THEORY EXAMINATION

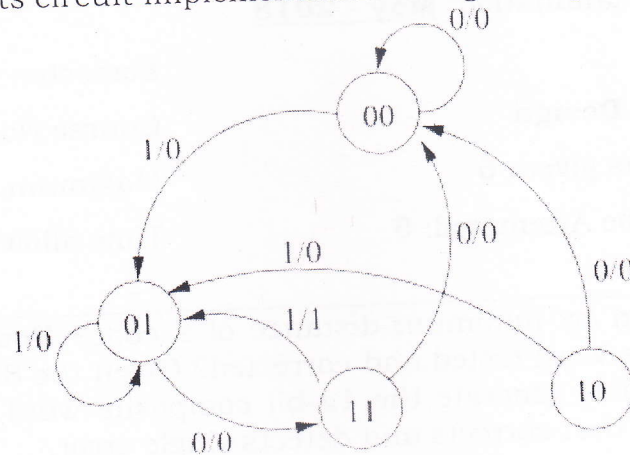Question Paper

Month and Year of the Examination: **May - 2018**

Programme: **B.Tech**   Semester: **2nd**

Subject: **Digital System Design**   Course No: **ITPC 10**

Total number of questions given: **6**   Maximum Marks: **50**

Number of Questions to be Attempted: **5**   Time allowed: **3 hrs**

1. (a)	What do you mean by minimum distance of a code? How is the Hamming Code word tested and corrected? Given the 8-bit data word 01011011, generate the 12-bit composite word for the hamming code that corrects and detects single error.		**06 Marks**
(b)	Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend: i) 11010-10000 ii) 11010-1101 iii) 100-11000 iv) 1010100-1010100		**04 Marks**
2. (a)	Draw the K-Map for the following expression: $F(A,B,C,D)=\sum m(1,4,7,10,13)+ \sum d(5,14,15)$ Minimize it and find the Essential Prime Implicants for the obtained expression.		**05 Marks**
(b)	Draw the circuit of an S-R Flip Flop using NOR Gates. Modify it to include clock. Derive J-K circuit from S-R Flip Flop Circuit & explain its Truth Table.		**05 Marks**
3 (a)	Implement the following logic function using an 8x1 Multiplexer: $F(A,B,C,D)= \sum m(1,3,4,11,12,13,14,15)$		**05 Marks**
(b)	Explain the Look Ahead Carry Generator and discuss its utility in adders.		**05 Marks**
4 (a)	Design and implement a 4-bit BCD-to-Gray Code Converter.		**05 Marks**

(b)	Consider the following state diagram for a circuit with one input X and one output Z. Analyze this state diagram and draw its circuit implementation using T- Flip Flop for Z.	05 Marks

5 (a)	A 4-bit Serial-in, Parallel-out Right shift-Shift Register is to be loaded with the bit pattern 1100. Write the sequence of bit patterns as the clock is applied to the Shift Register if initially all the bits are assumed to be zero. After how many clock cycles will an initial pattern 1100 return?	05 Marks
(b)	What are the steps to convert one type of flip-flop into another type? Show the conversion of S-R flip- flop to J-K flip-flop? Suggest some applications of flip-flops?	05 Marks
6 (a)	Design a MOD-12 Ripple Counter using J-K Flip-Flop. Also, suggest what would be the terminal count of the MOD-12 counter?	05 Marks
(b)	Implement 32x1 MUX using 8x1 MUX.	05 Marks