(a, b, d) same as before (c) no.

3-3 (c) $k'lm' + k'm'n + kl m' n' + lmn'$

$= k'lm'(n+n') + k'm'n(l+l') + klm'n' + lmn'(k+k')$

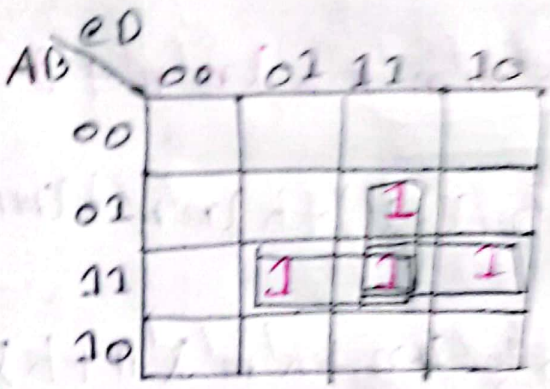
$= k'lm'n + k'lm'n' + k'lm'n + k'm'l'n + klm'n' + klmn' + k'lmn'$

kl \ mn	00	01	11	10
00		1		
01	1	1		1
11	1			1
10				

$F = k'm'n + ln' + k'lm'$

Ch-3

3-1 | (b) $F(A,B,C,D) = \Sigma(7, 13, 14, 15)$



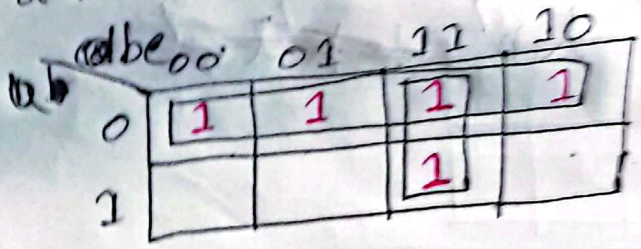
$F = BCD + ABD + ABC$

(a) (a, c, d) same as before (b) no.

3-2 (c) $a'b' + bc + a'bc'$

$= a'b'(c+c') + abc(a+a') + a'bc'$

$= a'b'c + a'b'c' + abc + a'bc + a'bc'$



$F = a' + bc$

(a, b, d) same as before (c) no. –

3-3] (c) $k'lm' + k'm'n + kl m'n' + lmn'$

$= k'lm'(n+n') + k'm'n(l+l') + klm'n' + lmn'(k+k')$

$= k'lm'n + k'lm'n' + k'lm'n + k'm'l'n + klm'n' + klmn' + k'lmn'$

kl \ mn	00	01	11	10
00		1		
01	1	1		1
11	1			1
10				

$F = k'm'n + lm' + ~~klm'~~$

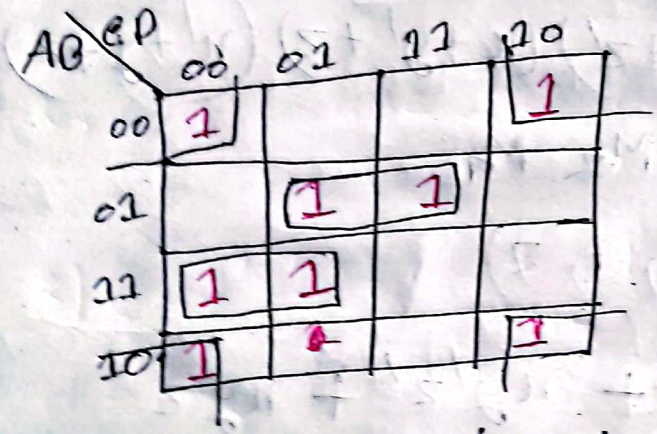
(d) $A'B'C'D' + AC'D' + B'CD' + A'BCD + BC'D$

