Question Paper

Exam Date & Time: 09-Jan-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences (MSIS), Manipal
First Semester Master of Engineering - ME (VLSI Design) Degree Examination - January 2023

Digital Systems and VLSI Design [VLS 5102]

Marks: 100 **Duration: 180 mins.**

Monday, January 9, 2023

Answer all the questions.

1)	a) Describe the basic structure of Amorphous materials, Polycrystals and Single crystals. b) Discuss on crystal defects.	(10)
2)	Explain the thermal oxidation mechanism.	(10)
3)	a) With a neat diagram, describe the structure of a MOSFET b) List the advantages of MOSFET over BJT.	(10)
4)	Explain the concept of holes and islands in patterning. What are the basic photoresist components and their roles in the process?	(10)
5)	List the components of dynamic power dissipation? Explain them briefly with the relevant formulae and diagrams.	(10)
6)	Explain transistor sizing? What is its importance? Explain the T-sizing of the following Boolean expression: Z = [(A.B + C.D).E]'	(10)
7)	Derive a complete low frequency, small signal model for a MOSFET with bulk effect.	(10)
8)	Describe a structured CMOS design? List its advantages? Explain the steps in this design with an example.	(10)
9)	Define noise margin for a gate. How do you determine the noise margin for a CMOS inverter using its DC transfer characteristics.	(10)
10)	a) Explain design rules? Compare lambda-based and micron-based design rules. b) Describe stick diagrams? Illustrate how are they helpful in physical layout? Explain.	(10)

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