# D.L.D Assignment-3

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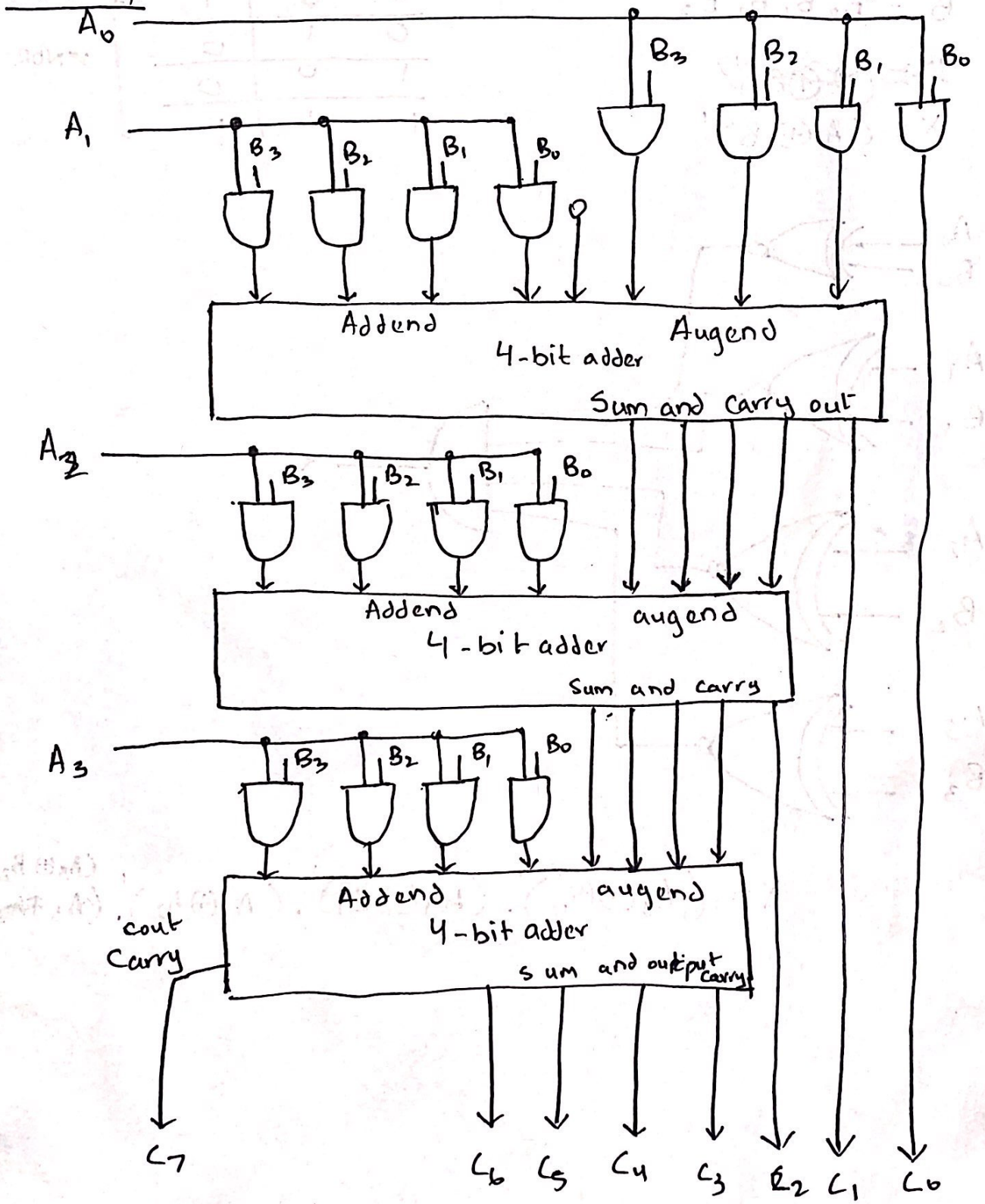
BS(CS) - B

4.20 (a)

