

Time: 3 Hours

Marks: 80

- N.B. : 1. Question One is Compulsory.  
 2. Solve any Three out of remaining.  
 3. Draw neat and clear diagrams.  
 4. Assume suitable data if required

- Q1 a) What are universal gates? Why are they called so? Explain with suitable example. 4M  
 b) Perform following subtractions using 7's complement method. 4M  
     a)  $(20)_5 - (14)_5$   
     b)  $(20)_{10} - (15)_{10}$   
 c) Perform  $(34)_{10} - (12)_{10}$  in BCD using 10's complement method 4M  
 d) Explain lockout condition. How can it be avoided 4M  
 e) If the 7 bit hamming code word received by receiver is 1011011, 4M  
 assuming the even parity, state whether the received code word is correct or wrong? If wrong locate the bit having error and extract corrected data.
- Q2 a) Reduce using Quine McClusky Method & realize the operation using 10M  
 NOR gates only.  $F(A, B, C, D) = \sum m(0, 1, 2, 8, 10, 11, 14, 15)$   
 b) Explain one digit BCD adder 10M
- Q3 a) Construct 32:1 MUX using 8:1 MUX only. Also comment about select 10M  
 lines used.  
 b) Solve the following using K-Map 5M  
 $F(A, B, C, D) = \pi M(3, 4, 5, 6, 7, 10, 11, 15)$   
 c) Design full adder using half adders and few gates 5M
- Q4 a) Convert SR Flip flop to JK flip flop and T flip flop 10M  
 b) Design 3-bit asynchronous up-down counter 10M
- Q5 a) Design 4-bit Binary to Gray Code Convertor. 10M  
 b) What is race around condition? How it is overcome in Master Slave JK 5M  
 Flip Flop?  
 c) Design 1-Bit Magnitude comparator using logic gates. 5M
- Q6 Write a short note on any Four 20M  
 a) VHDL Modelling Styles  
 b) TTL and CMOS Logic Families  
 c) SISO and PISO Shift Registers  
 d) ALU  
 e) Twisted ring counter

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