$= A'B'C'D' + AC'D'(B+B') + B'CD'(A+A') + A'BCD +$

$BC'D(A+A')$

$= A'B'C'D' + ABC'D' + AB'C'D' + AB'CD' + A'B'CD'$

$+ A'BCD + ABC'D + A'BC'D$



$F = B'D' + A'BD + AB'C'$

(a, b, c) same as before (c, d) no –

(3-5) (a) $F_1 = \Pi(0, 3, 5, 6)$

$= (x+y+z)(x+y'+z')(x'+y+z')$

$(x'+y'+z)$

$= M_0 M_3 M_5 M_6$

$F_2 = \Pi(0, 1, 2, 9)$

$= (x+y+z)(x+y+z')(x+y'+z)(x'+y+z)$

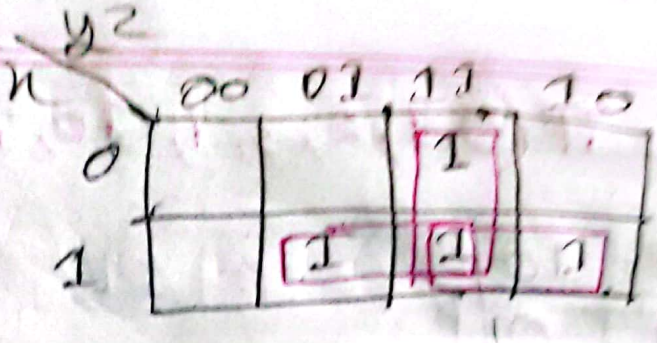
$= M_0 M_1 M_2 M_4$

(b) $F_1 = \Sigma(1, 2, 4, 7)$

$F_1 = x'y'z + x'yz' + xy'z' + xyz$

x \ yz	00	01	11	10
0		1		1
1	1		1	

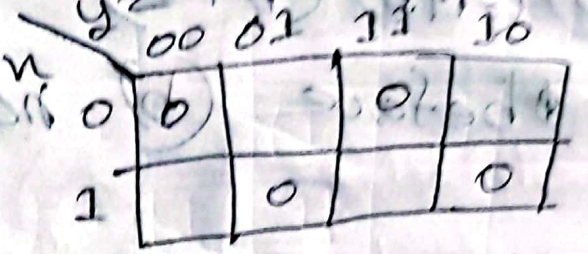
$F_2 = \Sigma(3, 5, 6, 7)$



$F = yz + xz + x'y$

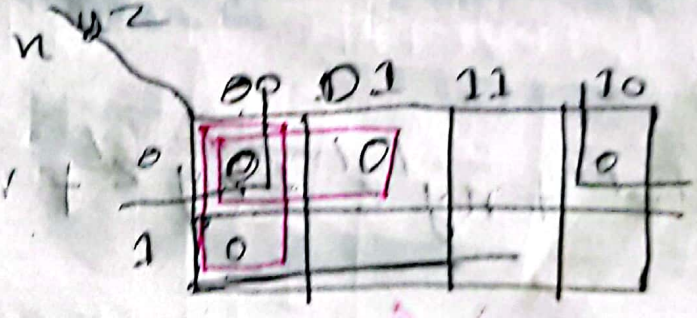
(e) From (b) we get

$F_1 = \Pi(0, 3, 5, 6)$ POS



$F = (x+y+z)(x+y'+z')(x'+y+z')(x'+y'+z)$

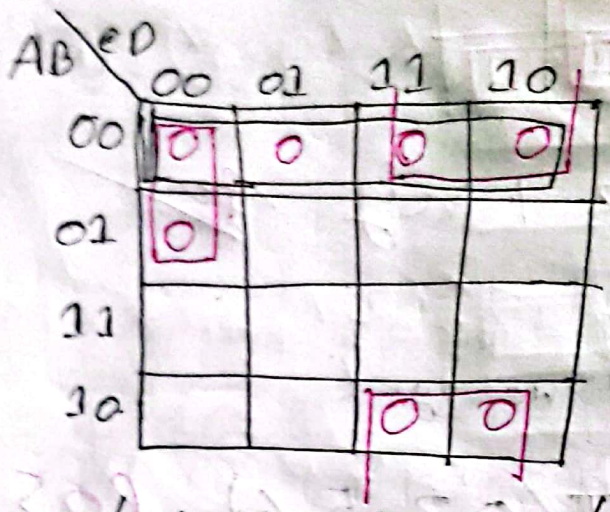
$F_2 = \Pi(0, 1, 2, 4)$ POS



$F = x'z' + x'y' + y'z'$

$(x+z)(x+y)(y+z)$

3-6 (b) $F(A,B,C,D) = \Pi(0,1,2,3,9,10,11)$



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

$= (A+C+D)(A+C+D)(A+B)(B+C')$

(a, c) same as before (b) no.-

(3-7) (a) $x'z' + y'z' + yz' + xyz$

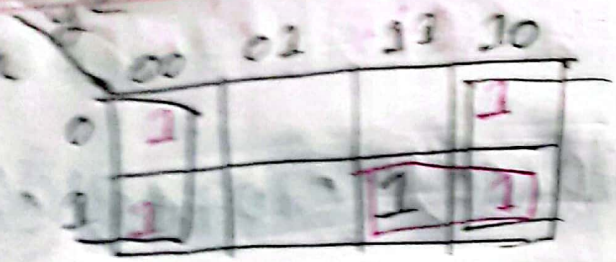
$= x'z'(y+y') + y'z'(x+x') + (x+x')yz' + xyz$

$= x'y'z' + x'y'z' + xy'z' + x'yz' + xyz' + x'yz'$

$+ xyz$

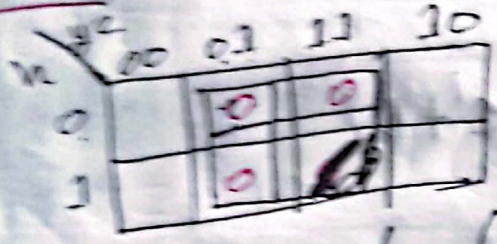
$= x'y'z' + x'y'z' + xy'z' + xyz' + xyz$

