

②

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$$\textcircled{A} f(A, B, C, D) = \sum m(0, 1, 4, 8, 9, 10)$$

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

$$\textcircled{1} \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D$$

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

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

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

$$= \bar{B}\bar{C}$$

$$\textcircled{2} \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D}$$

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

$$\bar{A}\bar{C}\bar{D}$$

$$\textcircled{3} \quad A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D}$$

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

$$A\bar{B}\bar{D}$$

So

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

Ans

part 2

$$\textcircled{b} \quad Y = \cancel{(\bar{A} + \bar{B} + C + D)} \cancel{(\bar{A} + \bar{B} + \bar{C} + D)} \cancel{(\bar{A} + \bar{B})}$$

Part ⑥

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

Now write the binary value for each on

$$Y = (1 + 1 + 0 + 0) (1 + 1 + 1 + 0) (1 + 1 + 1 + 1) (1 + 0 + 0 + 0)$$

$$Y = \begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow \\ 12 & 14 & 15 & 8 \end{matrix}$$

AB \ CD	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	0	15	15	14
10	0	9	11	10

$$\begin{aligned}
 M_1 &= \bar{A}\bar{B}CD + \bar{A}\bar{B}\bar{C}D \\
 &= \bar{A}\bar{B}D(\bar{C}+C) \\
 &= \bar{A}\bar{B}D
 \end{aligned}$$

$$\begin{aligned}
 M_2 &= \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D \\
 &= \bar{A}\bar{B}\bar{C}(\bar{D}+D) \\
 &= \bar{A}\bar{B}\bar{C}
 \end{aligned}$$

$$\begin{aligned}
 M_3 &= \bar{A}\bar{B}cD + \bar{A}BCD \\
 &= \bar{A}CD(\bar{B}+B) \\
 &= \bar{A}CD
 \end{aligned}$$

So

~~$$F = (\bar{A}\bar{B}D)$$~~

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

Q1:

$$\text{Part (a)} : \bar{A}\bar{B}\bar{C}D + \bar{A}BCD + ABD$$

$$\bar{A}BD(\bar{C}+C) + ABD$$

$$\bar{A}BD(1) + ABD$$

$$\bar{A}BD + ABD$$

$$BD(\bar{A}+A)$$

$$BD \Rightarrow \text{Ans.}$$

$$\text{Part (b)} \quad AB + \bar{A}\bar{C} + A\bar{B}C(AB+C)$$

$$AB + \bar{A}\bar{C} + A\bar{B}C + A\bar{B}CC$$