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. a) $(20)_5 - (14)_5$ b) $(20)_{10} - (15)_{10}$	4M
	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, 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.	4M
Q2	a)	Reduce using Quine McClusky Method & realize the operation using NOR gates only. $F(A,B,C,D) = \Sigma m(0,1,2,8,10,11,14,15)$	10M
	b)	Explain one digit BCD adder	10M
Q3	a)	Construct 32:1 MUX using 8:1 MUX only. Also comment about select lines used.	10M
	b)	Solve the following using K-Map $F(A,B,C,D) = \pi M(3,4,5,6,7,10,11,15)$	5M
	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 Flip Flop?	5M
	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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