

1.

①

$$Y_1 = \sum_m (1, 2, 3, 5, 6)$$

AB		00	01	11	10
C	0	0	1	1	0
	1	1	1	0	1

$$\Rightarrow Y_1 = \bar{A}C + \bar{B}C + B\bar{C}$$

②

$$Y_2 = \sum_m (0, 2, 4, 6, 8, 10)$$

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

$$\Rightarrow Y_2 = \bar{A}\bar{D} + \bar{B}\bar{D}$$

③

$$\begin{aligned}
 Y_3 &= \overline{\bar{A}\bar{B} + AC + B\bar{C}} \\
 &= (A+B)(\bar{A}+\bar{C})(\bar{B}+C) \\
 &= \bar{A}\bar{B}\bar{C} + \bar{A}BC
 \end{aligned}$$

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

$$\Rightarrow Y_3 = \bar{A}\bar{B}\bar{C} + \bar{A}BC$$

2.

$$\begin{aligned}
 Y_1 &= \overline{\overline{A\bar{B}} \cdot A} \cdot \overline{\overline{A\bar{B}} \cdot B} \\
 &= \overline{(\bar{A}+\bar{B})A} \cdot \overline{(\bar{A}+\bar{B})B} \\
 &= \overline{\bar{A}\bar{B}} \cdot \overline{\bar{A}\bar{B}} \\
 &= \bar{A}\bar{B} + \bar{A}\bar{B}
 \end{aligned}$$

$$Y_2 = \bar{A}\bar{D} + \bar{B}\bar{D} + \bar{B}C$$

$$\begin{aligned} Y_3 &= \bar{A}BC + A\bar{B}C + AB\bar{C} + ABC \\ &= \bar{A}BC + A\bar{B}C + AB \end{aligned}$$

