

1129
M.E. (Electronics and Communication Engineering)
First Semester
ECE-1104: Digital System Design

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) Define monotonicity of a D/A converter.
- b) What are the applications of multiplexers?
- c) How are FPGAs programmed?
- d) What are critical races?
- e) What is the need for testing while designing a system? (5x2)

UNIT - I

- II. a) What are the specifications of an A/D converter? What is the minimum quantization error that can be achieved in an A/D converter?
- b) Implement the logic function $F(A, B, C, D) = \Sigma(0, 1, 3, 4, 8, 9, 15)$ using a 8×1 multiplexer. (2x5)
- III. Design a BCD-to-seven-segment decoder and implement using gates. (10)
- IV. a) With the help of a block diagram, explain the internal structure of a PLA. How does it differ from a ROM?
- b) What are FPGAs? With the help of suitable diagrams, describe its architecture. (2x5)

UNIT - II

- V. a) Design a sequence detector that detects a sequence of 1011101 in the given binary input stream in non-overlapped manner.
- b) Design a modulo 7 ring counter which is initialized or reset to state 7. Make certain that your counter is self-correcting.

P.T.O.

(2)

- VI. What is a system controller? What are the phases of design of a system controller? Explain each phase briefly with suitable examples. (10)
- VII. a) How is a built-in self test different from a scan test?
b) Describe briefly the test architecture of boundary scan technique. (2x5)

x-x-x