Aug 2025 (Supplementary) Carry-On

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: **11th ~~Nov~~ Aug 25** Duration: **02.5 Hours** Max. Marks: **60**

nstructions:
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	R
b)	Explain the problem of CMOS latch up in a CMOS inverter.		CO2	U
c)	Design NOR based ROM to store the following data: 1001, 0001, 0111, 0010		CO4	Ap
Q 2	Solve any **two** questions out of three: (05 marks each)	**10**		
a)	Realize 4:1 Mux, using transmission gate design style.		CO3	Ap
b)	Draw a block diagram of 4-bit Ripple Carry Adder. If the delay of a block is 2 ns, calculate the total delay.		CO5	Ap
c)	Differentiate between HLSM and FSM.		CO6	Ap
Q.3	Solve any **two** questions out of three. (10 marks each)	**20**		
a)	For an nMOS, i. What are the different types of capacitances? Show all the capacitance components with a proper diagram. **(05 Marks)** ii. Write an expression for the capacitance values of an nMOS transistor given the following parameters: channel length L, channel width W, channel overlap length L_D, diffusion depth x_j and oxide capacitance per unit area C_{ox}. **(05 Marks)**		CO1	U
b)	Draw and explain 1T DRAM cell. Explain Read 1 and Write 0 operation.		CO4	U
c)	Design a soda dispenser machine using RTL design technique.		CO6	C
Q.4	Solve any **two** questions out of three. (10 marks each)	**20**		
a)	Derive expressions for V_{IL} and V_{OL} in CMOS Inverter.		CO2	U
b)	Realize the following expression using static CMOS design style. Also draw the stick diagram following the Euler's path. $Y = \overline{(A + BC)}$		CO3	Ap
c)	Explain the principle of operation of Carry Select Adder. Demonstrate the addition of the following numbers using the same principle, $(1001\ 0010\ 1001\ 1110)_2$ and $(0011\ 0101\ 1000\ 0011)_2$.		CO5	Ap

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