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4.21

$A = A_0 A_1 A_2 A_3$

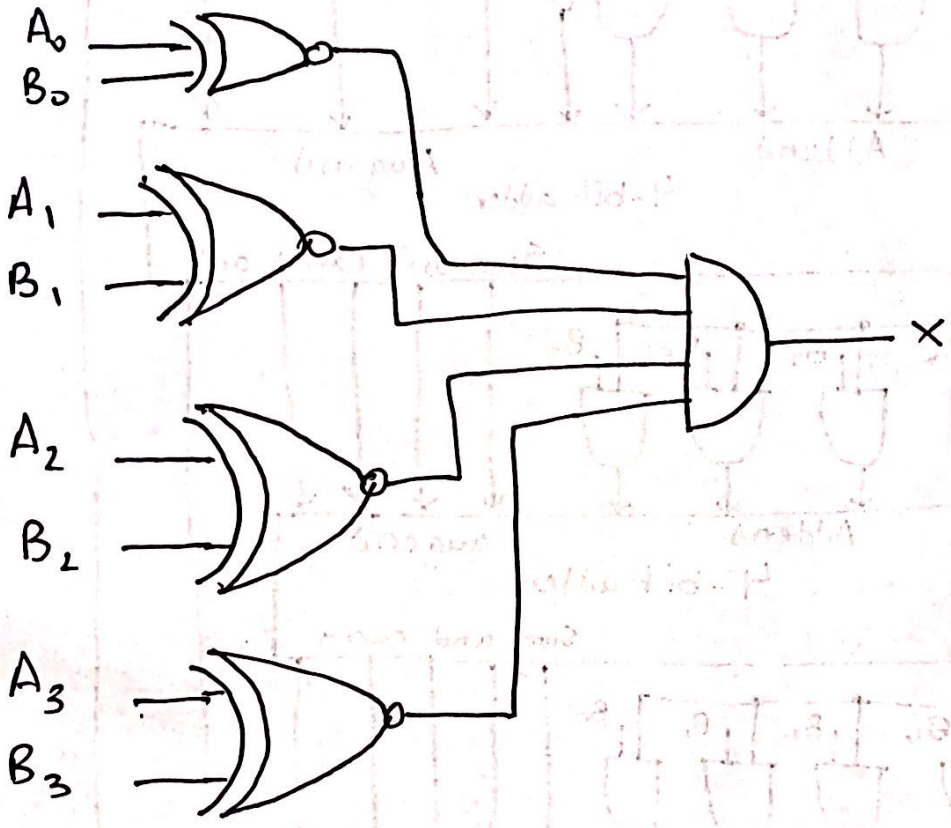
$B = B_0 B_1 B_2 B_3$

~~$X = (A \oplus B)'$~~

$X = (A \oplus B)'$

| A | B | X |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

XNOR




$X = (A_0 \oplus B_0)' \cdot (A_1 \oplus B_1)' \cdot (A_2 \oplus A_2)' \cdot (A_3 \oplus B_3)'$