(1) SOP $\longrightarrow$ 1



$y = z' + xy$

POS → 0



$F = (x+z')(y+z)$

(b) $(A+B'+D)(A'+B+D)(C+D)(C'+D')$

$= (AB'+D+CC')$

$= (A+B'+D+CC')(A'+B+D+CC')(C+D+AA')$

$AB'+D+CC' = (A+B'+C+D)(A+B'+C'+D)$

$A'+B+D+CC' = (A'+B+C+D)(A'+B+C'+D)$

$(C+D+AA'+BB') = A+C+D$

(b) $(A+B'+D')\ (A'+B+D)\ (C+D)\ (C'+D')$

$= (A+B'+D+CC')\ (A'+B+D+CC')\ (C+D+AA')\ (C'+D'+AA')$

1st term –

$(A+B'+C+D)\ (A+B'+C'+D)$

2nd term –

$(A'+B+C+D)\ (A'+B+C'+D)$

3rd term –

$(A+C+D)\ (A'+C+D)$ ~~$=A+$~~

$= (A+C+D+BB')\ (A'+C+D+BB')$

$= (A+B+C+D)\ (A+B+C+D)\ (A'+B+C+D)\ (A'+B'+C+D)$

4th term –

$(A+C'+D')\ (A'+C'+D')$

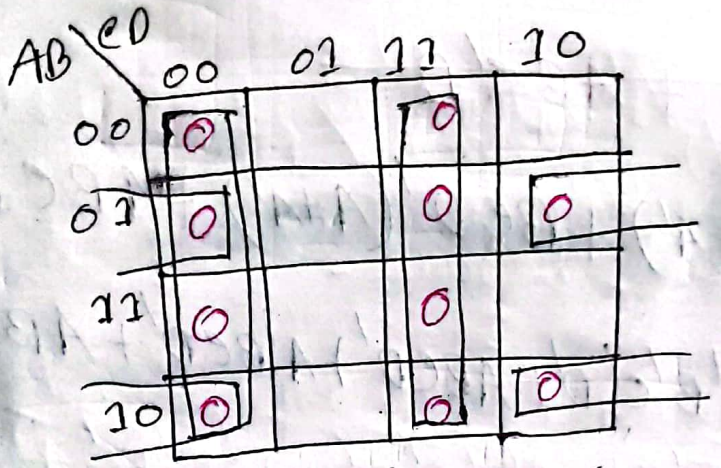
$= (A+C'+D'+BB')\ (A'+C'+D'+BB')$

