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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations May-2022

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	State and Prove Demorgan's Theorem using suitable example.	L3	6M
	b	Simplify the following to a sum of 3 terms: A'C'D' +AC' +BCD + A'CD' + A'BC +AB'C'	L4	6M
		OR		
2	a	Express the following functions in sum of Minterms and product of Maxterms i. F (A,B,C,D) = B'D + A'D + BD ii. F(x,y,z) = (xy + z)(xz+y)	L2	6M
	b	Express the following Boolean functions in to Canonical form: i. F=AB+BC+CA ii. F= XY+Z+YZ+XYZ	L2	6M

UNIT-II

3		Apply the K-Map technique to simplify the Boolean expression in POS and SOP form using K-map. Given: F(A,B,C,D) = Σ(1,2,4,5,9,12,13,14)	L4	12M
		OR		
4	a	Deduce the following Boolean expressions using K-map and implement them using NAND and NOR gates: (i) F (W, X, Y, Z) =W'X'YZ' + W'XYZ' + WX'YZ' +WX'YZ+WXYZ'+WXYZ	L4	6M
	b	Explain the structure of Ex-OR gate by K-Map using 4 Variable.	L2	6M

UNIT-III

5	a	Define Combinational Circuit; explain the analysis procedure of a combinational logic circuit using suitable example.	L2	6M
	b	Design & implement Full Adder with truth table.	L3	6M
		OR		
6	a	What is multiplexer? Construct 4:1 multiplexer with logic gates and truth table.	L3	6M
	b	Design 32:1 Mux using two 16:1 MUXs and one 2:1 MUX.	L3	6M

UNIT-IV

7	a	Explain the working principle of D & T Flip-Flops.	L2	6M
	b	Convert S-R flip flop into JK-flip flop. Draw and explain the logic diagram.	L2	6M
		OR		
8	a	Design a 4 bit Decade counter.	L4	6M
	b	Explain in brief about a 3-bit synchronous up-counter.	L4	6M

UNIT-V

9	a	Distinguish between Melay & Moore machines.	L2	6M
	b	Explain the following related to sequential circuits with suitable examples i) State diagram ii) State table	L2	6M
		OR		
10		Illustrate the PAL for the following Boolean function(i) F(A,B,C,D) = Σm(2,3,8,9,,10,12,13) (ii) G(A,B,C,D) = Σm(1,3,4,6,9,12,14)	L3	12M

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