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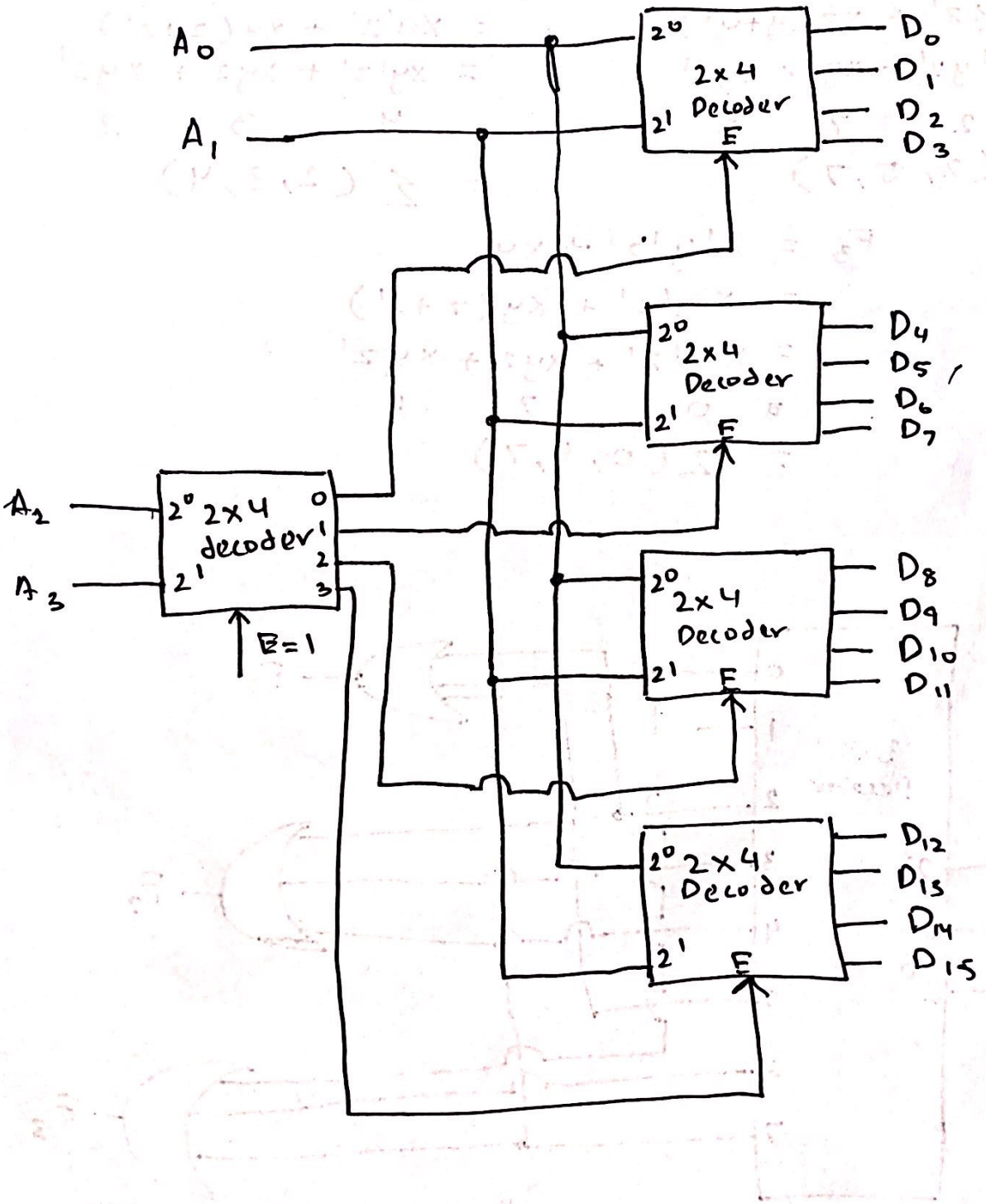
4.26