$= (A+B+C'+D')\ (A+B'+C'+D')\ (A'+B+C'+D')\ (A'+B'+C'+D')$

Combining all terms and removing those that appear more than once –

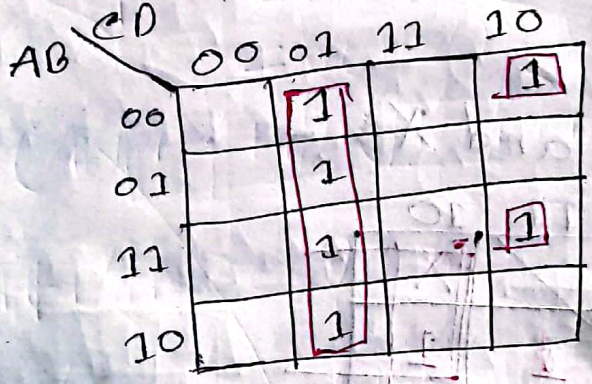
$= (A+B'+C+D)\ (A+B'+C'+D)\ (A'+B+C+D)\ (A'+B+C'+D)\ (A+B+C+D)$
$(A'+B'+C+D)\ (A+B+C'+D)\ (A+B'+C'+D')\ (A'+B+C'+D')\ (A'+B'+C'+D')$

(2) POS ⟶



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

(1) SOP ⟶



$F = C'D + A'B'CD' + ABCD'$

(c, d, e) same as before.

3-15 (b) $F = B'C'D' + BCD' + ABCD'$

$d = B'CD' + AB'CD'$

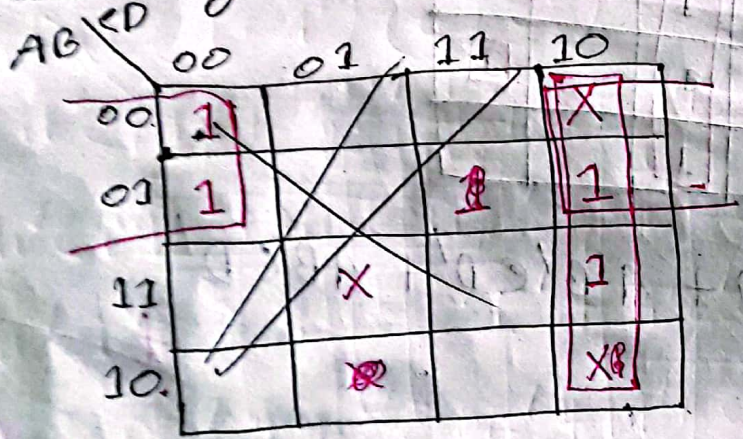
$F = B'C'D'(A+A') + BCD'(A+A') + ABCD'$

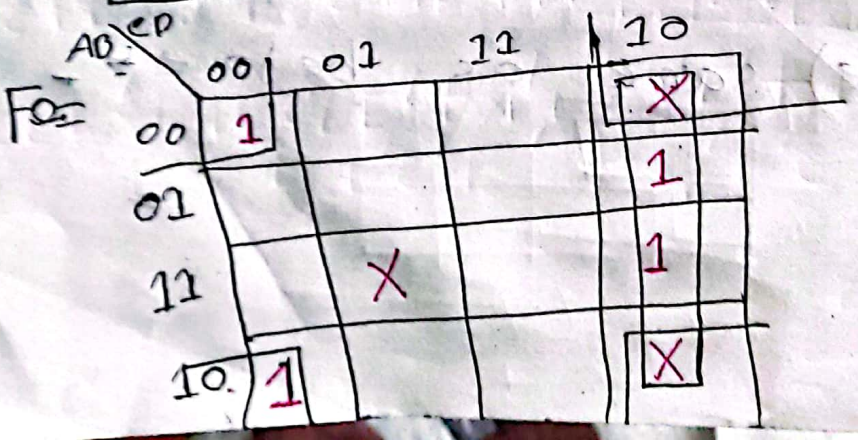
$= AB'C'D' + A'B'C'D' + ABCD' + A'BCD' + ABCD'$

