soln —

①

X	Y	Z	F
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

K-map with x, yz axes (00, 01, 11, 10):

row 0: 1, 1, , 1
row 1: 0, 0, 0, 0

$$F = x'y + x'z'$$ — ①

x', x' → AND → $x'y'$
x', z' → AND → $x'z'$
→ OR → F

⑧
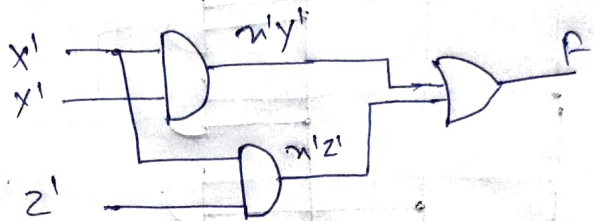
n	Y	Z	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

K-map with yz (00, 01, 11, 10):

row 0: 1₀, 0₁, 0₃, 1₂
row 1: 1₄, 0₅, 0₇, 0₆

K-map (yz: 00, 01, 11, 10):

row 0: 0, 0, 0, 1
row 1: 1, 0, 0, 1

$$F = yz' + nz'$$
$$F = z'(y + n)$$

n, y → gate → 2 → gate → F

②
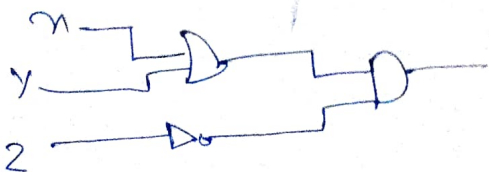
x	y	z
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

x \ yz	00	01	11	10
0	0	0	1	0
1	0	1	1	1

$$f = yz + xz + xy$$

⑧

Binary	2's
A B C D	W X Y Z
0	
0	
0	
0	
0	
0	
0	
0	
1	
1	
1	
1	
1	
1	
1	

Q1. $F(A,B,C,D) = \pi(5,6,7,10,11,12,13,14)$

sol'n → Mux is in sop form.

therefore $F(A,B,C,D) = \varepsilon m(0,1,2,3,4,8,9,15)$

(a) Using 16×1 Multiplexer —

(b) 8×1

	I_0	I_1	I_2	I_3	I_4	I_5	I_6	I_7
D								
D'								

© 4×1

'I'

4×

P

i₁

C'

3 S₁ S₀

A B
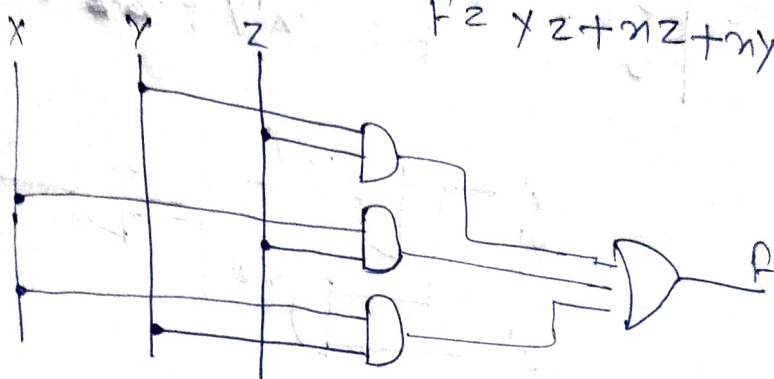
	I₀	I₁	I₂	I₃
00 C'D	0	4	8	12
01 C'D	1	5	9	13
10 CD	2	6	10	14
11 CD	3	7	11	15
	1	C'D'	C'	CD

