

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		<u>UNIT-I</u>	Marks	CO	BTL
1.	a)	Represent $(199)_{10}$ in the following code: (i) Binary (ii) BCD (iii) 2421 (iv) gray code.	7	1	3
	b)	Perform the subtraction $(-6) - (-13)$ using signed 2's complement representation.	7	1	3
		(OR)			
2.	a)	Convert the following. i. $AB_{16} = ()_{10}$ ii. $12348 = ()_{10}$ iii. $101100112 = ()_{10}$	7	1	3
	b)	Perform the subtraction using 1's complement and 2's complement methods. (i) $11010 - 10011$ (ii) $11000 - 1011$	7	1	3
		<u>UNIT-II</u>			
3.	a)	Determine the complement and dual of the given function. $xy + x(wz + wz')$	7	2	2
	b)	Simplify the following functions using K-map method. i) $f(A,B,C,D) = \sum m(0,2,4,6,7,9,11,14)$ ii) $F(A,B,C,D) = \sum m(2,3,12,13,14,15)$	7	2	2
		(OR)			
4.	a)	Convert the given expression in standard POS form $y = A.(A+B+C)$	7	2	2
	b)	Reduce the following function using k-map technique $F(A,B,C,D) = \Pi M(1,2,3,5,6,7,8,9,12,13)$	7	2	2
		<u>UNIT-III</u>			
5.	a)	Explain the concept of a half subtractor and describe its working with the help of a truth table.	7	3	2
	b)	Implement a BCD adder and explain using relevant block diagram and truth tables.	7	3	3
		(OR)			
6.	a)	Analyze the process of performing subtraction using 2's complement in a binary adder and explain its implementation step by step.	7	3	3
	b)	Analyze the mechanisms of carry generation and carry propagation in a carry look-ahead adder.	7	3	3
		<u>UNIT-IV</u>			
7.	a)	Implement the following Boolean function with 8X1 multiplexer and external gates: $F(A, B, C, D) = \sum (1, 3, 4, 11, 12, 13, 14, 15)$	7	4	3
	b)	Define an encoder. Design octal to binary encoder.	7	4	3
		(OR)			
8.	a)	Construct a 4x16 decoder using logic gates and explain its operation with the help of truth table.	7	4	2
	b)	Design 2-bit digital comparator and explain with neat sketch.	7	4	2
		<u>UNIT-V</u>			
9.	a)	Draw the logic diagram of a JK flip-flop and using excitation table explain its operation.	7	5	2
	b)	Draw and explain the operation of Johnson and ring counters.	7	5	2
		(OR)			
10.	a)	Design a modulo-10 ripple counter.	7	5	2
	b)	What are the different types of registers? Explain the Parallel Input Serial Output shift register	7	5	2