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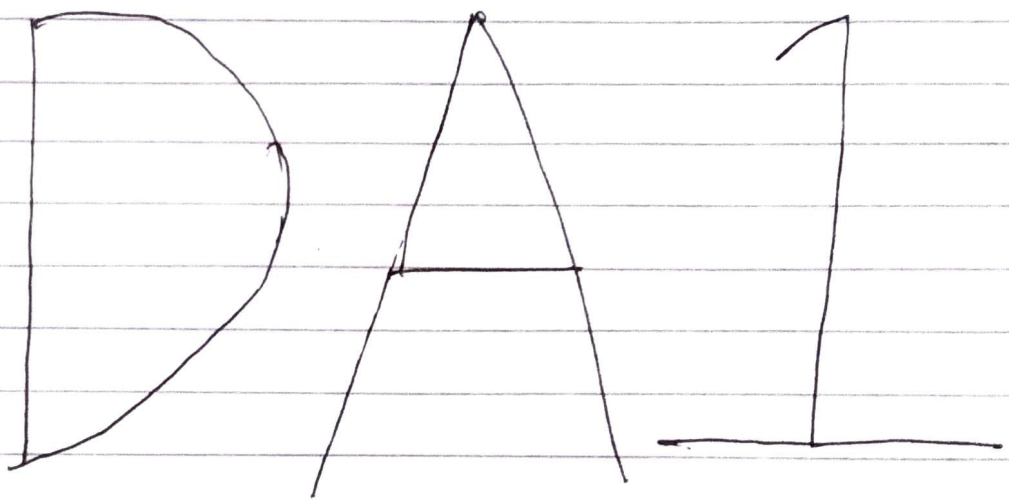
Course :- CSE1003 DLD Theory



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(1)

A	B	C	E
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

A → S_0

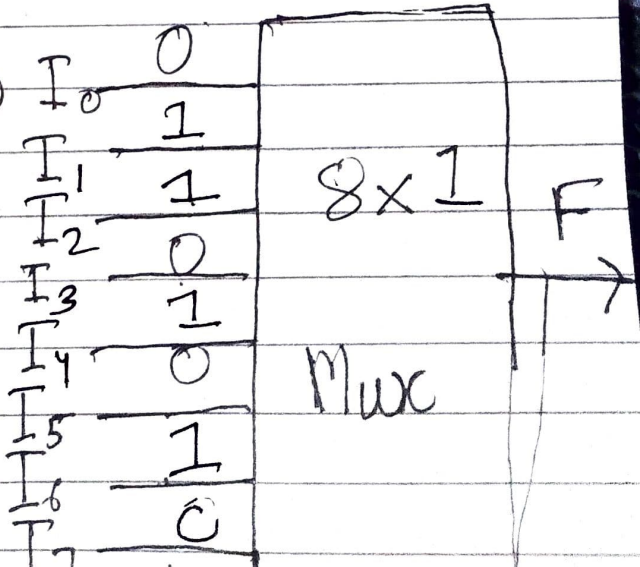
B → S_1

C → S_2

Below equal (min) → 0
Above or equal (min) → 1

<= 1o min → 0

> 1o min → 1



(2)

I_0	I_1	I_2	I_3	I_4	I_5	I_6	I_7	O_1	O_2	O_3
0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	1	x	0	0	1
0	0	0	0	0	1	x	x	0	1	0
0	0	0	0	1	x	x	x	0	1	1
0	0	0	1	x	x	x	x	1	0	0
0	0	1	x	x	x	x	x	1	0	1
0	1	x	x	x	x	x	x	1	1	0
1	x	x	x	x	x	x	x	1	1	1