$d = B'CD'(A+A') + ABC'D$

$= AB'CD' + A'B'CD' + ABC'D$

Combining 1's and X's





$F = B'D' + CD'$

(a) same as before -

3-16 (a) $F = A'B'D' + A'CD + ABC$

$= A'B'D(C+C') + A'CD(B+B') + A'BC(D+D')$

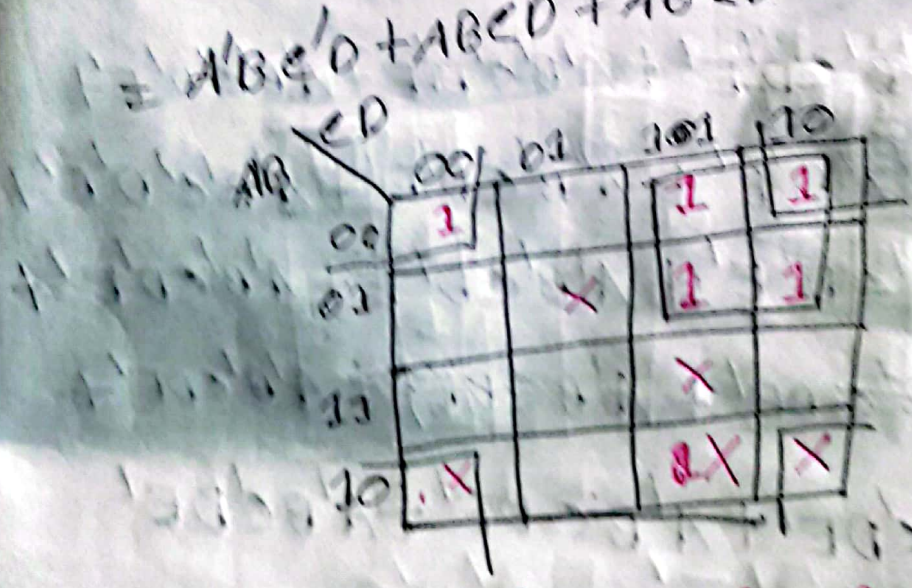
$= A'B'CD + A'B'C'D' + A'BCD + A'B'CD + ABCD + A'BCD'$

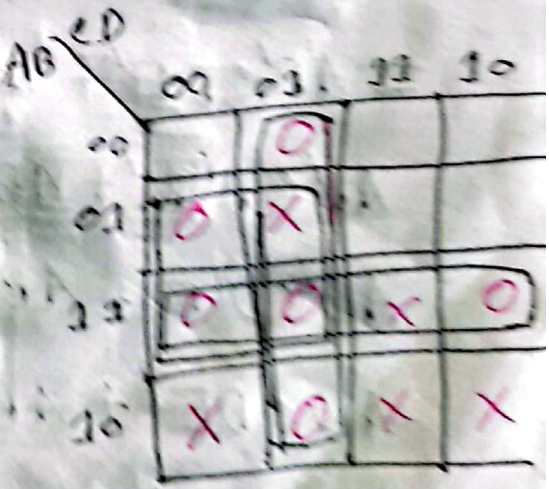
$= A'B'CD + A'BC'D' + A'BCD + ABCD$

$d = A'B'D + ACD + AB'D'$

$= A'BC'D + ACD(B+B') + AB'D'(C+C')$

$= A'BC'D + ABCD + AB'CD + AB'C'D + AB'C'D'$





~~F = B'~~ 1] Sum of product

$F = B'D + A'C$

2) POS

$F = \cancel{cD' + A'B' + B'c}$

$= (c + D')(A' + B')(B' + c)$

(b, c) same as before.

