ASSIGNMENT 6(2)

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1 QUESTION

The boolean expression F(X,Y,Z)=$\overline{X}Y\overline{Z}+X\overline{Y}\overline{Z}+XY\overline{Z}+XYZ$ converted into the canonical product of sum(POS) form is

2 ANSWER

2.1 table

X	Y	Z	F	maxterms
0	0	0	0	X+Y+Z
0	0	1	0	X+Y+$\overline{Z}$
0	1	0	1	-
0	1	1	0	$X+\overline{Y}+\overline{Z}$
1	0	0	1	-
1	0	1	0	$\overline{X}+Y+\overline{Z}$
1	1	0	1	-
1	1	1	1	-

Table 1: truth table

product of sum =(X+Y+Z)(X+Y+$\overline{Z}$)(X+$\overline{Y}+\overline{Z}$))($\overline{X}+Y+\overline{Z}$)(as product of sum is the combination for F=0

From the table we can see that when (X,Y,Z)=0, ((X,Y)=0,Z=1),(X=0,(Y,Z)=1) and ((X,Z=1,Y=0) we get output i.e F=0.

So the max terms are F(X,Y,Z)=M$_0.M_1.M_3.M_5(suffixes\ denote\ decimal\ code)$ $whereM_1=(X+Y+Z);M_2=(X+Y+\overline{Z})$; M$_3$ = $(X+\overline{Y}+\overline{Z}))$; M$_3+(\overline{X}+Y+\overline{Z})$

Min terms,F(X+Y+Z)=M$_2+M_4+M_6+M_7$
$whereM_2=\overline{X}Y\overline{Z};M_4=X\overline{Y}\overline{Z};M_6=XY\overline{Z};M_7=XYZ$

2.2 k-map

X \ YZ	00	01	11	10
0	0	0	0	1
1	1	0	1	1

from the k-map Product of Sum(POS) for F=$(Y+X)(\overline{Z}+Y)(\overline{Z}+X)$

The min terms are given 1 and max terms are given 0.As product of sum is given by max terms we need to group zeros in the kmaap

There is only possibility of doubles in the respective k-map.So we need to map (1,5) i.e vertically , (0,1) and (1,3) horizontally.

2.3 logic gates