8:3 Priority encoder

$O_1 = I_4 + I_5 + I_6 + I_7$

$O_2 = I_2 + I_3 + I_6 + I_7$

$O_3 = I_1 + I_3 + I_5 + I_7$

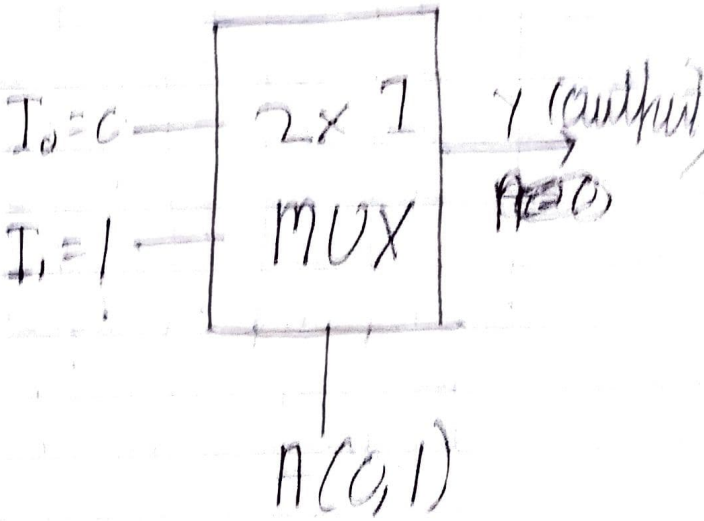
(4) Truth table (2×1) MUX:

