Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R,S) / S4 (PT) (R,S) Examination May 2024 (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	Explain the structure of IGBT with neat cross sectional diagram.	(3)
2	Compare Power BJT and Power MOSFET based on the need of driver circuits and power loss across the devices	(3)
3	How a snubber circuit protects the power device?	(3)
4	What is the need for using a freewheeling diode in RL load?	(3)
5	Write down the governing equation of DC-DC buck converter and explain the role of duty cycle in the equation.	(3)
6	Explain the working of flyback converter.	(3)
7	Explain the circuit of half bridge Inverter.	(3)
8	Explain PWM technique in sinewave inverters	(3)
9	What is DC motor drive? List types of DC Motor Drives	(3)
10	Why rotor never runs at synchronous speed?	(3)

PART B

Answer one full question from each module, each carries 14 marks.

Module I

11		With neat waveforms, explain the static and dynamic characteristics of the power MOSFET.	(14)

OR

12		With neat waveforms, explain the static and dynamic characteristics of SCR.	(14)

Module II

13	a)	Explain with circuit diagram and waveforms the working of three-phase diode bridge rectifier with R load	(14)

OR

14	a)	Explain any two gate drive circuits for power MOSFET.	(7)

b) Explain the principle of working of single-phase centre taped controlled rectifier with RL load (7)

Module III

15 a) Draw and explain the circuit diagram of the buck converter with inductor current and switching waveform. (9)

b) With a neat diagram, explain the working principle of an isolated full-bridge DC- DC converter (5)

OR

16 a) Draw and explain the circuit diagram of the buck- boost converter with inductor current and switching waveform (8)

b) Discuss full-bridge converter with circuit diagram and waveforms (6)

Module IV

17 a) Illustrate the working principle of three phase inverter. (14)

OR

18 a) Explain the operation of single-phase push pull inverter (7)

b) Illustrate the principle of space vector modulation in three phase inverters (7)

Module V

19 a) Explain any two industrial and residential applications of power electronics (14)

OR

20 a) Explain the block diagram of induction motor drive circuit. (8)

b) Explain any two residential applications of power electronic circuits. (6)

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