

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
DIGITAL LOGIC DESIGN

(Common to CSE, CSE(IOTCSBT) Branches)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.	Questions	Marks	CO	KL
1	a) Convert gray code 10101110 into its binary equivalent.	[2M]	1	
	b) Draw the NOR gate using NAND gate.	[2M]	2	
	c) Draw the K map for 4 variables.	[2M]	3	
	d) What is the difference between decoder and encoder?	[2M]	4	
	e) Draw the circuit diagram for SR flip flop.	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.	Questions	Marks	CO	KL
UNIT-I				
2.	a) Convert the following to Decimal and then to Octal. i) $125F_{16}$ ii) 10010011_2	[5M]	1	
	b) The binary numbers listed have a sign bit in the left most position and if negative, are in 1's complement form. Perform the arithmetic operations i) $101011 + 111000$ ii) $001110 + 110010$	[5M]	1	
OR				
3.	a) Perform the $(12.04)_{10} - (17.12)_{10}$ using 2's complement method	[5M]	1	
	b) A receiver with even parity hamming code receives the data 1110110. Determine the correct code.	[5M]	1	
UNIT-II				
4.	a) State duality theorem. List Boolean laws and their duals.	[5M]	2	
	b) Test the given expression into canonical SOP form i) $f = AB+BC+CA$ ii) $f=A+AB+ABC$	[5M]	2	
OR				
5.	a) Reduce the Boolean expression i) $F = (\overline{X} \cdot \overline{Y} + Z) + Z + XY + WZ$ into three literals. ii) $F = \overline{A} \cdot \overline{C} + ABC + A \cdot \overline{C} + A \cdot \overline{B}$ into two literals.	[5M]	2	
	b) Implement the following function F with the following two levels forms a) NAND-AND b) AND-NOR $F(A,B,C,D) = \sum (0,1,2,3,4,8,9,12)$.	[5M]	2	
UNIT-III				
6.	a) Obtain minimal SOP expression for the given Boolean function using K-map, and realize using NAND gates. $F = \sum m (0,1,4,5,6,7,9,11,15) + \sum d (10,14)$	[5M]	3	

	b)	Simplify the following Boolean expressions using K-map and implement using NOR gates. $F(A,B,C,D) = AB'C' + AC + A'CD'$	[5M]	3	
OR					
7.	a)	Reduce the following using k-map and implement it in NAND logic $F = \pi M(0,1,2,3,4,7)$	[5M]	3	
	b)	Obtain minimal SOP expression for the Boolean function $F = \sum m(0,5,7,8,9,10,11,14,15)$ using K-map, and realize using NAND gates.	[5M]	3	
UNIT-IV					
8.	a)	Design a combinational logic circuit for full-adder and give its applications	[5M]	4	
	b)	Realize 5-to-32 line decoder using one 2-to-4 and four 3-to-8 decoders	[5M]	4	
OR					
9.	a)	Write about combinational logic circuit for BCD adder.	[5M]	4	
	b)	Draw 16x1 multiplexer tree using 4x1 multiplexer.	[5M]	4	
UNIT-V					
10.	a)	Discuss the T- flip flop & D – flip flop using truth table and circuit.	[5M]	5	
	b)	Write about Master Slave JK flip flop	[5M]	5	
OR					
11.	a)	Draw the circuit of JK flip-flop and explain its operation with the help of its function table.	[5M]	5	
	b)	Design a Mod-8 asynchronous up counter.	[5M]	5	
