

2123
M.E. (Electronics and Communication Engineering)
First Semester
ECE-1104: Digital System Design
(For UIET Only)

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Design Constraints.
- b) Analog and digital conversion related errors
- c) Explain state diagram
- d) Need of modeling & simulation
- e) Difference between CLBs and Function blocks? (5x2)

UNIT - I

- II. a) Explain XC 9500 and its various blocks with the help of diagrams. (2x5)
b) Explain logic representation of a system.

- III. a) Write VHDL source code for a priority Encoder.
b) Explain Generic Array Logic. How GAL differs from PAL? (2x5)

IV. A combinational circuit is defined by the functions:

$$F_1(A,B,C) = \Sigma(3,5,6,7)$$

$$F_2(A, B, C) = \Sigma(0, 2, 4, 7)$$

Implement the circuit with a PLA having three inputs, four product terms, and two outputs. (10)

UNIT - II

- V. a) Define state reduction. What are the rules for state reduction?
b) Explain FSMs. With the help of diagram, explain all the categories of FSM. (2x5)

- VI. a) Design a modulo 10 Gray Code decade counter which can be cascaded with other identical counters to form a modulo n pure synchronous counter. This counter is to be designed to function identical to the 74160 series of counters.

(Sequence: $\rightarrow 0 \rightarrow 1 \rightarrow 3 \rightarrow 2 \rightarrow 6 \rightarrow 14 \rightarrow 10 \rightarrow 11 \rightarrow 9 \rightarrow 8 \rightarrow 1$)

Contd.....P/2

(2)

b) Explain state reduction. Explain the two basic rules for making state assignment. (6,4)

VII. a) Design a special circuit that will produce an output pulse if a sampled data input is tested three times and found to be at a relatively high voltage level an odd number of times, and will then return to an initial condition and start the testing process over again.

b) Explain the internal scan test methodology and BIST. (2x5)

x-x-x