for I2

$$= C'D' + C'D$$
$$= C'(D + D')$$
$$= C'$$

for

Ⓑ

I₀

I₁

I₂

P

I₃

I₄

I₅

I₆

I₇ S2 S1 S0

A B C
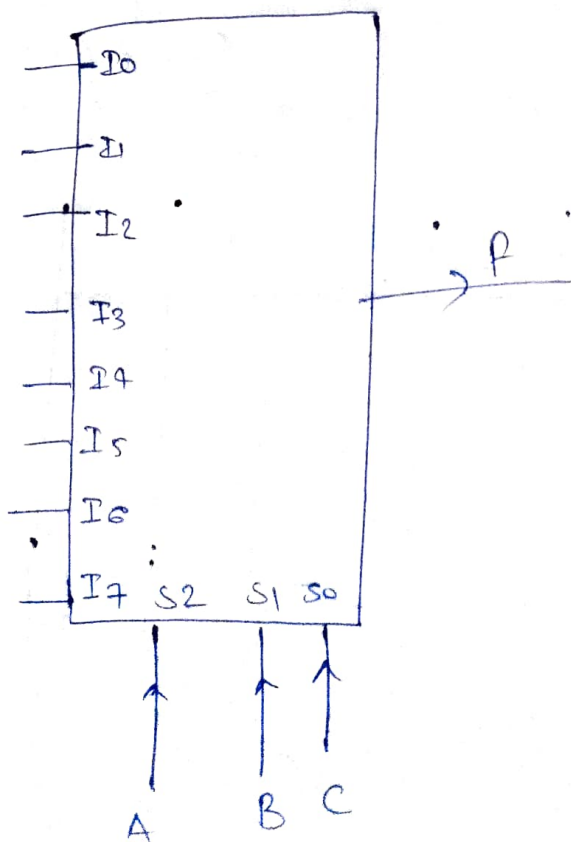
② $F_1 = x'y'z + xz$ $F_2 = xy'z + x'y$
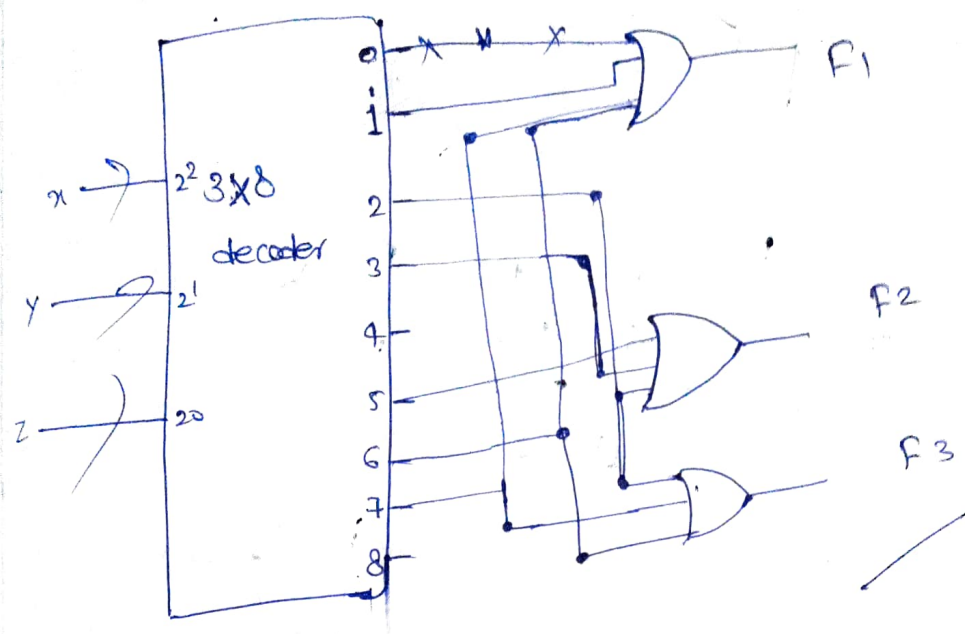
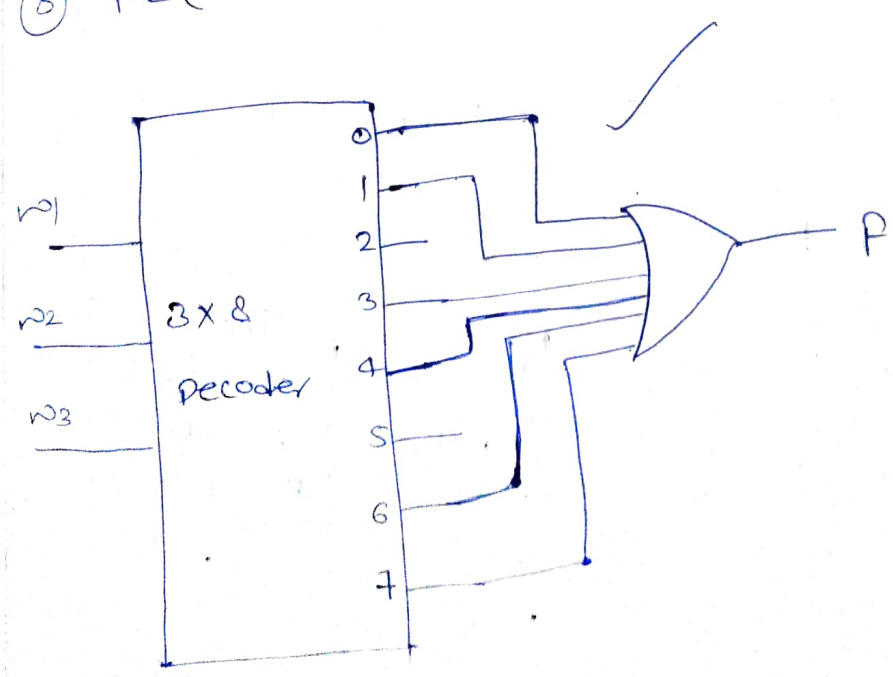$F_3 = x'y'z + xy$

