Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021

Course Code: EE364
Course Name: SWITCHED MODE POWER CONVERTERS

Max. Marks: 100   Duration: 3 Hours

Graph Sheets will be provided

PART A

	Answer all questions, each carries 5 marks.	Marks
1	A boost converter operating under continuous conduction mode with an input voltage of 100 V switched at 30 kHz of switch frequency is having an output voltage of 250 V. If output current is 2A, determine the value of output capacitor. Given inductor ripple current is 0.2A and capacitor ripple voltage is 0.60V.	(5)
2	Explain the advantages of switched mode power converters.	(5)
3	Analyse the working of half bridge dc-dc converter with circuit diagram and waveform.	(5)
4	Derive expression for switching utilisation ratio of three phase full-bridge inverters.	(5)
5	Explain hysteresis current control of voltage source inverter.	(5)
6	Compare DC utilisation of space vector modulation with sine PWM modulation.	(5)
7	Explain the advantages of resonant converters.	(5)
8	Explain parallel resonant circuit.	(5)

PART B
Answer any two full questions, each carries 10 marks.

9	a)	Explain the working of buck -boost converter under continuous conduction mode of operation with circuit diagram and relevant waveforms.	(5)
	b)	Design a buck converter working in conduction mode of operation with following specifications: Input voltage = 50 V, output current = 3 A, output voltage = 25 V, switching frequency = 50 kHz, inductor ripple current = 0.3 A & capacitor ripple voltage = 0.25 V	(5)
10	a)	Explain working of cuk converter with circuit and neat waveforms. Derive the output voltage to input voltage relation.	(5)

	b)	Draw the inductor voltage waveform of a buck converter and derive the input –output voltage relation in terms of duty cycle.	(5)
11	a)	Explain the working of full bridge dc-dc converter under PWM with unipolar voltage switching.	(7)
	b)	Compare bipolar voltage and unipolar voltage switching of full bridge dc-dc converter.	(3)

PART C

Answer any two full questions, each carries 10 marks.

12	With neat circuit diagram and waveforms, explain the operation of flyback converter.	(10)
13 a)	Explain the output control of a VSI by voltage cancellation method with waveform.	(5)
b)	Calculate the duty ratio of a push pull converter having input voltage of 200V and output voltage of 35 V. The transformer of push pull converter has 20 turns in secondary and 60 turns in the primary.	(5)
14	Illustrate the working of three phase sine PWM inverter with circuit diagram and waveforms.	(10)

PART D

Answer any two full questions, each carries 10 marks.

15	How switching pulses are generated using space vector modulation. Explain with an example of any one sector.	(10)
16 a)	Compare ZCS & ZVS Resonant Converters.	(5)
b)	Explain selective harmonic elimination switching.	(5)
17	With neat circuit and waveforms, explain any ZCS resonant switch converter.	(10)

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