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4.28a

$F_1 = x'yz' + xz$

$= x'yz' + xz(y+y')$

$= x'yz' + xyz + xyz'$

2 7 5

$= \Sigma(2, 5, 7)$

$F_2 = xy'z' + xy$

$= xy'z' + xy(z+z')$

$= xy'z' + xyz + xyz'$

4 3 2

$= \Sigma(2, 3, 4)$

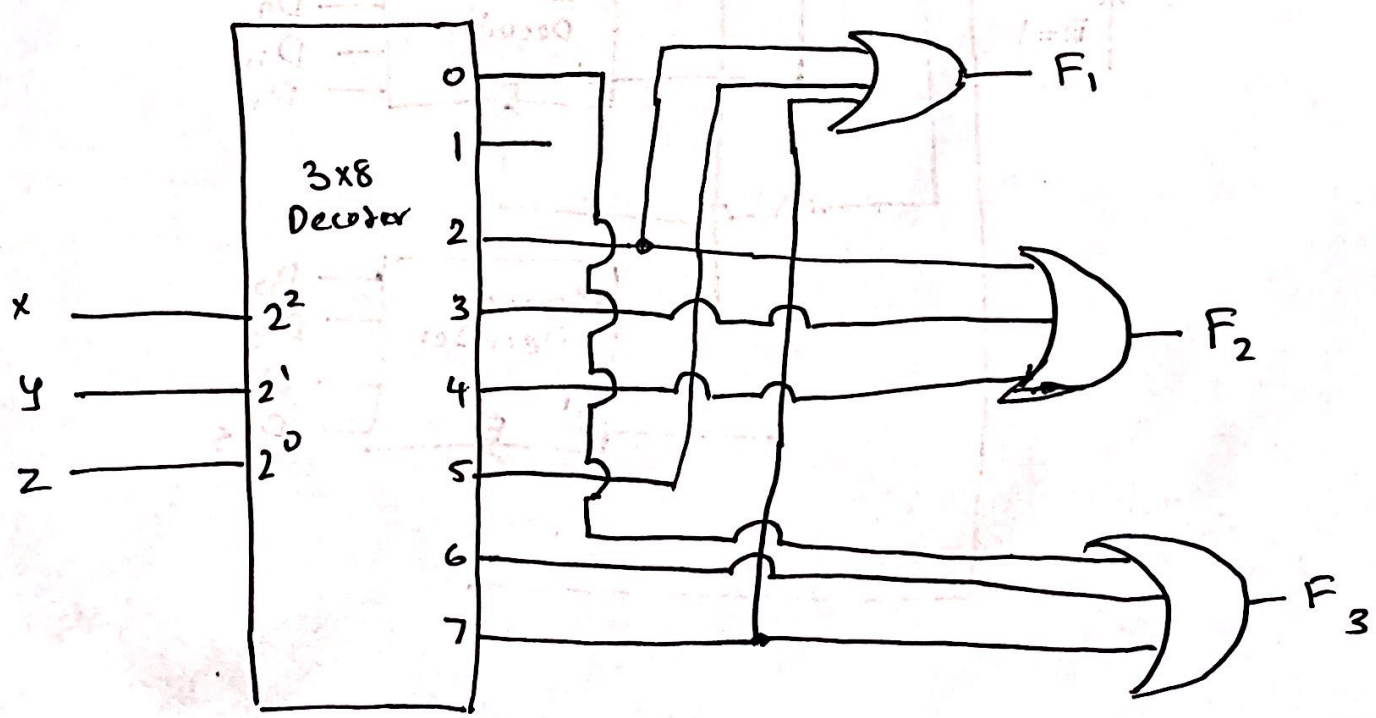
$F_3 = x'y'z' + xy$

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

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

0 7 6

$= \Sigma(0, 6, 7)$

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4.30

| $D_0$ | $D_1$ | $D_2$ | $D_3$ | $D_4$ | $D_5$ | $D_6$ | $D_7$ | x | y | z | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | x | x | x | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| x | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| x | x | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| x | x | x | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| x | x | x | x | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| x | x | x | x | x | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| x | x | x | x | x | x | 1 | 0 | 1 | 1 | 0 | 1 |
| x | x | x | x | x | x | x | 1 | 1 | 1 | 1 | 1 |

