



CBCS SCHEME

18EE53

Fifth Semester B.E. Degree Examination, June/July 2024 Power Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Mention the six types of power electronic circuit indicating circuit diagram with input and output waveform. Mention two applications of each. (15 Marks)
- b. Briefly explain about different types of power diodes. (05 Marks)

OR

- 2 a. Consider a full wave rectifier with resistive load and center tapped transformer, determine :
 - i) Efficiency
 - ii) The FF
 - iii) The RF
 - iv) The TUF
 - v) The input power factor PF. (10 Marks)
- b. Draw and explain the significant of freewheeling diode with switched RL load with Mode-1 and Mode-2. (10 Marks)

Module-2

- 3 a. Draw and n-channel enhancement type MOSFET circuit and draw the transfer characteristic and output characteristic. (10 Marks)
- b. Explain the switching model of MOSFETS with switching waveforms and times. (10 Marks)

OR

- 4 a. Draw and explain the cross section of Bipolar junction transfer, transient model and switching times. (10 Marks)
- b. Draw the cross section and equivalent circuit of IGBTs and explain its working with output and transfer characteristics. (10 Marks)

Module-3

- 5 a. What is a Thyristor? Draw and explain the cross section VI characteristics and two transistor model of thyrestor. (10 Marks)
- b. Briefly explain about different types of thyristers (At least five types). (10 Marks)

OR

- 6 a. Briefly explain the following :
 - i) di/dt Protection
 - ii) di/dt protection. (10 Marks)
- b. Draw and explain the VI characteristics, cross section and symbols of DIAC. (10 Marks)

Module-4

- 7 a. Draw the circuit diagram with input and output voltage and current wave form of single phase full converter with RL load. Explain its working. (10 Marks)
- b. With suitable diagrams, explain about single – phase full-wave controllers with resistive loads. (10 Marks)

OR

- 8 a. With the aid of input and output voltage waveform and circulating inductor voltage explain the working of single phase dual converter. (10 Marks)
- b. Draw the typical waveforms of single phase AC voltage controller with RL load which include input supply voltage and output voltage and voltage across thyristor T_1 . Briefly explain each one. (10 Marks)

Module-5

- 9 a. What are the performance parameters of DC – DC converters? (10 Marks)
- b. Briefly explain the following :
- i) Principle of step down operation
 - ii) Principle of step up operation
- With respect to DC – DC converter. (10 Marks)

OR

- 10 a. Briefly explain about classification of DC–DC converters. (10 Marks)
- b. With diagram and waveform explain about principle of operation of single phase bridge inverters. (10 Marks)
