



# CBCS SCHEME

18MT62

## Sixth Semester B.E. Degree Examination, June/July 2023 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. Define power electronics. List the applications of power electronics. (10 Marks)  
b. What are the peripheral effects of power electronic equipments? What are the remedies for them? (10 Marks)

OR

- 2 a. Explain the isolation of gate drive using:  
i) Pulse transformers  
ii) Optocouplers. (10 Marks)  
b. Write the symbol and control characteristics of the following devices:  
i) IGBT ii) SCR iii) GTO iv) MOSFET v) MCT. (10 Marks)

### Module-2

- 3 a. Explain two transistor model of SCR and derive the expression for anode current. (10 Marks)  
b. Define the following:  
i) Latching current  
ii) Holding current.  
Explain V-I characteristics of SCR with different operation modes. (10 Marks)

OR

- 4 a. Define commutation. Explain with neat circuit diagram and waveforms natural commutation. (10 Marks)  
b. Draw the circuit diagram and explain the principle of complementary commutation. (10 Marks)

### Module-3

- 5 a. What is an AC voltage controller? With the help of circuit diagram and waveforms explain the principle of ON-OFF control. (10 Marks)  
b. With the help of circuit diagram and waveforms explain the operation of single phase bidirectional AC voltage controller with resistive load. (10 Marks)

OR

- 6 a. With circuit diagram and waveforms explain the principle of phase-controlled converter operation. (10 Marks)  
b. Explain single phase semi converter with circuit diagram and waveforms (Assume R load). (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-4**

- 7 a. Explain with neat circuit diagram and waveforms the operation of a step down chopper with R load. (10 Marks)  
b. With the help of circuit diagram explain four quadrant class E chopper. (10 Marks)

**OR**

- 8 a. With neat circuit diagram, explain the operation of step up chopper. (10 Marks)  
b. With neat circuit diagram explain the operation of class C chopper. (10 Marks)

**Module-5**

- 9 a. What is an inverter? Write a note on performance parameters of inverters. (10 Marks)  
b. With the help of circuit diagram and waveforms explain the principle of operation of inverters. (10 Marks)

**OR**

- 10 a. Explain with relevant circuit diagram and waveforms single phase full bridge inverter. (10 Marks)  
b. Discuss the following two types of voltage control in single phase inverters:  
i) Single pulse width modulation  
ii) Multiple pulse width modulation. (10 Marks)

\*\*\*\*\*