for $D_2 = 1$ and $D_0 = 1$

$xyz = 110$ $V = 1$

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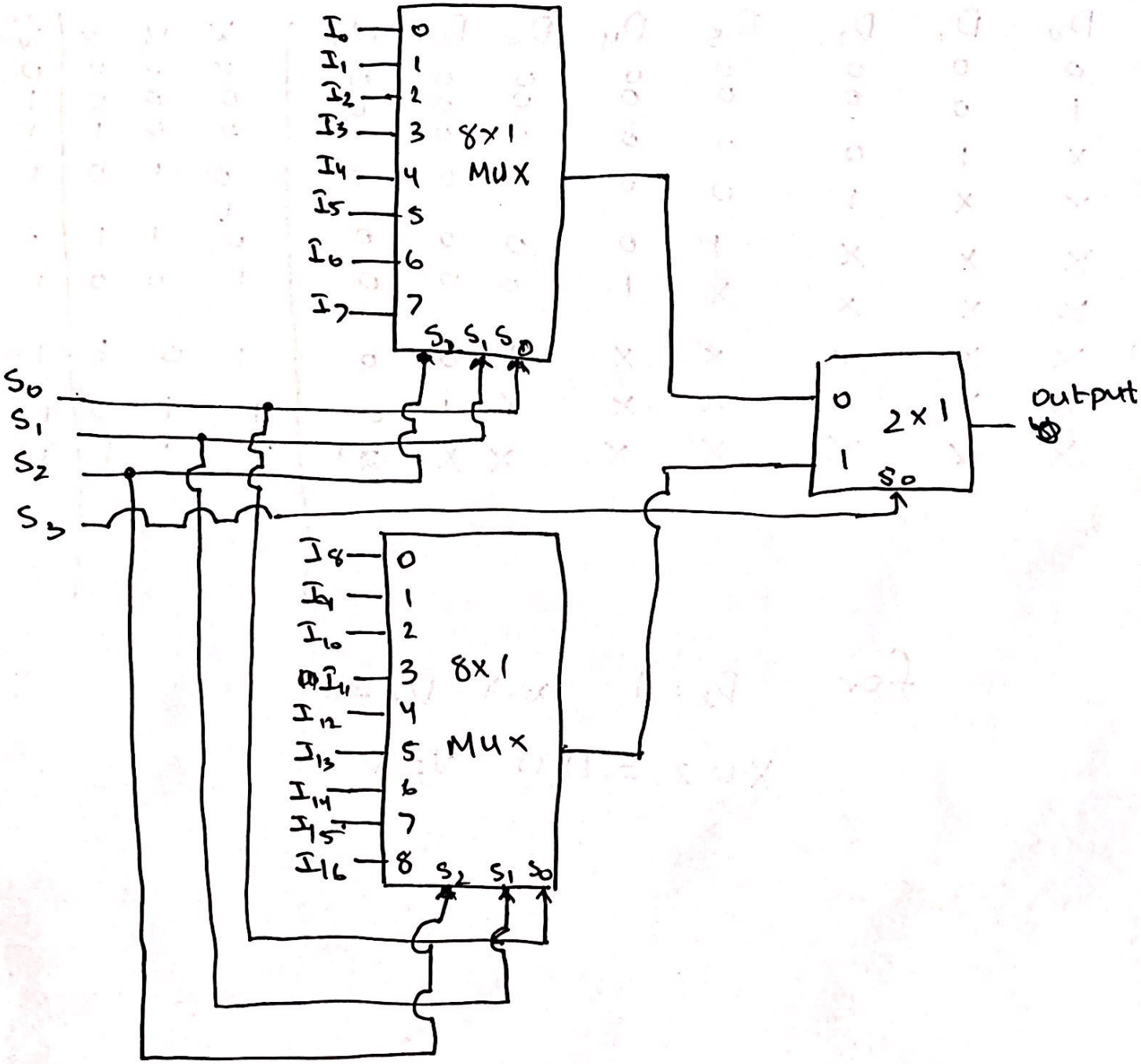
4.31

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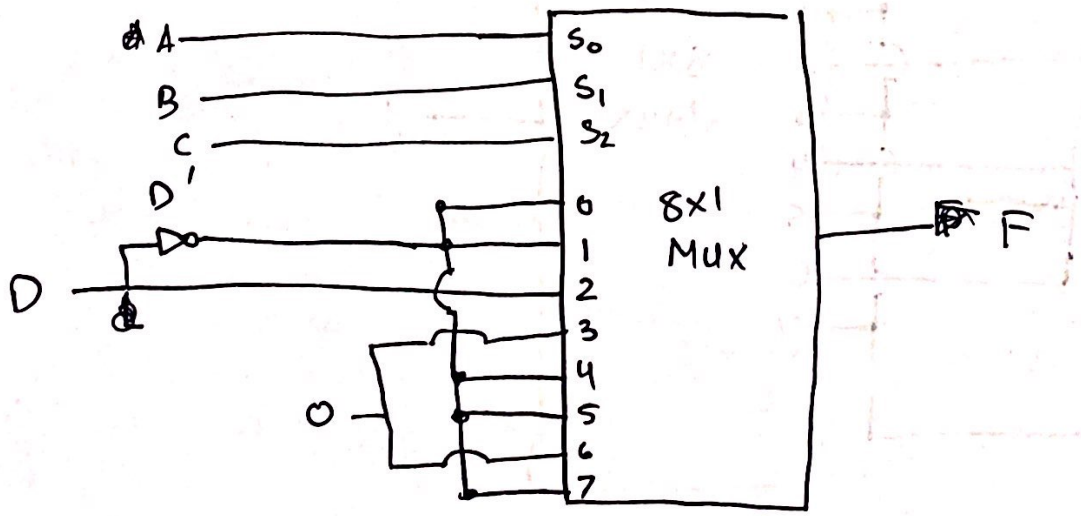
4.32

