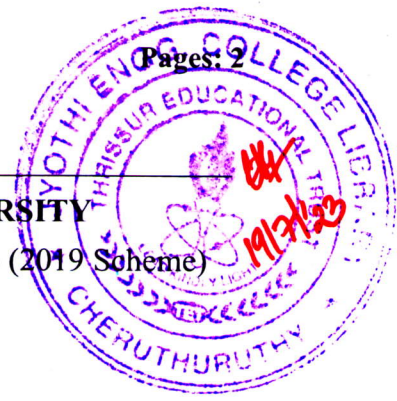


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R, S) / S4 (PT) (R, S) Examination June 2023 (2019 Scheme)

**Course Code: ECT322****Course Name: POWER ELECTRONICS**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions, each carries 3 marks.*

		Marks
1	What is holding current and latching current in SCR?	(3)
2	Draw the VI characteristics of GTO and list its various modes.	(3)
3	Draw the circuit diagram of a single-phase half-wave fully controlled rectifier with RL load. Also draw the load voltage and current waveform	(3)
4	What is the purpose of using a freewheeling diode in a full wave-controlled rectifier with an inductive RL load?	(3)
5	Describe the forward converter with its circuit and waveforms.	(3)
6	What is the difference between isolated and non-isolated converters? What are the different types of isolated converters?	(3)
7	Explain the working principle of the push-pull inverter.	(3)
8	Define space vector modulation.	(3)
9	What is DC motor drive? List types of DC Motor Drives.	(3)
10	What is power electronics? Give the applications of power electronics.	(3)

PART B*Answer one full question from each module, each carries 14 marks.***Module I**

- 11 a) Draw the structure of a power BJT and explain its static and dynamic characteristics. Explain the phenomenon of quasi saturation in power BJTs. (14)

OR

- 12 a) Describe the working of IGBT with the input and output characteristics. How does latch-up occur in IGBT? (7)
- b) Explain the switching characteristics of a power MOSFET. (7)

Module II

- 13 a) Explain any two gate drive circuits for power MOSFET. (7)
b) Explain the principle of operation of three-phase diode bridge rectifier with circuit diagram and necessary waveforms. (7)

OR

- 14 a) Explain single-phase full wave bridge converter with RLE load using relevant voltage and current waveforms for continuous load current. (14)

Module III

- 15 a) Draw and explain the circuit diagram of the boost converter with inductor current and switching waveform. (10)
b) Explain the working of flyback converter with neat diagram. (4)

OR

- 16 a) With a neat diagram, explain the working principle of an isolated full-bridge DC-DC converter. (7)
b) Draw the circuit diagram of a buck-boost regulator and explain its operation with the equivalent circuit for different modes and waveforms. (7)

Module IV

- 17 a) Explain the principle of operation of switched-mode inverters. Draw the circuit of a full bridge single-phase inverter circuit and explain its operation with relevant waveforms for R load. (14)

OR

- 18 a) Explain in detail the two conduction modes of a three-phase inverter. (14)

Module V

- 19 a) Explain any two residential applications of power electronic circuits. (7)
b) Write a short note on VSI Induction motor drive. (7)

OR

- 20 a) Explain any two industrial applications of power electronics. (7)
b) Illustrate the principle of adjustable-speed DC drive. (7)