S	Output
0	I_0
1	I_1

(a) AND gate

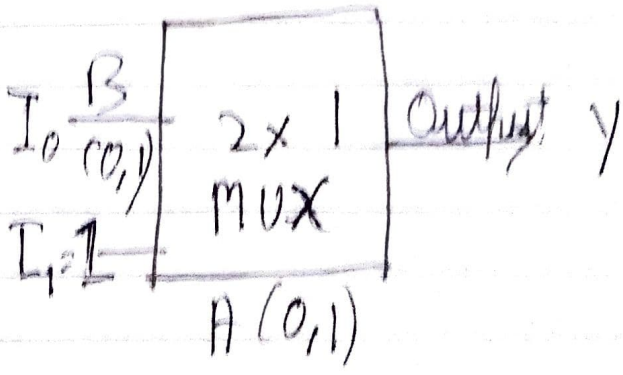
Truth table

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



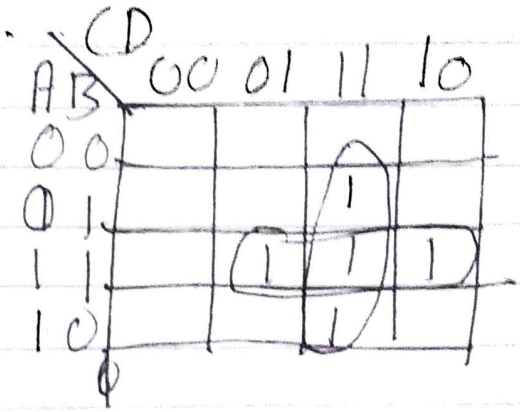
(B) OR gate

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



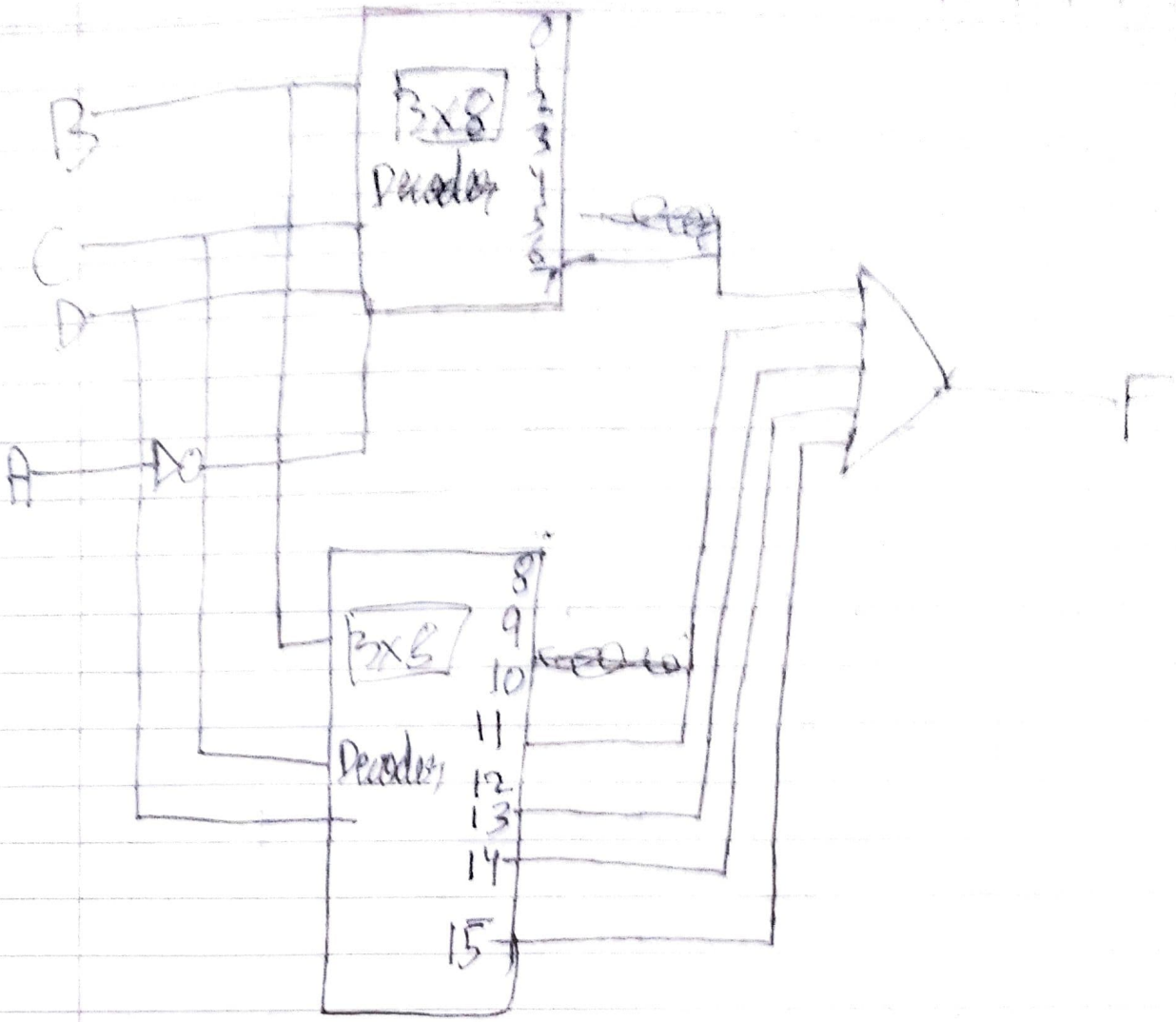
(5)

