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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations November-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 any two Boolean theorems with examples. **L3 6M**
b Simplify the following Boolean functions to minimum number of literals: **L4 6M**
i. $(a + b)' (a' + b)'$ ii. $y(wz' + wz) + xy$

OR

- 2 a Express the following functions in sum of Minterms and product of Maxterms. **L2 6M**
i. $F(A,B,C,D) = B'D + A'D + BD$ ii. $F(x,y,z) = (xy + z)(xz + y)$
b Express the following Boolean functions in to Canonical form: **L2 6M**
i. $F = AB + BC + CA$ ii. $F = XY + Z + YZ + XYZ$

UNIT-II

- 3 a Simplify the Boolean expression using K-map and draw the logic diagram **L4 6M**
using AOI. $F = A' + AB + ABD' + AB'D' + C'$
b Simplify the Boolean function using 5 variable K-map. **L4 6M**
 $F = \sum m(0, 1, 2, 4, 7, 8, 12, 14, 15, 16, 17, 18, 20, 24, 28, 30, 31)$

OR

- 4 Simplify the following Boolean function using Tabulation method, realize with **L4 12M**
NAND gates and NOR gates. $Y(A, B, C, D) = \sum(1, 3, 5, 8, 9, 11, 15)$.

UNIT-III

- 5 a Design a 4 bit binary-to-BCD code converter. **L3 6M**
b Design & implement Full Adder with truth table. **L3 6M**

OR

- 6 a What is Decoder? Explain a 2 to 4 line binary decoder. **L2 6M**
b What is multiplexer? Construct 4:1 multiplexer with logic gates and truth table. **L3 6M**

UNIT-IV

- 7 a What is a sequential circuit? Explain with the help of a block diagram. **L2 6M**
b Explain the working principle of JK Flip-Flop in detail. **L2 6M**

OR

- 8 a Explain in brief about any two types of shift registers. **L2 6M**
b Design a 4-bit Ripple counter. **L4 6M**

UNIT-V

- 9 a Explain the following related to sequential circuits with suitable examples **L2 6M**
i. State diagram ii. State table
b Compare ROM and RAM. **L2 6M**

OR

- 10 Illustrate the PAL for the following Boolean function **L3 12M**
i. $A(w,x,y,z) = \sum m(0, 2, 6, 7, 8, 9, 12, 13)$
ii. $B(w,x,y,z) = \sum m(0, 2, 6, 7, 8, 9, 12, 13, 14)$

*** END ***