

Nov - Dec 2024 Jan - Feb 2025		
B. Tech Program: Electronics and Telecommunications Scheme: IIB		
Regular Examination: TY Semester: V		
Course Code: EXC502_IIB Course Name: Digital VLSI Design		
Date of Exam: 25th Nov 24	Duration: 02.5 Hours	Max. Marks: 60
Supplementary 01-02-2025		

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

	Marks	CO	BT
Q 1 Solve any two questions out of three: (05 marks each)	10		
a) Explain output VI characteristics of an nMOS with a proper diagram.		CO1	U
b) Define the following terms: V_{IH} , V_{IL} , V_{OH} , V_{OL} , V_{TH}		CO2	R
c) Explain cascading problem in domino with an example.		CO3	U
Q 2 Solve any two questions out of three: (05 marks each)	10		
a) Differentiate between NAND based ROM and NOR based ROM		CO4	A
b) Draw a circuit diagram of full adder as a CMOS mirror circuit.		CO5	A
c) Draw HLSM of a Soda Dispenser Machine using RTL design technique.		CO6	C
Q.3 Solve any two questions out of three. (10 marks each)	20		
a) i. Draw a stick diagram of a CMOS inverter, (02 marks)		CO1	U
ii. Draw the layout of a CMOS inverter. (08 marks)			
b) Consider a CMOS inverter with the following parameters: $V_{DD} = 1.2\text{ V}$, $V_{tn} = 0.5\text{ V}$, $V_{tp} = -0.48\text{ V}$, $\mu_n C_{ox} = 98\mu\text{A/V}^2$, $\mu_p C_{ox} = 46\mu\text{A/V}^2$, $(W/L)_n = 20$, $(W/L)_p = 30$ and output load capacitance is 10fF. Calculate rise time and fall time.		CO2	A
c) Design 3 tap FIR filter using RTL design technique. What is the delay of 100 tap FIR filter, if the delay of an adder is 2ns and the delay of a multiplier is 20ns.		CO6	C
Q.4 Solve any two questions out of three. (10 marks each)	20		
a) Realize following circuits using static CMOS design style i. JK Latch ii. Half Adder		CO3	A
b) Design NOR based ROM to store the following data: 0101, 0001, 1101, 1010. Draw stick diagram for the same.		CO4	A
c) Draw a block diagram of shift and add multiplier. Explain its operation.		CO5	U