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



$F = ACD + ABD + ABC + BCD$

$= (A+B)CD + AB(C+D)AB$


B
C
D
A
3x8
Decoder
0
1
2
3
4
5
6
7
3x8
Decoder
8
9
10
11
12
13
14
15
F

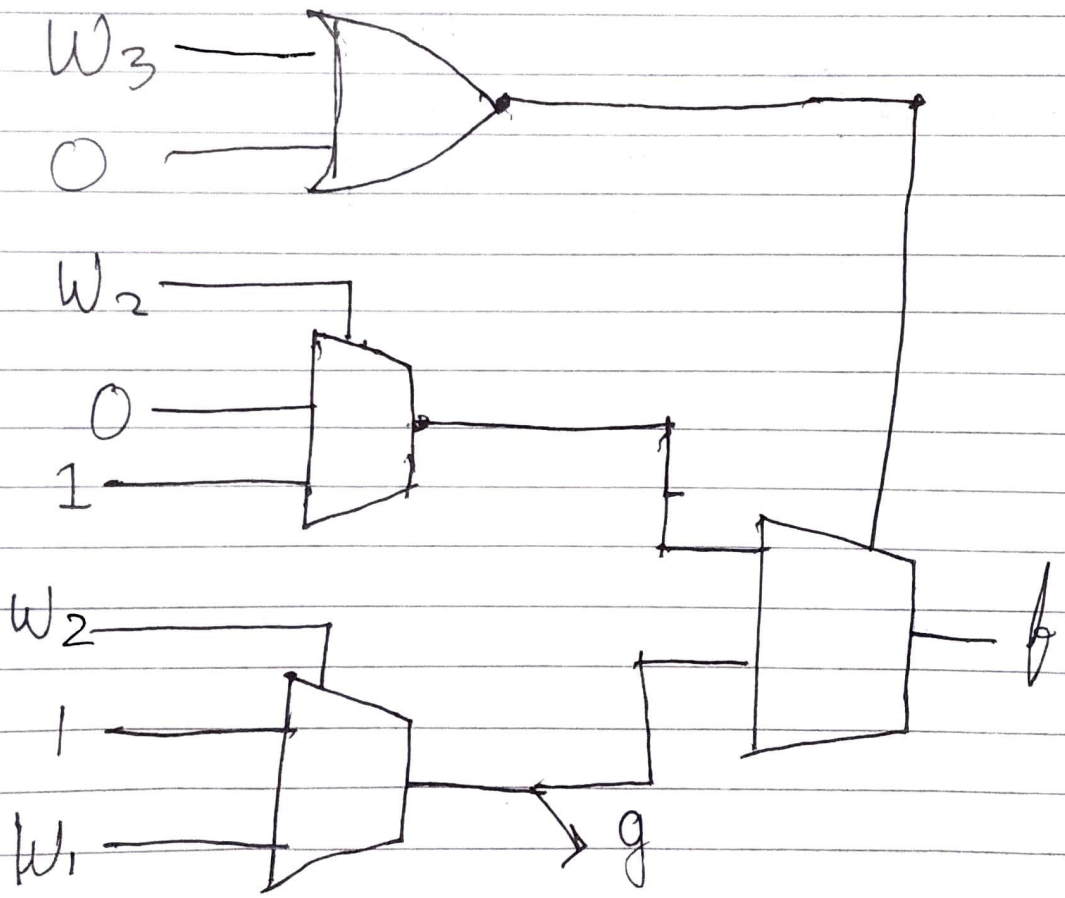
(6) $w_2 w_3' + w_1 w_3 + w_2' w_3$

$= w_2 w_3' + w_3 (w_1 + w_2')$

$= w_3 (g) + w_2 w_3'$

$g = w_1 + w_2'$

$= w_1' + w_2 w_1$



$f = w_3 (g) + w_2 w_3'$

$g = w_2 + w_2 w_1$

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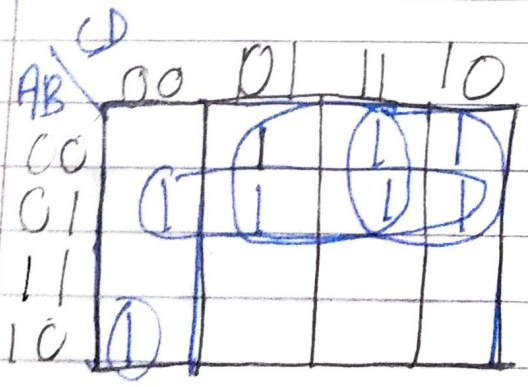
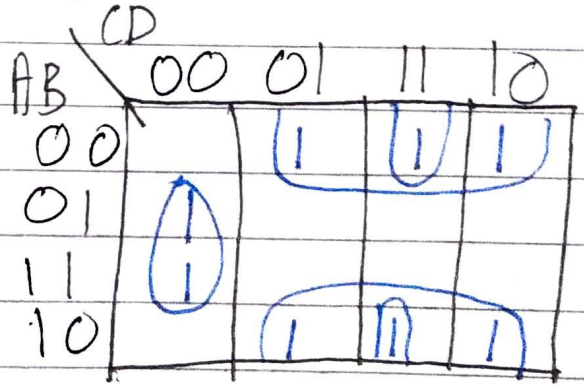
7)

A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1
0	0	1	0	1	1	1	0
0	0	1	1	1	1	0	1
0	1	0	0	1	1	0	0
0	1	0	1	1	0	1	1
0	1	1	0	1	0	1	0
0	1	1	1	1	0	0	1
1	0	0	0	1	0	0	0
1	0	0	1	0	1	1	1
1	0	1	0	0	1	1	0
1	0	1	1	0	1	0	1
1	1	0	0	0	1	0	0
1	1	0	1	0	0	1	1
1	1	1	0	0	0	1	0
1	1	1	1	0	0	0	1



