Exam.Code:0975
Sub. Code: 34643

2125

M. Tech. (Micro-Electronics)

First Semester

MIC-103: MOS Integrated Circuit Modeling

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

a) What is MOSFET modeling? What are model parameters? Differentiate between charge based and voltage-based MOS modeling.

b) Differentiate between NMOS pass transistor and a CMOS transmission gate.

c) What is the role of a clock in a digital logic? Give one example.

d) What is the difference between a random logic and a structured logic?

e) Give two advantages of a BiCMOS inverter as compared to a CMOS inverter. (5x2)

UNIT - I

II. a) Explain how inversion takes place in a MOSFET? Explain how MOS capacitance varies with the applied gate voltage?

b) List two short channel effects arising in the deep sub micron MOSFETs. And explain why these effects are not desirable. (5,5)

III. a) What is an active resistor? Give its working. How it is different to a passive resistor?

b) Compare the working of a CMOS inverter and a NMOS inverter with active load. (4,6)

IV. Write notes on:-

a) Gate delay and interconnection delays in digital circuits.

b) Dynamic power dissipation in CMOS circuits (5,5)

UNIT - II

V. a) Differentiate between PMOS pass transistors and CMOS transmission gate used in the digital logic and compare the delays in both logics.

b) What is a depletion load MOSFET? How it is different to the enhancement load MOSFET? (5,5)

P.T.O.

VI. a) Explain using a neat diagram the working of a CMOS based SR latch.

b) What is the role of a clock in sequential circuits? (5,5)

VII. Write notes on :-

a) Depletion mode MOSFET

b) Dynamic CMOS circuits. (5,5)

x-x-x