$F_1 = x'y'z + xzy + xzy'$ $F_2 = xy'z + x'yz + xyz'$

$F_1 = (1, 7, 6)$ $F_{22}(5, 3, 2)$

$F_3 = x'y'z + xyz + xyz'$

$F_{3} = (2, 7, 6)$
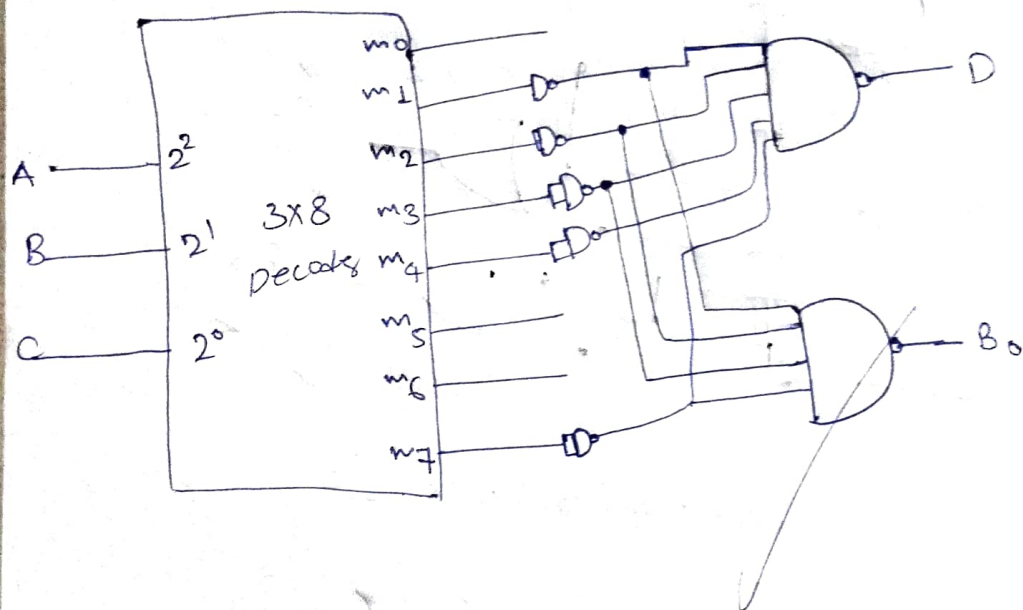

⑧ $F = (w_1, w_2, w_3) = \sum m(0, 1, 3, 4, 6, 7)$

④

A	B	C	D	Bo
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Por Diferencia.
Borrow

