22/12/22 (M)

Exam.Code:0929
Sub. Code: 6597

2122

B.E. (Electronics and Communication Engineering)
Fifth Semester
EC-505: Digital System Design

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 Part.*

x-x-x

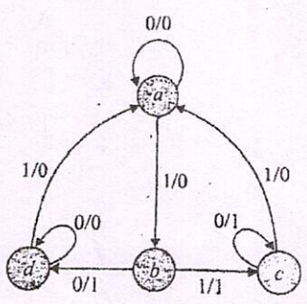
1
a) What are multi output functions? Explain with an example. (2)
b) Explain state assignment with the help of an example. (2)
c) Explain block parity method for error detection and correction. (2)
d) Explain stuck-at-zero and stuck-at-one faults. (2)
e) What is the difference between critical and non-critical races? (2)

Part A

2 (a) Calculate the essential prime implicants for the following using Q-M method:
$Y = \sum m (0,2,4,7,8,16,24,32,36,40,48)$ (5)
(b) Minimize the following using K-map:
$Y(A,B,C,D) = \Pi M (1,2,3,8,9,10,11,14) . d (7,15)$
Also implement the circuit using NOR gates only. (5)
3 (a)Implement the following function $Y(A,B,C) = \sum m (0,1,3,5,7)$ using:
(i) Type 0 Mux designing
(ii) Type 1 Mux designing
(iii) Type 2 Mux designing. (5)
(b) Explain error detection and correction techniques. (5)
4 (a) Explain path sensitizing method for fault detection in combinational circuits. (5)
(b) Assume data 1001101 as number of message bits or data bits without parity bits. Check the error if any and find the correct code using Hamming codes. (5)

Part B

5 (a) Derive the state table and state diagram for the following
JA = XB', KA = 1, JB =X'A', KB = 1 and output Y = B' + X' + A'.
Also specify the type of clocked sequential circuit. (5)
(b) Convert SR flip-flop to D flip-flop. (5)
6 (a) How hazards can be removed? Also explain cycles and hazards in asynchronous circuits. (5)
(b) What are Moore and Mealy machines? Compare the machines with the help of suitable circuit diagram. (5)
7 (a) Write all the methods for fault detection in sequential circuits. Explain any one with suitable example. (5)
(b) Design a circuit that will function according to the given state diagram



(5)

x-x-x