a)

$F(A,B,C,D) = (0,2,5,8,10,14)$

| A | B | C | D | F | |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | $F = D'$ 0 |
| 0 | 0 | 0 | 1 | 0 | |
| 0 | 0 | 1 | 0 | 1 | $F = D'$ 1 |
| 0 | 0 | 1 | 1 | 0 | |
| 0 | 1 | 0 | 0 | 0 | $F = D$ 2 |
| 0 | 1 | 0 | 1 | 1 | |
| 0 | 1 | 1 | 0 | 0 | $F = 0$ 3 |
| 0 | 1 | 1 | 1 | 0 | |
| 1 | 0 | 0 | 0 | 1 | $F = D'$ 4 |
| 1 | 0 | 0 | 1 | 0 | |
| 1 | 0 | 1 | 0 | 1 | $F = D'$ 5 |
| 1 | 0 | 1 | 1 | 0 | |
| 1 | 1 | 0 | 0 | 0 | $F = 0$ 6 |
| 1 | 1 | 0 | 1 | 0 | |
| 1 | 1 | 1 | 0 | 1 | $F = D'$ 7 |
| 1 | 1 | 1 | 1 | 0 | |

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b) $F = \bar{\Sigma}(2, 6, 11)$

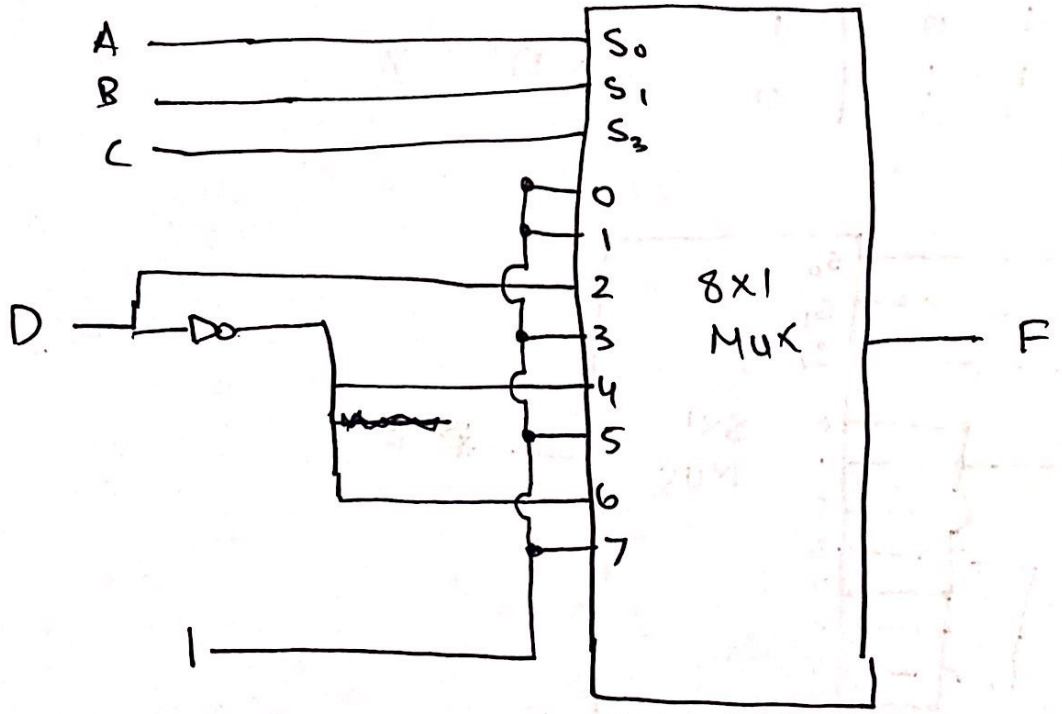
$F' = (A'+B'+C+D')(A+B+C+D')(A+B'+C+D)$

$F' = \Sigma(13, 9, 4)\ ABC'D + AB'C'D + A'BC'D$

