

$$Q1. (a) F(A, B, C, D) = \sum (4, 6, 7, 15)$$

A	B	C	D	F	
0	0	0	0	0	m_0
0	0	0	1	0	m_1
0	0	1	0	0	m_2
0	0	1	1	0	m_3
0	1	0	0	1	m_4
0	1	0	1	0	m_5
0	1	1	0	1	m_6
0	1	1	1	1	m_7
1	0	0	0	0	m_8
1	0	0	1	0	m_9
1	0	1	0	0	m_{10}
1	0	1	1	0	m_{11}
1	1	0	0	0	m_{12}
1	1	0	1	0	m_{13}
1	1	1	0	0	m_{14}
1	1	1	1	1	m_{15}

Q1 (a)

K-Map

AB \ CD	00	01	11	10
00	0	0	0	0
01	1	0	1	1
11	0	0	1	0
10	0	0	0	0

$$F = A'B'D' + BCD$$

simplifying:-

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

ANS

(b) $F(w, x, y, z) = \sum (2, 3, 12, 13, 14, 15)$

K-Map

w _x \ y _z	00	01	11	10
00	0	0	1	1
01	0	0	0	0
11	1	1	1	1
10	0	0	0	0

$$F = w'x'y'' + wxz' + wxy' + wxy$$

$$\Rightarrow w'x'y'' + wx(z' + y' + y)$$

$$\Rightarrow w'x'y'' + wx(z' + 1)$$

$$w'x'y'' + wx(1)$$

$$(\because y' + y = 1)$$

$$(\because z' + 1 = 1)$$

$$F = w'x'y'' + wx$$

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Q7 (6)

w	x	y	z	F	
0	0	0	0	0	m ₀
0	0	0	1	0	m ₁
0	0	1	0	1	m ₂
0	0	1	1	1	m ₃
0	1	0	0	0	m ₄
0	1	0	1	0	m ₅
0	1	1	0	0	m ₆
0	1	1	1	0	m ₇
1	0	0	0	0	m ₈
1	0	0	1	0	m ₉
1	0	1	0	0	m ₁₀
1	0	1	1	0	m ₁₁
1	1	0	0	1	m ₁₂
1	1	0	1	1	m ₁₃
1	1	1	0	1	m ₁₄
1	1	1	1	1	m ₁₅

TRUTH TABLE

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Q1 (c)

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$$F = (A, B, C, D) = \Sigma(3, 7, 11, 13, 14, 15)$$

Truth Table

A	B	C	D	F	
0	0	0	0	0	m_0
0	0	0	1	0	m_1
0	0	1	0	0	m_2
0	0	1	1	1	m_3
0	1	0	0	0	m_4
0	1	0	1	0	m_5
0	1	1	0	0	m_6
0	1	1	1	1	m_7
1	0	0	0	0	m_8
1	0	0	1	0	m_9
1	0	1	0	0	m_{10}
1	0	1	1	1	m_{11}
1	1	0	0	0	m_{12}
1	1	0	1	1	m_{13}
1	1	1	0	1	m_{14}
1	1	1	1	1	m_{15}

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Q1 (c)

K-Map

		<u>CD</u>			
		00	01	11	10
<u>AB</u>	00	0	0	1	0
	01	0	0	1	0
	11	0	1	1	1
	10	0	0	1	0

$$F = ABC + CD + ABD$$

$$\Rightarrow F = AB(C + D) + CD$$

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