$D = \varepsilon (m_1, m_2, m_4 \ldots)$

$B_0 = \varepsilon (m_1, m_2, m_3 \ldots)$

⑤

$$f2(A, B, C) = \varepsilon (1, 3, 5, 6)$$

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0
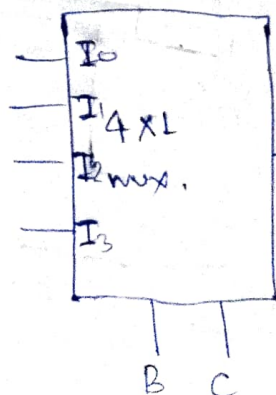
	I_0	I_1	I_2	I_3
A'	0	①	2	③
A	4	⑤	⑥	7
F	0	1	A	A'

6 F = ABD + CD + ACD + ABC + ABCD

1) C 16X1 using 8X1

I0 →
8 X1
mux

I7 →

I8 →
8 X1
mux,

I15 →
S2 S1 S0

To → 2X1
I0
I1   S3
→ Y

2)
I0 →
4 X1
mux

I3 →

I4 →
4X1
mux

I7 →

I8 →
4X1
mux

I11 →

I12 →
4X1
mux

I15 →
S1 S0

To → I0
I1
I2
I3 S3 S2
→ Y
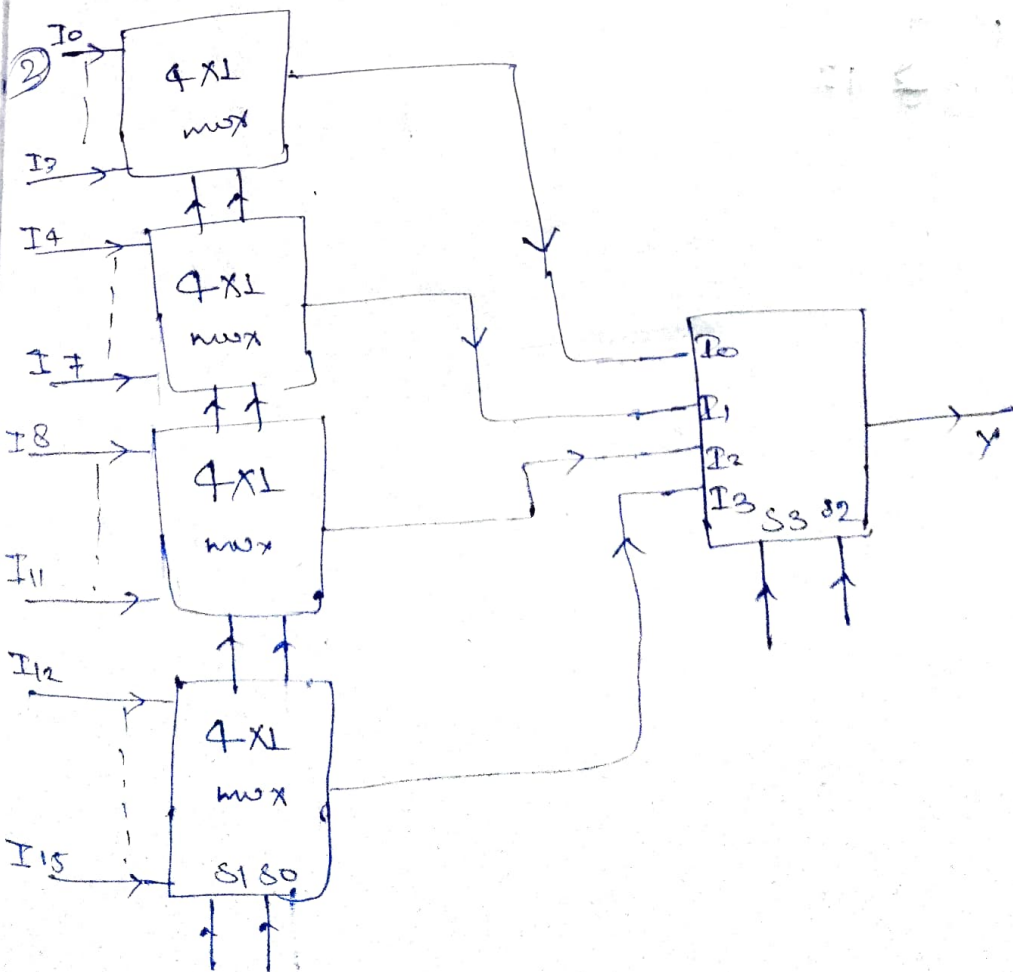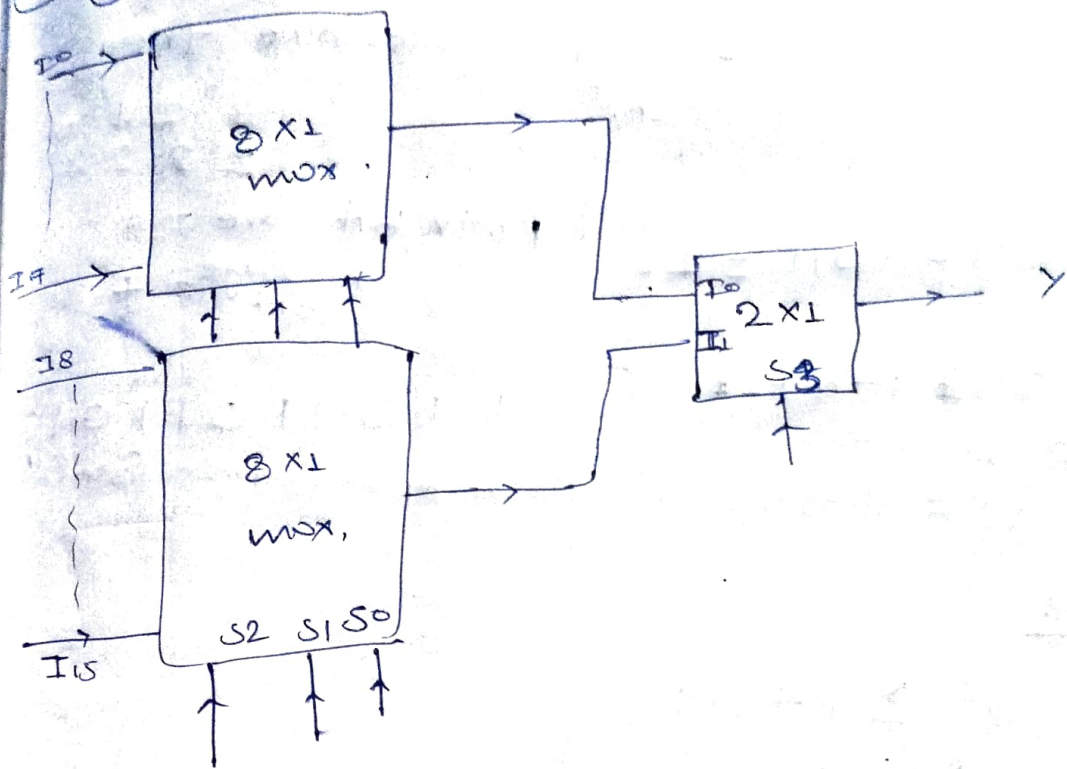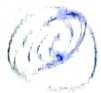
At the Recieving end total message is Recieve with even parity as

11011011011 Determine the

error Bit position..?

$\begin{array}{cccc} 3 & 2 & 1 & 0 \\ 2 & 2 & 2 & 2 \end{array}$

→ $11011011011 = 11$

parity bit one $= 4$

message bit $= 7$

$2^P \geq P + m + 1$

let $m = 4$

$2^P \geq P + 4 + 1$

$1 \; 1 \; 0 \; 1 \; 1 \; 0 \; 1 \; 1 \; 0 \; 1 \; 1$

$m_7 \quad m_6 \quad m_r \quad P_4 {}^{m_f} \; {}^{m_3} \; {}^{m_2} \; P_3 {}^{m_1} \; P_2 \; P_1$

m⊕s ,

$2^P \geq P + 7 + 1$

$2^P \geq P + 8$

$P \geq 4$

$16 \geq 12$

$1 \; 1 \; .$