Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

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)	Compare power MOSFETs and power BJTs.	(5)
	b)	With neat sketch explain the static and dynamic characteristics of power diodes.	(10)
2	a)	Draw the circuit of a Buck converter and explain its working with relevant waveforms.	(6)
	b)	What are the advantages of isolated converter circuits over the basic converter circuits? Explain the forward converter circuit with relevant waveforms.	(9)
3	a)	Draw the structure of an IGBT and explain its operation.	(8)
	b)	Explain the operation of a Flyback converter.	(7)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	With relevant waveforms explain the circuit of a push pull single phase inverter circuit.	(9)
	b)	Explain the principle of space vector modulation in three phase inverter circuits.	(6)
5	a)	Draw the block diagram and explain the functional elements of an instrument?	(5)
	b)	What do you mean by static characteristics of an instrument? Define any six static parameters of an instrument.	(10)
6	a)	Explain the principle of operation of switched mode inverters. Draw the circuit of a full bridge single phase inverter circuit and explain its operation with relevant waveforms for R load.	(8)
	b)	Draw a Maxwell's bridge circuit and derive the condition for balance of the bridge for finding the unknown inductance value.	(7)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Mention a few criterion that has to be considered in the selection of transducer for a particular application.	(5)

b) What is the principle of operation of Hall effect transducers? Mention any two applications. (7)

c) What is the working principle of strain gauge? Explain the various types of strain gauges with neat sketches. (8)

8 a) Explain the operating principle of time measurement of a signal using digital instruments. (8)

b) Write notes on: (12)

(i) spectrum analyzer

(ii) Electronic multimeter

9 a) Explain the principle of operation of proximity transducers. Give two applications. (10)

b) With a block diagram describe Logic State Analyzer. (10)

****

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 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

1 a) Draw the structure of a power BJT and explain its static and dynamic characteristics. Explain the phenomenon of quasi saturation in power BJTs. (12)

b) Distinguish between linear electronics and power electronics. (3)

2 a) Draw the circuit of a Buck Boost converter and explain its various modes of operation with relevant waveforms. Also write the expression for output voltage, voltage and current ripple under continuous conduction mode. (9)

b) With a neat circuit diagram, explain the operation of a push pull converter circuit with all relevant waveforms. (6)

3 Draw the structure of a power MOSFET and explain its operation. Also explain the static and switching characteristics. Mention a few advantages of power MOSFETs compared to power BJTs. (15)

PART B

Answer any two full questions, each carries 15 marks.

4 Write notes on: (15)

(i) Principle of switched mode inverters.

(ii) Space vector modulation.

(iii) Push pull single phase inverters.

5 a) Explain the various classification of instruments with suitable examples. (10)

b) Distinguish between static characteristics and dynamic characteristics of an instrument? (5)

6 a) Draw a bridge circuit for measuring capacitance and derive the balance condition of the bridge for determining unknown capacitance value. (8)

b) For a Maxwell's bridge, given R1= 10 kohm, C1=10 micro Farad, R2=R3=1 kOhm, find unknown Rx and Lx. (7)

PART C

Answer any two full questions, each carries 20 marks.

7 a) How the transducers are classified? Explain the working principle of a strain (10)

gauge.

b) Explain the working of a capacitor micro phone with relevant figures. (10)

8 a) Explain: (12)
(a) Frequency synthesizer
(b)Electronic multimeter

b) What is the principle of operation of proximity transducers? Explain inductive and capacitive type proximity transducers. (8)

9 a) With a neat sketch, explain the working principle of a digital storage oscilloscope? List a few applications. (10)

b) Explain the operating principle of the following transducers: (10)

(i) Hall effect transducers

(ii) LVDT

****

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)

****

Reg No.:_____ **00000EC307121902** Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth semester B.Tech degree examinations (S) September 2020

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)	Explain the structure of power BJT with neat schematic.	(6)
	b)	Explain switching characteristics of power diode with the help of waveform.	(6)
	c)	What is the importance of free-wheeling diodes in converters?	(3)
2	a)	Draw and explain the circuit diagram of Boost converter with inductor current and switching waveform.	(8)
	b)	Describe the working of IGBT and draw input and output characteristics. How does latch up occurs in IGBT?	(7)
3	a)	Define the working of fly back converter with neat diagram.	(5)
	b)	Draw the VI characteristics of GTO and list its various modes.	(3)
	c)	Explain the working of full bridge isolated converters with help of circuit diagram and relevant waveform.	(7)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	List any five differences between offline UPS and online UPS.	(5)
	b)	With neat circuit diagram and switching waveform explain the working of push pull inverters.	(10)
5	a)	Explain how to measure an unknown resistance using Wheatstone's bridge with the help of schematic.	(5)
	b)	Describe phase vector modulation of three phase inverter.	(5)
	c)	Define the following Static Characteristics: i) Accuracy ii) Precision iii) Repeatability iv) Reproducibility v) Resolution	(5)
6	a)	List any two differences between half bridge and full bridge inverter.	(3)
	b)	Explain different classification of instruments.	(8)
	c)	Define Q-factor.	(4)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Differentiate transducer from sensor. Explain various classification of transducer with examples.	(10)
	b)	Describe the working of Audio power meter with circuit diagram.	(10)
8	a)	What is the working principle of resistance transducer? Explain the working of stain gauge with neat sketch.	(8)
	b)	Describe the operation of proximity transducer with neat diagram.	(6)
	c)	Explain the block diagram of logic state analyser.	(6)
9	a)	List out any four specifications of digital voltmeter.	(4)
	b)	Explain the working principle of Hall effect transducer with neat diagram.	(6)
	c)	Explain the measurement of frequency using digital instrument with neat schematic.	(10)

****