Date:

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Section : "2A"
LAB TASH : 01
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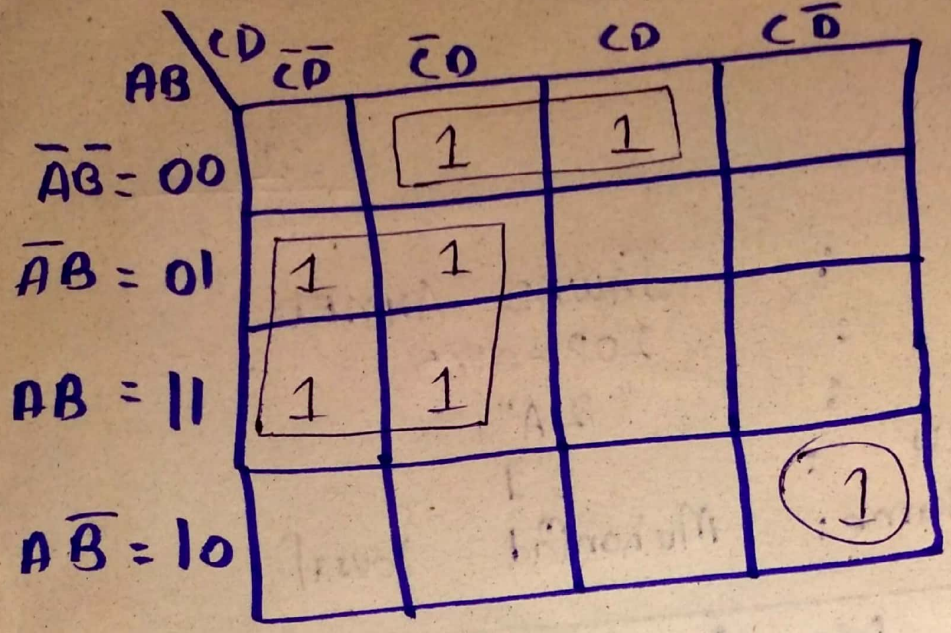
Question No 1

F = (m1, m3, m4, m5, m10, m12, m13)

Solution

$Y = \Sigma m(1, 3, 4, 5, 10, 12, 13)$

AB \ CD	00	01	11	10
00	0	1 (1)	3 (1)	2
01	4 (1)	5 (1)	7	6
11	12 (1)	13 (1)	15	14
10	8	9	11	10 (1)



* 1st pair

$= (\bar{A}\bar{B}) \cdot (\bar{C}D + CD)$

$= (\bar{A}\bar{B}) \cdot [D(\bar{C} + C)]$ $\quad \because \bar{C} + C = 1$

$= (\bar{A}\bar{B}) \cdot [D(1)]$

$= (\bar{A}\bar{B}) \cdot (D)$

$= \bar{A}\bar{B}D \longrightarrow (1)$

* 2nd Pair (Quad)

$= (\bar{A}B + AB) \cdot (\bar{C}\bar{D} + \bar{C}D)$

$= (B(\bar{A} + A)) \cdot (\bar{C}(\bar{D} + D))$

$= (B(1)) \cdot (\bar{C}(1))$

$= B\bar{C} \longrightarrow (2)$

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3rd pair.

$= A\bar{B} \cdot (C\bar{D})$

$= A\bar{B}C\bar{D} \rightarrow (3)$

Adding (1) (2) (3)