3-4) (c) $A'B'CE' + A'B'c'D' + B'D'E' + B'cD' + cDE' + BDE'$

$= A'B'CE'(D+D') + A'B'c'D'(E+E') + B'D'E'(A+A')(c+c')$

$+ B'cD'(A+A')(E+E') + cDE'(A+A')(B+B') +$

$BDE'(A+A')(c+c')$

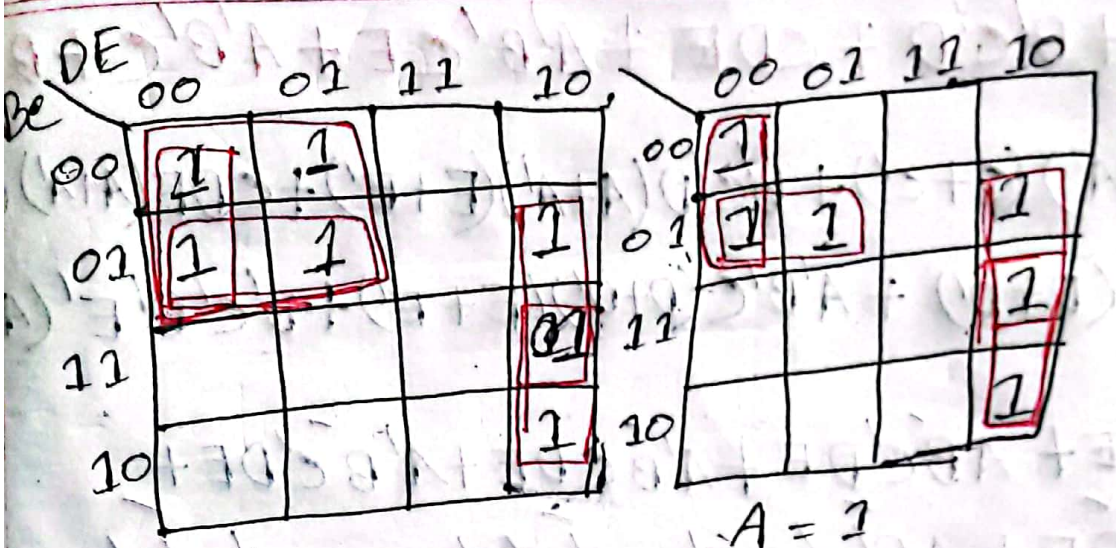
$= A'B'cDE' + A'B'cD'E' + A'B'c'D'E + A'B'cD'E' +$

