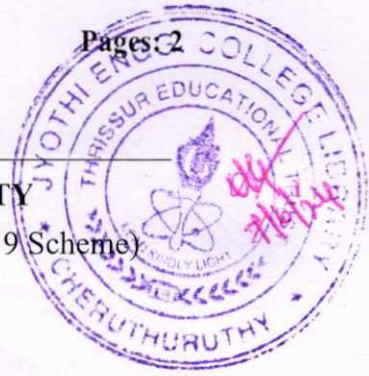


Reg No.: \_\_\_\_\_

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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