



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ETC	Pattern:2022
Name of Course:VLSI Design and Technology	Course Code:ETC222013
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 02 pages.
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.

Question No. 1 Attempt following Question

- 1a) Implement following Boolean function using PAL (6) CO1
 $F1 = \sum m(0,2,3,4,5,6,7,8,10,11,15)$, $F2 = \sum m(1,2,8,12,13)$

Question No. 2 Attempt following Question

- 2a) Explain different Verilog operators with example in detail (6) CO2

Question No. 3 Attempt following Question

- 3a) Explain difference between Task and Function (8) CO3

OR

- 3b) Write Verilog test bench for full adder (8) CO3

- 3c) Design and implement a 4:1 Multiplexer using a) Data Flow modeling b) Behavioral modeling in verilog HDL (8) CO3

OR

- 3d) Write verilog code for CMOS 2 input NAND gate in switch level modeling (8) CO3

Question No. 4 Attempt following Question

- 4a) Design and Implement 2:1mux using Transmission gates and Conventional method. (8) CO4

OR

- 4b) Draw CMOS inverter circuit and explain Voltage transfer characteristics. (8) CO4

4c) Design CMOS logic for $Y=(AB+CD)'$ and verify its truth table. (8) CO4

OR

4d) Draw stick diagram and logic diagram for CMOS 2 input NOR gate (8) CO4

Question No. 5 Attempt following Question

5a) What is the need of boundary scan? Explain boundary scan technique in detail. (8) CO5

OR

5b) Explain TAP controller with FSM and its instructions. (8) CO5

5c) Explain IEEE 1149.1 architecture in detail. (8) CO5

OR

5d) Explain Stuck at Fault models in brief. (8) CO5

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