K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:ETC	Pattern:2022
Name of Course:Power Electronics	Course Code:ETC223012
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Create a comparison table between SCR and IGBT based on: • Control Terminal (Voltage/Current) • Switching Speed • On-state Voltage Drop • Typical Power Rating • Suitability for High-Frequency Switching • Ease of Turn-Off	(6)	CO1
Question No. 2			
2a)	Explain the operation of Single phase Semi converter for RL load with necessary waveforms Derive an expression for rms and average o/p voltage	(6)	CO2
Question No. 3			
3a)	A step up chopper is used to deliver load voltage is 500V from 220V DC source. If the blocking period of thyristor is 80μs, compute the turn on time.	(8)	CO3
	OR		
3b)	What is the need of SMPS? Explain with block schematic working of SMPS.	(8)	CO3
3c)	Explain the working of step down (Buck converter) with the help of suitable waveforms and derive an expression for average & RMS output Voltage.	(8)	CO3
	OR		
3d)	Give classification of choppers based on quadrants ?	(8)	CO3
Question No. 4			
4a)	Explain working of single phase half bridge inverter for R load with input & output waveforms.	(8)	CO4
	OR		

4b)	Explain harmonics in inverters Reduction techniques to reduce harmonics	(8)	CO4
4c)	A single phase full bridge inverter is operated from a 48V battery and supplying power to a resistive load of 10 Ω. Determine: a. The fundamental output rms voltage and first three harmonics rms voltages b. Output rms power	(8)	CO4

OR

4d)	Explain how harmonics can be reduced by 120 degree mode with gate signals and output waveforms.	(8)	CO4

Question No. 5

5a)	Explain Operation of Online UPS with block diagram	(8)	CO5

OR

5b)	Enlist Types of UPS and compare them.	(8)	CO5
5c)	**What are the different types of HVDC links? What are the main advantages of HVDC transmission over HVAC transmission?**	(8)	CO5

OR

5d)	Explain various battery charging models for EVs	(8)	CO5

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