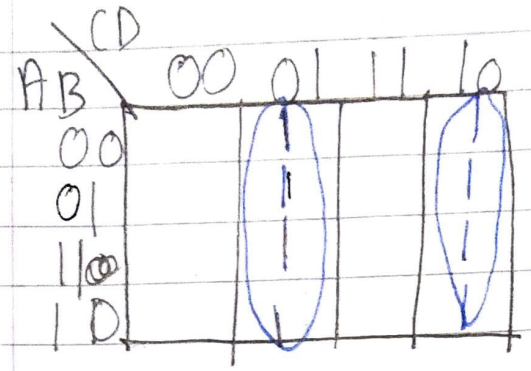


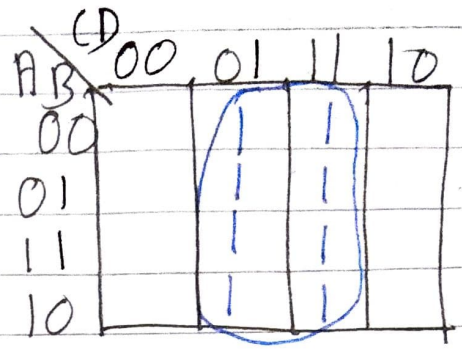
$W = AB'C'D' + A'(B+C+D)$

$= A \oplus (B+C+D)$

$X = BC'D' + B'(C+D)$

$= B \oplus (C+D)$





$Y = CD' + C'D$

$= C \oplus D$

I ⇒ Input O ⇒ Output

$O = I \oplus (A + B + C + D)$

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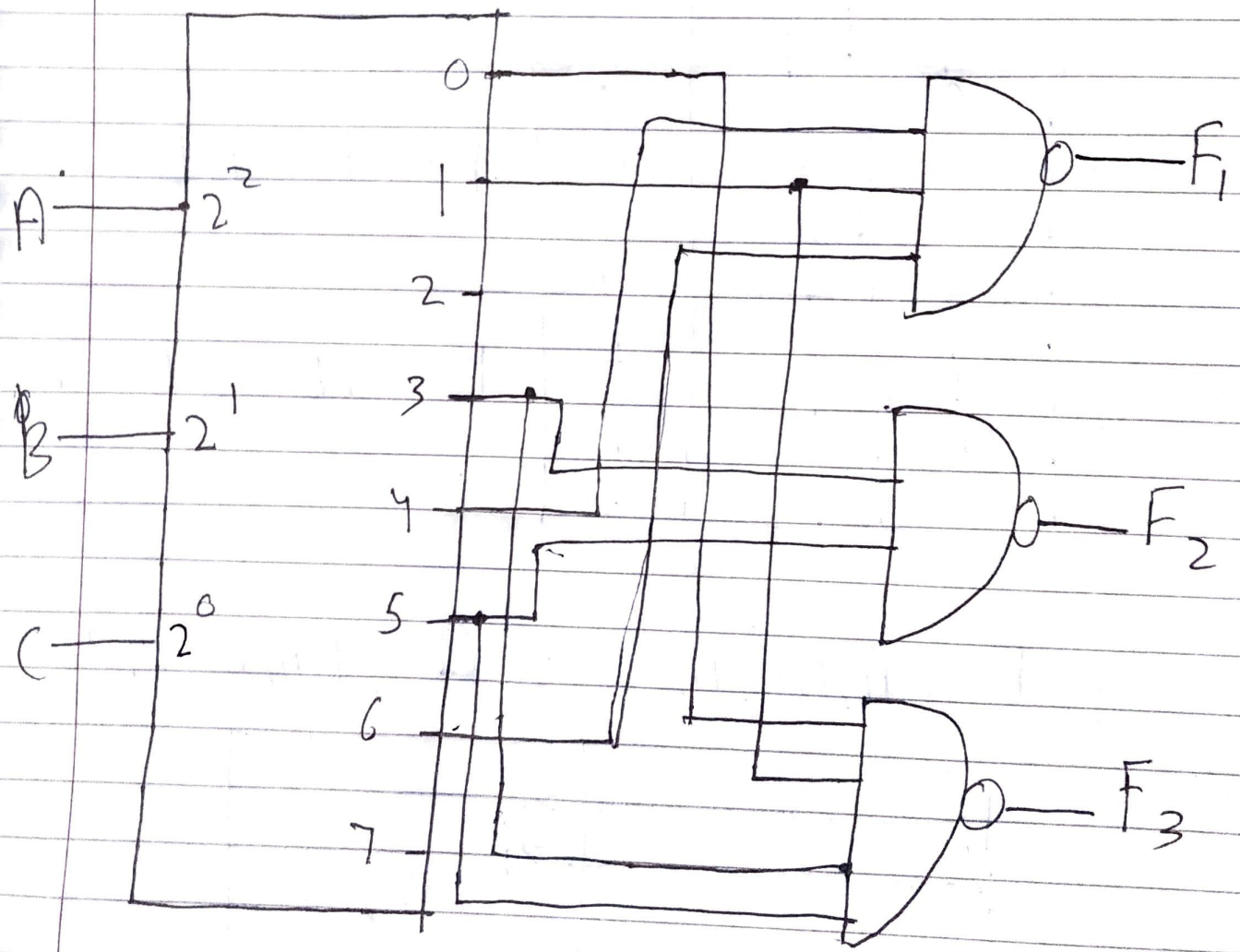
(8) $F_1(A,B,C) = \Sigma(1,4,6)$

