

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 Part.

x-x-x

- Q1
- a) Explain state assignment with the help of an example. (2)
 - b) What are multi output functions? Explain with an example. (2)
 - c) Explain block parity method for error detection and correction. (2)
 - d) Why the numbering in K-map cells are not in sequence? (2)
 - e) What is the difference between critical and non-critical races? (2)

Part A

- Q2 (a) Minimize the following using K-map:
 $Y(A,B,C,D) = \prod M (1,2,3,8,9,10,11,14) \cdot d (7,15)$
Also implement the circuit using NOR gates only. (5)
- (b) 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)

- Q3 (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)

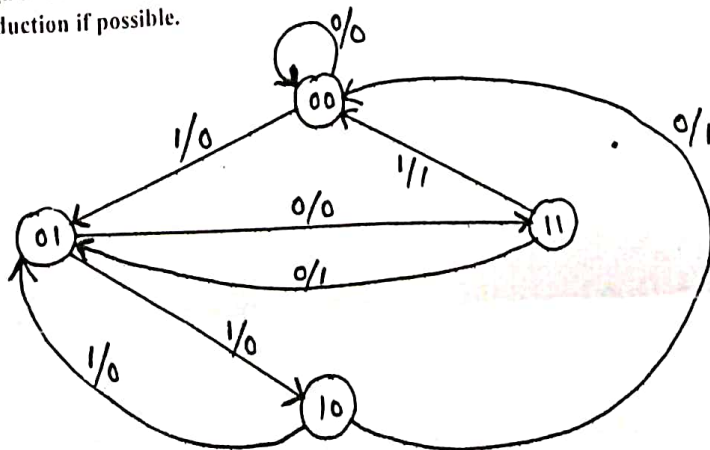
- Q4 (a) Assume data 1001101 as number of message bits or data bits without parity bits. Check the error if any and find the correct code using Hamming codes. (5)
- (b) Explain path sensitizing method for fault detection in combinational circuits. (5)

Part B

- Q5 (a) Derive the state table and state diagram for the following
 $JA = XB'$, $KA = 1$, $JB = X'A'$, $KB = 1$ and output $Y = B' + X' + A'$. (5)
- Also specify the type of clocked sequential circuit. (5)
- (b) Convert SR flip-flop to D flip-flop.

- Q6 (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)

- Q7 (a) Write all the methods for fault detection in sequential circuits. Explain any one with suitable example. (5)
- (b) Design a clocked sequential circuit using T flip-flop for the following state diagram. (5)
- Use state reduction if possible.



x-x-x