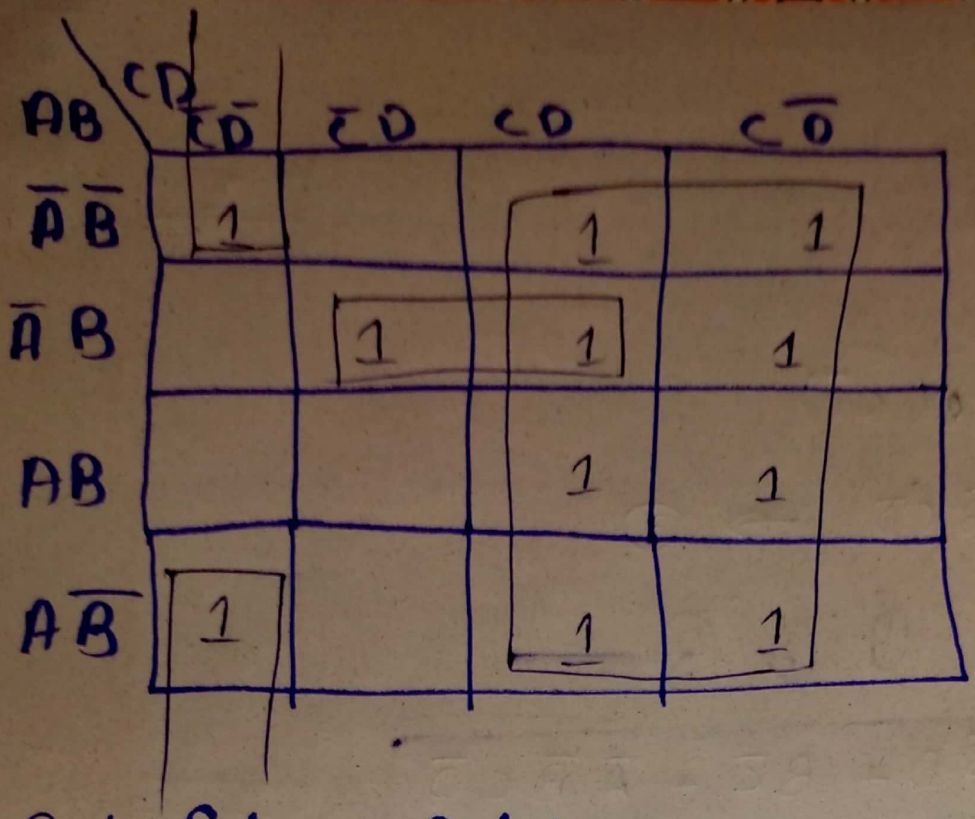
$$F = \bar{A}\bar{B}D + B\bar{C} + \bar{A}\bar{B}C\bar{D}$$

(2) $F = (m0, m2, m3, m5, m6, m7, m8, m10, m11, m14, m15)$

Solution:

$$Y = \Sigma m(0, 2, 3, 5, 6, 7, 8, 10, 11, 14, 15)$$

AB \ CD	00	01	11	10
00	(1) 0	1	3 (1)	2 (1)
01	4	5 (1)	7 (1)	6 (1)
11	12	13	15 (1)	14 (1)
10	8 (1)	9	11 (1)	10 (1)



First Solving Octet

$$= (\bar{A}\bar{B} + \bar{A}B + AB + A\bar{B}) \cdot (CD + C\bar{D})$$

$$= ((\bar{A}(\bar{B}+B) + A(B+\bar{B})) \cdot (C(D+\bar{D}))$$

$$= (\bar{A}(1) + A) \cdot (C(1))$$

$$= (1) \cdot (C)$$

$$= C \longrightarrow \text{eq } (1)$$

Next Pair

$$= (\bar{A}B) \cdot (\bar{C}D + CD)$$

$$= (\bar{A}B) \cdot (D(\bar{C}+C))$$

$$= (\bar{A}B) \cdot (D(1))$$

$$= \bar{A}BD \rightarrow \text{eq } (2)$$

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*Corners

$= (\bar{A}\bar{B} + A\bar{B}) \cdot \bar{C}\bar{D}$

$= (\bar{B}(\bar{A} + A)) \cdot \bar{C}\bar{D}$

$= (\bar{B}(1)) \cdot \bar{C}\bar{D}$

$= \bar{C}\bar{D}\bar{B}$ → eq (3)