$F_2(A,B,C) = \Sigma(3,5)$

$F_3(A,B,C) = \Sigma(2,4,6,7)$ (NAND)

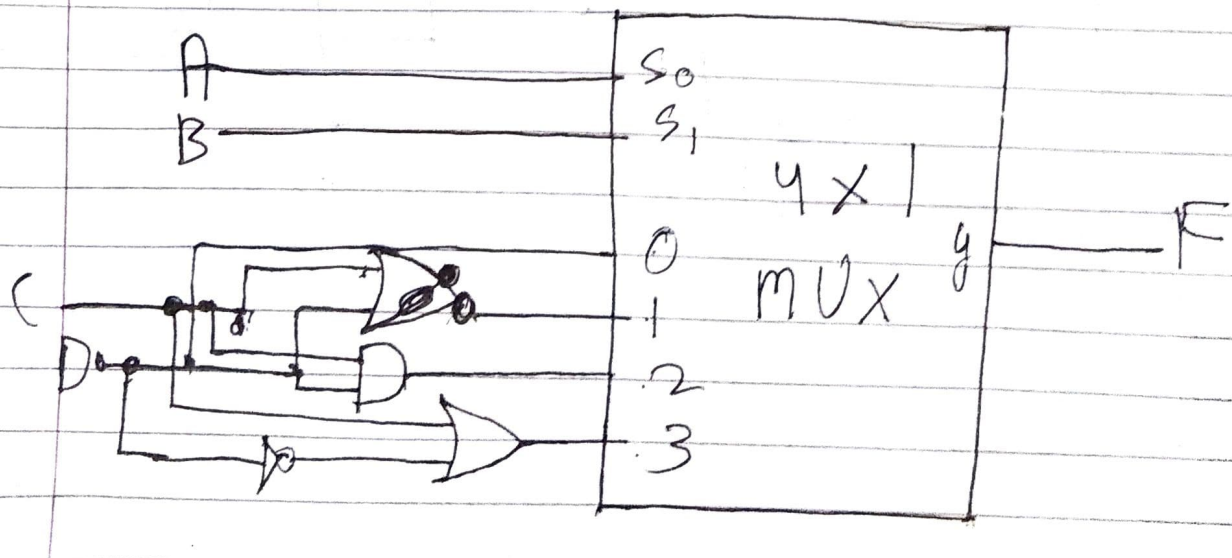
$F'_3(A,B,C) = \Sigma(0,1,3,5)$ (AND)



⑨

A	B	C	D	F	
0	0	0	0	0	F = D , AB = 00
0	0	0	1	1	
0	0	1	0	0	
0	0	1	1	1	
0	1	0	0	1	F = (C+D'), AB = 01
0	1	0	1	0	
0	1	1	0	0	
0	1	1	1	0	
1	0	0	0	0	F = CD , AB = 10
1	0	0	1	0	
1	0	1	0	0	
1	0	1	1	1	
1	1	0	0	1	F = (C+D'), AB = 11
1	1	0	1	0	
1	1	1	0	1	
1	1	1	1	1	

$F = (A, B, C, D) = \Sigma (1, 3, 4, 11, 12, 14, 15)$



(10) In 8×1 multiplexer, inputs → A, B and C
selection inputs → S_1 and S_2

$\therefore F = ABC'D' + C(A \oplus B) + AB'C'D$

$F = A'B'C'D' + BC + AB'D + AB\bar{C}'D$

$I_1 = I_2 = I_7 = C$
$I_3 = I_5 = 1$
$I_0 = I_4 = D$
$I_6 = D'$

A	B	C	Output
0	0	0	I_0 D
0	0	1	I_1 C
0	1	0	I_2 C
0	1	1	I_3 1
1	0	0	I_4 D
1	0	1	I_5 1
1	1	0	I_6 D
1	1	1	I_7 C

$\therefore F = A'B'C'D + A'BC + AB'C'D + AB'C + ABC'D$

$F = C'D(A' + A) + C(A'B + AB') + AB'C'D' + B'$

$F = ABC'D' + C(A \oplus B) + B'C'D'$