Reg No.:_____ Name:_____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

**Course Code: EC307**

**Course Name: POWER ELECTRONICS & INSTRUMENTATION**

Max. Marks: 100 Duration: 3 Hours

**PART A**

***Answer any two full questions, each carries 15 marks.***

| | | Marks |
|---|---|---|
| 1a) | With neat diagram, explain the structural features of Power MOSFET. | (6) |
| 1b) | Draw the Safe Operating Area (SOA) of (i) Power BJT (ii) Power MOSFET | (6) |
| 1c) | Explain the second breakdown phenomena in Power BJT | (3) |
| 2a) | Explain the switching characteristics of a power MOSFET | (7) |
| 2b) | With neat diagram, explain the working principle of an isolated full-bridge DC-DC converter. | (8) |
| 3a) | Explain the working of a non-isolated buck DC-DC converter. Also obtain the expression for the output voltage in terms of duty-ratio and input voltage. | (7) |
| 3b) | With neat block diagram, explain the working of an isolated multiple output switched mode power supply | (6) |
| 3c) | Compare the linear regulated power supply with a switched mode power supply | (2) |

**PART B**

***Answer any two full questions, each carries 15 marks.***

| | | |
|---|---|---|
| 4a) | With neat diagram, explain the working principle of a full-bridge square wave inverter with RL load. Indicate the commutation sequences of the devices. | (8) |
| 4b) | The single-phase full bridge inverter has a resistive load of R=10Ω and the dc input voltage is Vs=220 V. Determine (a) the rms output voltage at the fundamental frequency $Vo_1$(rms); (b) The output power $P_o$ | (7) |
| 5a) | Explain the working principle of a space vector PWM inverter. | (9) |
| 5b) | Explain the principle of measurement of resistance using Wheatstone bridge. | (6) |
| 6a) | Explain the principle of measurement of capacitance using Schering's bridge. | (6) |
| 6b) | Explain the static characteristics of a measuring instrument | (9) |

## PART C

***Answer any two full questions, each carries 20 marks.***

| | | |
|---|---|---|
| 7) | Explain the working principle of (i) Capacitance transducer (ii) Hall Effect Transducer (iii) Proximity Transducer | (20) |
| 8a) | Explain the working principle of a capacitor microphone | (6) |
| 8b) | Explain the working principle of Audio Power meter | (6) |
| 8c) | With neat block diagram, explain the working principle of spectrum analyzer | (8) |
| 9a) | Explain the working principle of digital voltmeter | (8) |
| 9b) | With neat block diagram, explain the working principle of Logic analyzer | (12) |

****