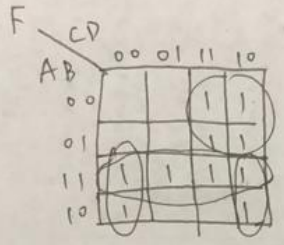
4.(2) $F' = (A+B)\cdot AC + (\bar{C}(D+E)) = AC + BAC + \bar{C}D + \bar{C}E$

$= AC + \bar{C}D + \bar{C}E$

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

$= \bar{A}\bar{C} + C\bar{D} + C\bar{E}$

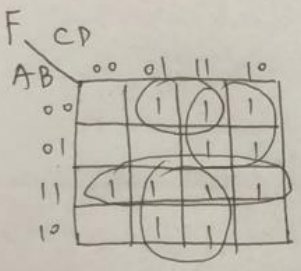
9.(1)



$F(A,B,C,D) = \bar{A}C + AB + A\bar{C}\bar{D} + AC\bar{D}$

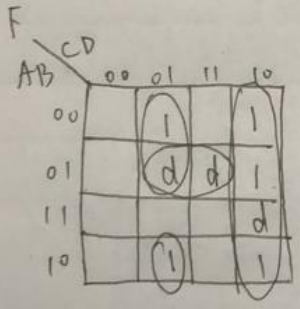
$= \bar{A}C + AB + A\bar{D}$

(2)



$F(A,B,C,D) = \bar{A}\bar{B}D + \bar{A}C + AB + AD.$

(3)

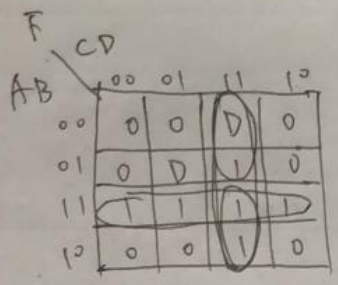


$F(A,B,C,D) = \bar{A}\bar{C}D + \bar{A}BD + C\bar{D} + A\bar{B}\bar{C}\bar{D}$

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

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

(4)



$F(A,B,C,D) = AB + CD.$

21.

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

$\therefore F = \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + ABC$

$= \bar{B}\bar{C} + ABC.$