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:V
Class:TY	Program:B.Tech
Branch Code:ETC	Pattern:2023
Name of Course:VLSI design and Technology	Course Code:2302303
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)	Compare CPLD with FPGA.	(6)	CO1
Question No. 2			
2a)	Write verilog code for half adder in dataflow modelling and behavioral modelling.	(6)	CO2
Question No. 3			
3a)	Design and Implement CMOS 4 input NAND gate in switch level modelling along with test bench in verilog HDL	(8)	CO3
	OR		
3b)	Design two floors lift controller with verilog HDL code	(8)	CO3
3c)	Design and Implement 2:4 decoder using structural modelling along with test bench.	(8)	CO3
	OR		
3d)	Design a 4 bit ripple carry adder using structural modelling in verilog.	(8)	CO3
Question No. 4			
4a)	Explain voltage transfer Characteristics of CMOS Inverter. Plot Approximate VTC and mark different regions of operation.	(8)	CO4
	OR		
4b)	Design and implement 4:1 MUX using transmission gate	(8)	CO4
4c)	Implement CMOS function Y=(A+BCD)' along with stick diagram.	(8)	CO4
	OR		
4d)	Implement Y=[AB+C(D+E)]' using CMOS logic. Explain PDN and PUN for A=1,B=0, C=1, D=0, E=1.	(8)	CO4
Question No. 5			

5a)	Define metastability in flip flops. What are the methods to overcome meta-stability. Explain anyone in detail.	(8)	CO5

OR

5b)	Explain stuck at 0 and stuck at 1 fault in brief with one example.	(8)	CO5
5c)	What do you mean by JTAG . Explain with suitable diagram.	(8)	CO5

OR

5d)	Write short note on: Controllability and Observability with examples.	(8)	CO5

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