

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.

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|---|-----|
| 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 $R=10\Omega$ and the dc input voltage is $V_s=220\text{ V}$. Determine (a) the rms output voltage at the fundamental frequency $V_{O1}(\text{rms})$; (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)
