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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 22CS3PCLOD **Max Marks: 100**
Course: Logic Design

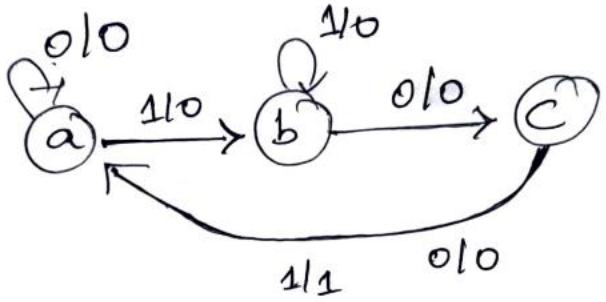
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a	Construct truth table for each of the following Boolean functions i) F (A, B, C)=(A'+B) (B'+C) ii) F(A, B,C)=AB+BC+CA	CO1	PO1	**06**
	b	Draw the logic diagram using gates corresponding to the following Boolean expressions. Assume that the input variables are available in both complemented and uncomplemented form. i) Y=A'B'C'+AB+AC ii) A=X(YZ'+Y'Z)+W' (Y'+X'Z)	CO1	PO1	**06**
	c	Draw the truth table for the logical function M for three inputs A, B and C, where M = F (A, B, C). The output is 0 (zero), if the majority of inputs are zero (0) and one (1) if the majority of inputs are one (1). Write the sum of products expression (SOP) and circuit diagram for M.	CO2	PO2	**08**
		OR			
2	a	Simplify the following Boolean functions to obtain minimal sum expressions. i) F(a,b,c,d)= $\sum$ m(0,2,5,7,8,10,13,15)+ $\sum$d(1,4,11,14) ii) F(a,b,cd)= πM(0,1,4,5,8,9,11)+ πd(2,10)	CO1	PO1	**10**
	b	Using Quine-McCluskey method, obtain all the prime implicants for the following Boolean function: f(a,b,c,d) = $\sum$ m(0,1,2,5,6,7,8,9,10,14)	CO1	PO1	**10**
		UNIT - II			
3	a	Implement the Boolean function f(a,b,c,d)= $\sum$ m(4,5,7,8,10,12,15) using a 4 to 1 line MUX and external gates if i) a and b are connected to select lines a1 and a0 respectively ii) c and d are connected to select lines a1 and a0 respectively	CO3	PO3	**10**
	b	Implement the given function using 3 –to-8-line decoder using OR gates f1(x,y,z)=$\sum$ m(2,3,5,6) f2(x,y,z)=)=$\sum$ m(1,4,5,6)	CO3	PO3	**04**

	c	Design a 1- bit magnitude comparator using basic gates.	*CO3*	*PO3*	**06**
		UNIT - III			
4	a	Design a BCD to Excess-3 code converter and implement it using a suitable PLA.	*CO3*	*PO3*	**10**
	b	Implement the Boolean functions F1 = A'BC'D + A'BCD' + ABC'D and F2 = A'BC' + A'BC + AB'C + ABC' with PAL device.	*CO3*	*PO3*	**10**
		UNIT - IV			
5	a	With the help of circuit diagram, derive the truth table, characteristic equation and timing diagram of SR Flip Flop.	*CO2*	*PO2*	**10**
	b	List different types of registers. Explain serial in parallel out register with neat diagram.	*CO2*	*PO2*	**07**
	c	Explain working of simple bistable element with diagram.	*CO2*	*PO2*	**03**
		UNIT - V			
6	a	Design a Mod-6 synchronous counter using JK flip-flops.	*CO3*	*PO3*	**10**
	b	Design a 3 bit binary ripple counter that counts up using JK Flip Flop and explain the working.	*CO3*	*PO3*	**10**
		OR			
7	a	Design sequence detector using moore model so that any input sequence ending in 011 will produce an output Z = 1.Use JK Flip-flops for final circuit realization.	*CO3*	*PO3*	**10**
	b	With a block diagram compare mealy and moore model. Construct state synthesis table for given state transition diagram.	*CO2, 3*	*PO2, 3*	**10**

Input (BCD Code)				Output (Excess-3 Code)			
B_3	B_2	B_1	B_0	E_3	E_2	E_1	E_0
0	0	0	0	0	0	1	1
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0
1	0	0	0	1	0	1	1
1	0	0	1	1	1	0	0

			7b)  			

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