$F' = \Sigma(4, 9, 13)$

$F = \Sigma(0, 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 14, 15)$

| A | B | C | D | F | | |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | | |
| 0 | 0 | 0 | 1 | 1 | F = 1 | 0 |
| 0 | 0 | 1 | 0 | 1 | | |
| 0 | 0 | 1 | 1 | 1 | F = 1 | 1 |
| 0 | 1 | 0 | 0 | 0 | | |
| 0 | 1 | 0 | 1 | 1 | F = D | 2 |
| 0 | 1 | 1 | 0 | 1 | | |
| 0 | 1 | 1 | 1 | 1 | F = 1 | 3 |
| 1 | 0 | 0 | 0 | 1 | | |
| 1 | 0 | 0 | 1 | 0 | F = D' | 4 |
| 1 | 0 | 1 | 0 | 1 | | |
| 1 | 0 | 1 | 1 | 1 | F = 1 | 5 |
| 1 | 1 | 0 | 0 | 1 | | |
| 1 | 1 | 0 | 1 | 0 | F = D' | 6 |
| 1 | 1 | 1 | 0 | 1 | | |
| 1 | 1 | 1 | 1 | 1 | F = 1 | 7 |

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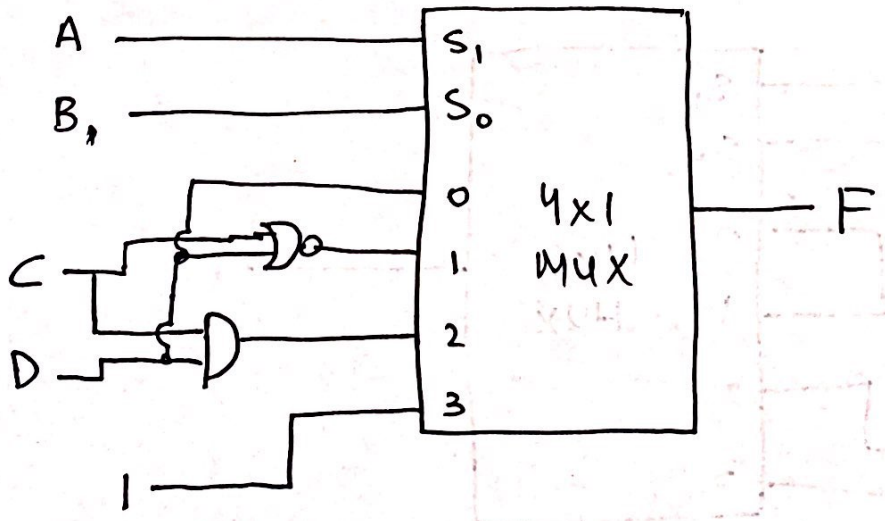
Q 4.35