$AB'cD'E' + AB'c'D'E' + A'B'cD'E' + A'B'c'D'E' +$

$AB'cD'E + AB'cD'E' + A'B'cD'E + A'B'cD'E' +$

$ABcDE' + AB'cDE' + A'BcDE' + A'B'cDE' +$

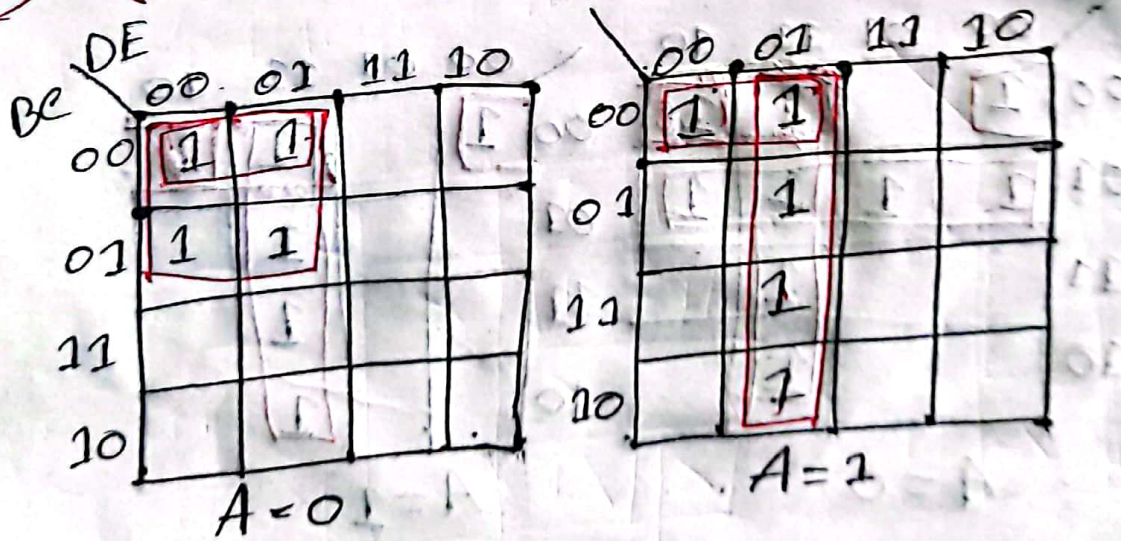
$ABcDE' + ABc'DE' + A'BcDE' + A'Bc'DE'$



$F = CDE' + BDE' + B'CD' + B'D'E' + B$

$A'B'D'$ 4

(a) $F(A,B,C,D,E) = \sum(0,1,4,5,16,17,21,25,29)$



$F = B'C'D' + A'B'D' + AD'E$ 4

(b) $BDE + B'C'D + CDE + A'B'CE + A'B'C + B'C'D'E'$

$= BDE(A+A')(C+C') + B'C'D(A+A')(E+E') + CDE(A+A')(B+B')$

$+ A'B'CE(D+D') + A'B'C(D+D')(E+E') + B'C'D'E'(A+A')$

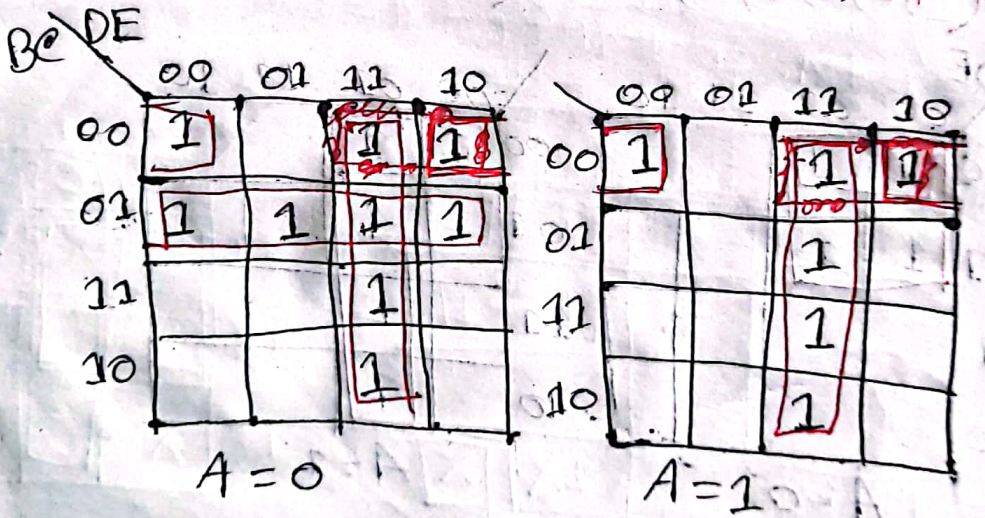
$= ABCDE + ABC'DE + A'BCDE + A'BC'DE +$

$AB'C'DE + AB'C'DE' + A'B'C'DE + A'B'C'DE' +$

$ABCDE + AB'CDE + A'BCDE + A'B'CDE +$

$A'B'CDE + A'B'CD'E + A'B'CDE + A'B'CDE' +$

$A'B'CD'E + A'B'CD'E' + AB'C'D'E' + A'B'C'D'E'$



$F = DE + B'C'E' + A'B'C$