

Hall Ticket No.:

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Set-1

Course Code: 23MTVLE01

MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE
(AUTONOMOUS)

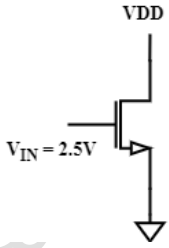
I - M.Tech. I - Semester (MR23) Regular Examinations, March - 2024

VLSI TECHNOLOGY**Department of Electronics & Communication Engineering**

Time: 3 hours

Max. Marks: 75

Answer **ALL** the questions – 5*15=75 Marks

Q. No.	Question	Marks	CO	BL
1	a) Derive $I_{ds}-V_{ds}$ relationship of MOS Transistor in Resistive region?	8M	CO1	L3
	b) Derive an expression for trans-conductance of an n-channel enhancement MOSFET operating in active region?	7M	CO1	L3
(OR)				
2	a) What is difference between enhancement type and depletion type MOSFETs? Explain why enhancement type MOSFET is preferred?	8M	CO1	L4
	b) Consider an N-MOSFET as shown in figure below. What will be the change in I_D if V_{DD} changes from 3.3 to 1.8V. Consider $V_{TH}=0.5V$ and $\mu_n C_{ox} W/L=100\mu A/V^2$.	7M	CO1	L5
				
3	a) What are the steps involved in CMOS n-Well Fabrication? Explain with neat sketches.	8M	CO2	L3
	b) What is meant by latch up? How can it be eliminated?	7M	CO2	L4
(OR)				
4	a) Determine the pull up to pull down ratio for NMOS inverter driven by another NMOS inverter?	8M	CO2	L3
	b) Analyze CMOS inverter with its transfer characteristics?	7M	CO2	L4
5	a) Draw the schematic diagram, stick diagram and layout of 2-input CMOS NAND	8M	CO3	L4
	b) Explain 2 μm Double Metal, Double Poly CMOS / Bi-CMOS Rules?	7M	CO3	L4
(OR)				
6	a) What is the need of scaling in MOS circuits? Derive the Scaling factors for MOS transistor parameters?	8M	CO3	L4
	b) Draw a stick diagram and layout for CMOS logic $Y = (A+B+C)'$?	7M	CO3	L5

7	a	Give the design rules for the following cases with neat sketches: (i) Polysilicon – polysilicon (ii) n-type diffusion – n-type diffusion (iii) n-type diffusion – p-type diffusion (iv) metal 1 – metal 2	8M	CO4	L3
		Explain the switch logic and give an example for each one?	7M	CO4	L3
(OR)					
8	a	Derive the expression for CMOS inverter delay in terms of rise time and fall time?	8M	CO4	L3
	b	Explain about the following types of faults with suitable example: (i) Stuck at faults (ii) Bridge faults (iii) Temporary faults	7M	CO4	L3
(OR)					
9	a	Discuss about switching power dissipation and short circuit power dissipation in detail?	8M	CO5	L4
	b	Draw the VLSI design flow diagram and explain?	7M	CO5	L5
(OR)					
10	a	Explain the different categories of DFT techniques?	7M	CO5	L3
	b	Write a short note on low power SRAM technologies?	8M	CO5	L3

MODEL QUESTION PAPER