Department of ECE

North South University

Assignment 1

Submitted By

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Course	**:** Digital Logic Design
Course Code	**:** EEE211
Section	**:** 01

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Answer to question NO:1.

X	Y	Z	A
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

(a) $F = x'y'z' + x'y'z + xy'z' + xy'z + xyz'$

$F = \Sigma(0, 1, 4, 5, 6)$

(b) ~~$F = xyz(x+y'+z)(x+y'+z')(x'+y'+z')$~~

$= \pi(2, 3, 7)$.

$= x'y'(z'+z) + xy'(z'+z) + xyz'$

$= x'y' + xy' + xyz'$

$= y'(x'+x) + xyz'$

$= y' + xyz'$

Shorthand notation: $F = \Sigma(0, 1, 4, 5, 6)$.

(b) $F = (x+y'+z)(x+y'+z')(x'+y'+z')$

$F = \pi(2, 3, 7)$.

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Answer to question NO:2.

Here, $F = (V, W, X, Y)_D = \Sigma m(2,3,6,7,10,11,12,13) + \Sigma d(8,9)$

VW \ XY	00	01	11	10
00	0	0	1	1
01	0	0	1	1
11	1	1	0	0
10	x	x	1	1

$F = V\bar{X} + V\bar{X} + W\bar{X}$

Answer to question NO:3.

T → Temperature sensor that produces 1 if $T > 70°C$ else 0.

P → Pressure sensor Produces 1 if $P > 1012$ mbar else 0.

A → Accelerometer " " 1 " $A > 10ms^{-1}$ else 0.

G → Gyroscope " " 1 " $G > 15°/s$ " 0 "

T	P	A	G	F = Output
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

So, $F = \Pi_M(0, 1, 2, 4)$

$= (T + P + A + G_1) \cdot (T + P + A + G_1') \cdot$

$(T + P + A' + G_1) \cdot (T + P' + A + G_1)$

Let, $T+P+A = X$,

So, $F = \cancel{(X + G_1) \cdot (X + G_1') \cdot} (X)(T + P + A + G_1 \cdot G_1') \cdot$

$(T + P + A' + G_1) \cdot (T + P' + A + G_1)$ [Distributive law]

$= (\overbrace{T + P + A}^{X}) \cdot (\overbrace{T + P + G_1 + A'}^{Z}) \cdot (T + G_1 + P' + A)$

$= [T + P + (A(G_1 + A'))] \cdot [T + G_1 + A + P']$

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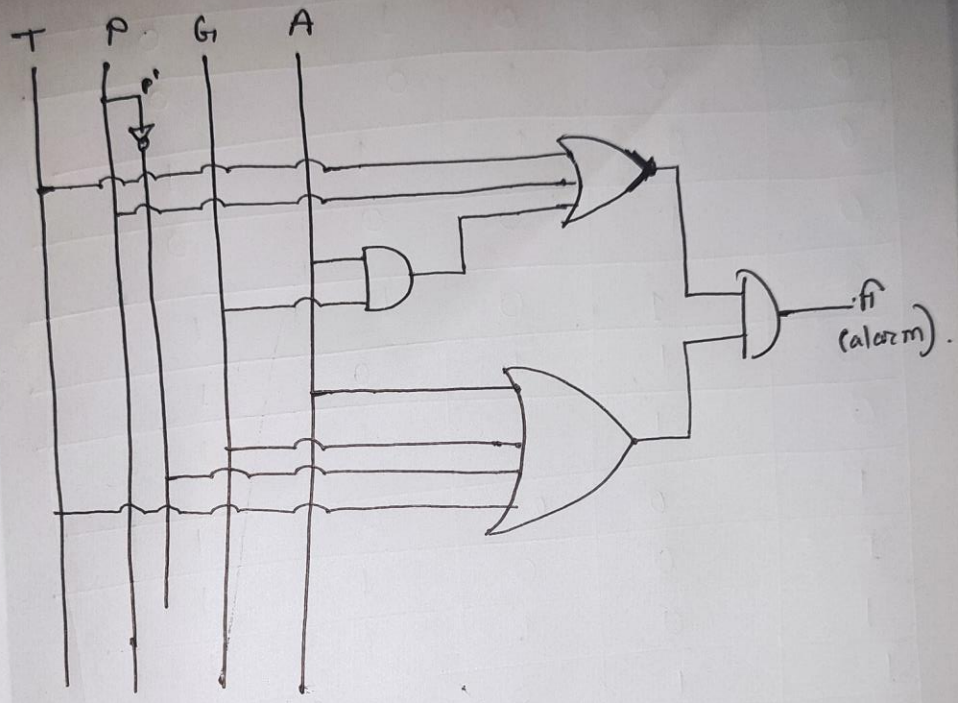
$$= [T + P + AG] [T + G + A + P']$$



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Answer to question NO: 4.

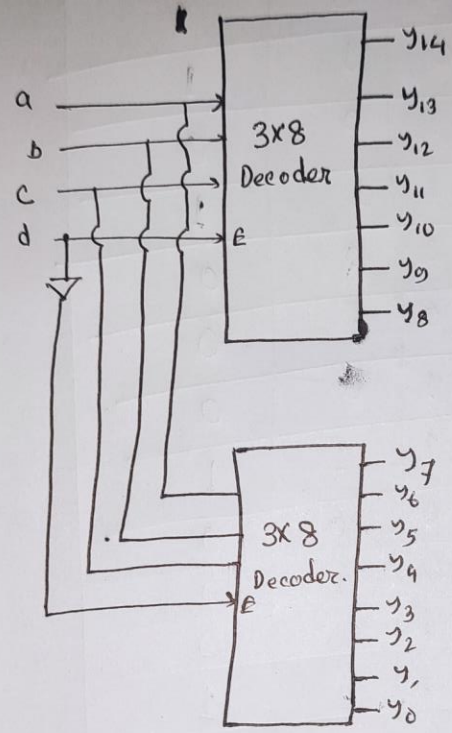

Figure: Implementation of 4X16 decoder using 3X8 decoders.

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Answer to question NO:5.

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0