

CBCS SCHEME

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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)

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