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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S, FE) / S3 (PT) (S, FE) Examination December 2023 (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 Power BJT. (6)

b) Explain the steady-state output and switching characteristics of Power BJT (9)

2 a) Explain the working of a non-isolated buck-boost DC-DC converter with circuit diagram and necessary waveforms. (8)

c) Explain the isolated full bridge DC-DC converter with the help of circuit diagram and necessary waveforms. (7)

3 a) With neat diagram, explain the operation of flyback converter. (8)

b) Explain how electrical switches are classified? Give examples of power semiconductor switches for each type. What are the properties of an ideal semiconductor switch? (7)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Explain the working principle of space vector PWM inverter for a three phase full bridge inverter. (12)

b) What is need for the "dead time" in a full bridge inverter circuits? (3)

5 a) Explain in detail, the functional block diagram of a generalised measuring instrument (9)

b) Explain the principle of resistance measurement using Whetstone's bridge with the help of a schematic. (6)

6 a) With neat circuit diagram and relevant waveforms, explain the principle of single pulse width modulation applied to a single phase full bridge inverter. (8)

b) Explain the principle of inductance measurement using MAXWELL bridge and derive the balancing condition. (7)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Explain the working of a general purpose spectrum analyzer with a neat block diagram	(10)
	b)	Explain the working of a digital voltmeter with a block diagram.	(10)
8	a)	Explain the working of	
		(i) Hall Effect sensor,	(7)
		(ii) Proximity sensor,	(7)
		(iii) capacitor microphone	(6)
9	a)	Explain the steps involved in the selection of a transducer?	(5)
	b)	Explain the principle of a strain gauge transducer.	(5)
	c)	Explain the working of a PLL based frequency synthesizer.	(10)

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