Adding Eq 1, 2, 3

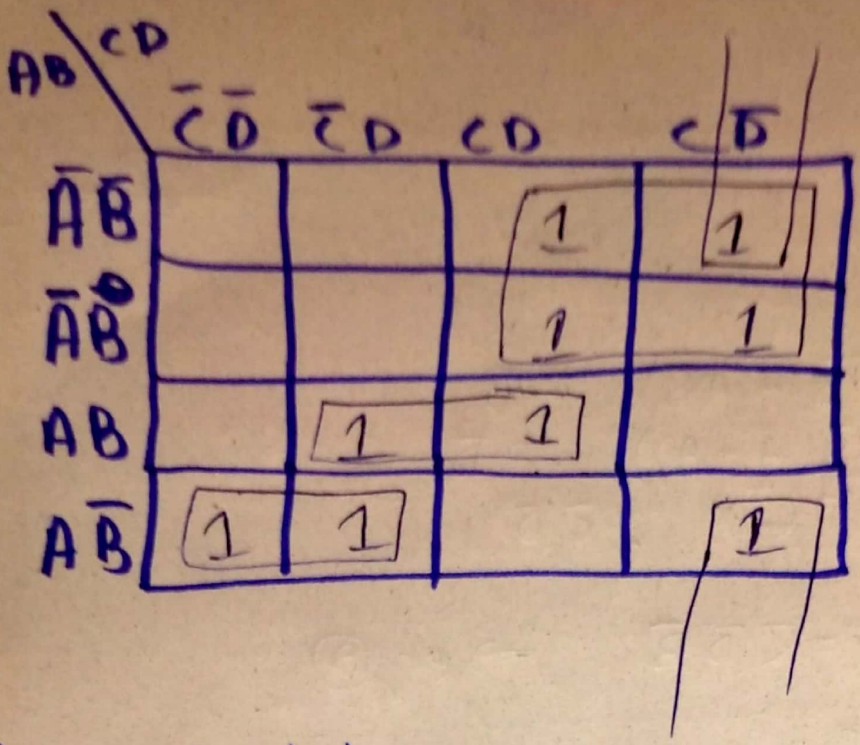
$$F = C + \bar{A}BD + \bar{C}\bar{D}B$$

3) $F = (m2, m3, m6, m7, m8, m9, m10, m13, m15)$

$Y = \Sigma m(2, 3, 6, 7, 8, 9, 10, 13, 15)$

Solution:

AB \ CD	00	01	11	10
00	0	1	3 [1]	2 [1]
01	4	5	7 [1]	6 [1]
11	12	13 [1]	15 [1]	14
10 [1]	8	9 [1]	11	10 [1]



Solving Octet

$$= (\bar{A}\bar{B} + \bar{A}B).(CD + C\bar{D})$$

$$= (\bar{A}(B+\bar{B})).(C(D+\bar{D}))$$

$$= (\bar{A}(1)).(C(1))$$

$$= \bar{A}C \rightarrow eq\ (1)$$

Next Pair

$$= (AB).(\bar{C}D + CD)$$

$$= (AB).(D(\bar{C}+C))$$

$$= (AB).(D(1))$$

$$= ABD \rightarrow eq\ (2)$$

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Next Pair

$$= A\bar{B} \cdot (\bar{C}\bar{D} + \bar{C}D)$$

$$= A\bar{B} \cdot (\bar{C}(\bar{D} + D))$$

$$= A\bar{B} \cdot (\bar{C}(1))$$

$$= A\bar{B}\bar{C} \rightarrow \text{eq } (3)$$

Corners

$$= A\bar{B} \cdot C\bar{D}$$

$$= A\bar{B}C\bar{D} \rightarrow \text{eq } (4)$$

Adding Eq 1, 2, 3, 4

$$F = \bar{A}C + ABD + A\bar{B}\bar{C} + A\bar{B}C\bar{D}$$