a) $F_{(A,B,C,D)} = \Sigma(1,3,4,11,12,13,14,15)$

| A | B | C | D | F | |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | AB = 00 |
| 0 | 0 | 0 | 1 | 1 | F = D |
| 0 | 0 | 1 | 0 | 0 | |
| 0 | 0 | 1 | 1 | 1 | |
| 0 | 1 | 0 | 0 | 0 | AB = 01 |
| 0 | 1 | 0 | 1 | 0 | F = (C+B)' |
| 0 | 1 | 1 | 0 | 0 | |
| 0 | 1 | 1 | 1 | 0 | |
| 1 | 0 | 0 | 0 | 0 | AB = 10 |
| 1 | 0 | 0 | 1 | 0 | F = C.D |
| 1 | 0 | 1 | 0 | 0 | |
| 1 | 0 | 1 | 1 | 1 | |
| 1 | 1 | 0 | 0 | 1 | AB = 11 |
| 1 | 1 | 0 | 1 | 1 | F = 1 |
| 1 | 1 | 1 | 0 | 1 | |
| 1 | 1 | 1 | 1 | 1 | |

0
1
2
3

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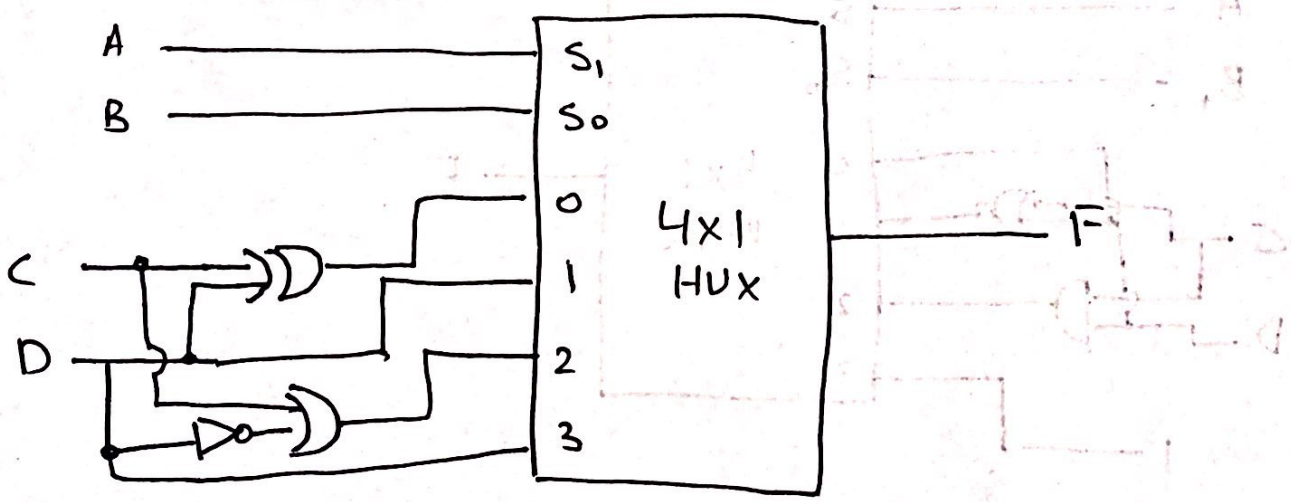
b) $F(A,B,C,D) = \sum(1,2,5,7,8,10,14,13,15)$

| Input A | B | C | D | output F | |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | AB=00, F = C⊕D → 0 |
| 0 | 0 | 0 | 1 | 1 | |
| 0 | 0 | 1 | 0 | 1 | |
| 0 | 0 | 1 | 1 | 0 | |
| 0 | 1 | 0 | 0 | 0 | AB=01, F=D → 1 |
| 0 | 1 | 0 | 1 | 1 | |
| 0 | 1 | 1 | 0 | 0 | |
| 0 | 1 | 1 | 1 | 1 | |
| 1 | 0 | 0 | 0 | 1 | AB = 10, F = C+D' → 2 |
| 1 | 0 | 0 | 1 | 0 | |
| 1 | 0 | 1 | 0 | 1 | |
| 1 | 0 | 1 | 1 | 1 | |
| 1 | 1 | 0 | 0 | 0 | AB = 11, F = D → 3 |
| 1 | 1 | 0 | 1 | 1 | |
| 1 | 1 | 1 | 0 | 0 | |
| 1 | 1 | 1 | 1 | 1 | |

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