

201603

May, 2019

**B. TECH (CE)-6th Semester
DIGITAL SYSTEM DESIGN (CE-306-C)**

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What is a K-map? What are its advantages? (1.5)
- (b) Differentiate between Adders and Subtractors using suitable example. (1.5)
- (c) How a sequential circuit can be designed using FPGA? (1.5)
- (d) Explain the procedure how to realization of State machine chart. (1.5)
- (e) Explain the different Faults presented in combinational circuits with examples. (1.5)

- (f) Define a diagnosable sequential machine and how it can be constructed. (1.5)
- (g) Explain microcomputer system. (1.5)
- (h) Differentiate between assignment statement and sequential statement. (1.5)
- (i) Explain test generation and test process in a combinational circuit. (1.5)
- (j) Define fault class. (1.5)

PART-B

2. (a) Determine the essential prime cubes for the following four variable single output function using IISc algorithm $f = 0200 + 1102 + 2201 + 0011 + 0010$. (10)
- (b) What are the basic building blocks of an ASM chart? Draw the ASM chart of a SR flip flop. (5)
3. (a) Describe briefly the various DFT schemes used in digital systems? (5)
- (b) Design an ASM chart for a serial adder with accumulator and show the control block diagram. (10)
4. Implement the following Boolean functions using PAL
 $F1(X, Y, Z) = \sum(1, 2, 4, 6)$ $F2(X, Y, Z) = \sum(0, 1, 6, 7)$
 $F3(X, Y, Z) = \sum(2, 6)$. (15)

5. (a) Draw the general structure of a CPLD and explain how a logic function can be realized on CPLD with simple example. (5)
- (b) Compare ROM, PLA and PAL with respect to all features, programming aspects and applications. (10)
6. (a) Differentiate between CPLDs and FPGAs using suitable examples. (5)
- (b) Explain skills in digital systems design using Computer-Aided-Design (CAD) in detail using suitable examples. (10)
7. Explain different types of flip-flops in detail using suitable examples. (15)
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