

**EC - 605****B.E. VI Semester**

Examination, June 2014

**VLSI Circuits and Systems***Time : Three Hours**Maximum Marks : 70*

**Note:** Attempt only one question from each unit. All questions carry equal marks.

**Unit - I**

1. a) Explain the physical structure and operation of an n-MOS enhancement transistor.
- b) Explain the VLSI design flow in three domains with the help of Y-chart.

OR

2. a) Explain CMOS inverter and CMOS 2- I/P NAND gate with the help of CMOS logic.
- b) Give the various steps in the CAD tools design process.

**Unit - II**

3. a) What is meant by sequence detector? Explain the design of sequence detector by using  $\Delta$  flip - flop.
- b) What do you understand by the term state diagram? How will you obtain the state table from it?

OR

4. a) Discuss the important function of a sequential machine. What are the capabilities and limitations of finite - state machine?
- b) Find a minimum state reduced machine of the following machine state table.

PS	NS, Z		
	$I_1$	$I_2$	$I_3$
A	C, 0	E, 1	-
B	C, 0	E, -	-
C	B, -	C, 0	A, -
D	B, 0	C, -	E, -
E	-	E, 0	A, -

PTO

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**Unit - III**

5. a) Discuss the minimum requirement of pulse mode and fundamental mode sequential machines.
- b) Explain, how the transition diagram is obtained from a flow table and also define stable and unstable states.

OR

6. a) Discuss different types of the races in asynchronous circuits.
- b) Draw the logic diagram of POS  $Y = (A + \bar{B})(B + C)$ . Show the presence of hazard, its type and a way of removal.

**Unit - IV**

7. a) What is ASM chart? Compare conventional flowchart with ASM chart?
- b) What is the concept of hardware and firmware algorithm? Explain.

OR

8. a) What is system controller? Discuss the design aspect of controller phases. Design a controller for binary multiplier.
- b) What do you understand by a branch sequencer? Explain the four - way branch sequencer with block diagram and static diagram.

**Unit - V**

9. a) Discuss the fault detection test using Boolean differences method and using path sensitizing method.
- b) Write short note on PLD devices.

OR

10. a) What is the concept of programmable read only memory? Explain it with suitable logic diagram.
- b) By using PLA, implement a combinational circuit which takes 4 inputs and produces gray code.

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