

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S, FE) / S3 (PT) (S,FE) Examination June 2024 (2015 Scheme)

**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

- 1 a) With neat diagram, explain the structural features of an n-channel enhancement type Power MOSFET. (6)
- b) Explain the output characteristics and switching characteristics of an n-channel enhancement type Power MOSFET in common source configuration. (9)
- 2 a) Explain the working of a non-isolated Boost DC-DC converter with circuit diagram and necessary waveforms. (9)
- b) In a non-isolated Boost converter operating at 50 KHz under the continuous conduction mode with an input dc voltage $V_{in} = 10V$. The duty ratio of the converter is 70%, calculate the output voltage. (3)
- c) What are the advantages of isolated DC-DC converters over basic converters (3)
- 3 a) Explain the working of a flyback DC-DC converter with the help of circuit diagram and necessary waveforms. (7)
- b) Draw the Safe Operating Area of IGBT (3)
- c) Explain the structural features of the IGBT. (5)

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

- 4 a) Explain the working of a single phase full bridge inverter for R and RL load with circuit diagram and necessary waveforms. (12)
- b) Compare the linear regulators versus switching regulators (3)
- 5 a) Explain the principle of measurement of capacitance using Schering's bridge. (9)
- b) Define the following static characteristics of a measuring instrument: (6)
 - (i) Accuracy (ii) Precision (iii) Resolution
 - (iv) error (v) sensitivity (vi) linearity

- 6 a) With block diagram explain the operation of Offline UPS system. Write any two disadvantages of online UPS over offline UPS (8)
- b) Describe the principle of operation of Wheatstone bridge and derive the expression for unknown resistance. (7)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Explain the various classifications of Transducers with examples and applications. (12)
- b) With necessary diagrams explain the principle of working of a linear variable differential transformer. (8)
- 8 a) With neat block diagram, explain the working of a logic analyser. (8)
- b) Explain the principle of digital frequency measurement with the help of a block diagram. (8)
- c) List any four types of digital voltmeter (4)
- 9 a) Explain the working of a direct frequency synthesizer with a block diagram. (10)
- b) Explain the principle of capacitive transducers & RTD. (10)