Q.P. Code: 20EC0403 **R20**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular & Supplementary Examinations March-2023

SWITCHING THEORY AND LOGIC DESIGN

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define Boolean Algebra and list the postulates used in it.	CO1	L1	6M
	b	State and prove any four Boolean theorems of Boolean algebra.	CO1	L3	6M
		OR			
2	a	Simplify the given Boolean function, F to minimum number of literals using Boolean algebra F=XY'Z + X'Y'Z +W'XY + WX'Y + WXY.	CO1	L4	6M
	b	Draw the logic diagram for the simplified expression of the above using AOI logic.	CO2	L1	6M

UNIT-II

3	a	Simplify the Boolean function using Five Variable K-Map. F=∑m(0, 1,2, 4, 7, 8, 12, 14, 15, 16, 17, 18, 20, 24, 28, 30, 31)	CO2	L4	6M
	b	Apply the K-Map technique to simplify the given Boolean expression in POS form using K-Map F(A,B,C,D) = Σ(1,2,4,5,9,12,13,14)	CO2	L4	6M
		OR			
4		Simplify the following Boolean function using Tabulation method, and realizeits logic circuit with NAND gates and NOR gates. Y(A, B,C,D) = Σ(1,3,5,8,9,11,15)	CO2	L4	12M

UNIT-III

5	a	Explain the procedure of designing a combinational logic circuit with an example.	CO1	L2	6M
	b	Design a Full Subtractor using truth table.	CO5	L3	6M
		OR			
6	a	Define Multiplexer. Construct 4:1 multiplexer with logic gates and truth table.	CO4	L3	6M
	b	Represent the following Boolean function with an 8:1 multiplexer. F(A,B,C,D) = A'BD'+ACD+B'CD+A'C'D.	CO4	L2	6M

UNIT-IV

7	a	Define Latch and list different types of Latches.	CO1	L1	4M
	b	Define Flip-Flop. What are the different types of Flip-Flops?	CO1	L1	4M
	c	Explain the working principle of RS Flip-Flop with the help of logic diagram and give its Characteristic Table and Graphic symbol.	CO3	L2	4M
		OR			
8		What is a synchronous counter? Design a 3-bit synchronous up/down counter.	CO6	L4	12M

UNIT-V

9		Explain the following related to sequential circuits with suitable examples: i) State diagram ii) State table iii) State assignment	CO1	L2	12M
		OR			
10		Illustrate the PAL for the following Boolean functions. (i) A(w,x,y,z)=Σm(0,2,6,7,8,9,12,13) (ii) B(w,x,y,z))=Σm(0,2,6,7,8,9,12,13,14)	CO5	L3	12M

*** END ***

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