are available to be used in a string to handle 6 kV and 1 KA. Calculate the number of series and parallel unit required in case derating factor is (a) 0.1 and (b) 0.2. 7

328833(28)

[3]

- (d) Explain single phase half wave rectifier with RLE load. 7

Unit-III

3. (a) Write two differences between circulating and non-circulating current type dual converter. 2
- (b) Explain full bridge converter with RL load with suitable waveforms. 7
- (c) What is the difference between Symmetric and Asymmetric bridge single phase semi converter? Explain it with help of waveforms. 7
- (d) Explain three-phase three pulse converters and draw output waveforms for $\alpha = 0^\circ$ and $\alpha = 30^\circ$. 7

Unit-IV

4. (a) Define Duty cycle of Chopper. 2
- (b) With the help of neat circuit diagram and waveform, explain briefly the operation of three phase bridge inverter with resistive load 120° conduction mode. 7

328833(28)

PTO

[4]

- (c) With help of neat sketch, explain the operation of Jones chopper. 7
- (d) A DC chopper has resistive load of $R = 20 \Omega$ and input voltage drop of 2 V and chopping frequency is 1 kHz. If the duty cycle is 0.6 and input voltage is 200 V determine : 7
- (i) Average output voltage
 - (ii) RMS output voltage
 - (iii) Effective input resistance of chopper
 - (iv) Chopper efficiency

Unit-V

5. (a) What is the difference between Step up and Step down cyclo converter? 2
- (b) Explain single phase to single phase step up mid-point cyclo converter. 7
- (c) Explain in detail Triac based AC voltage regulator. 7
- (d) State and explain Integral cycle control techniques used in AC controllers with suitable waveforms. 7