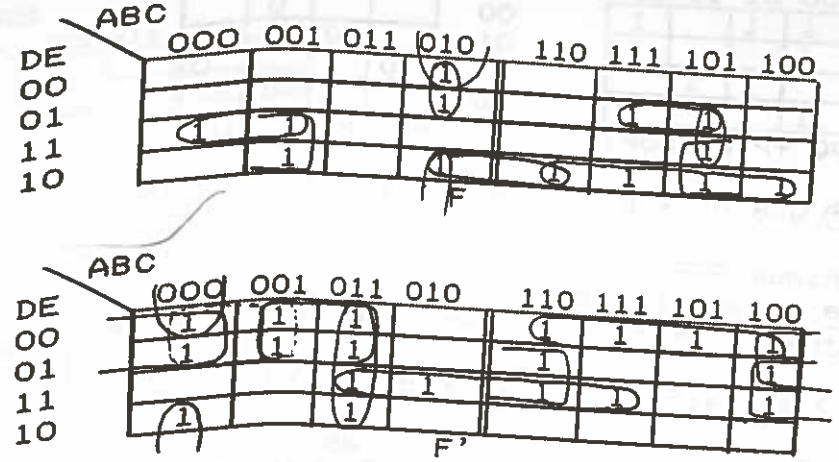
3.9 (iii)$F=\sum m(3,6,7,8,9,10,18,21,22,23,26,29,30)$



(a)Prime implicants :A'B'DE, BC'DE', B'CD, A'BC'D', A'BC'E', ADE', ACD'E, AB'CE, AB'CD

(b)Essential :A'B'DE, B'CD, ADE', A'BC'D', ACD'E

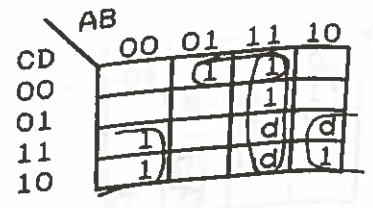
(c)Minimum SOP F=A'B'DE + B'CD + ADE' + A'BC'D' + ACD'E + BC'DE'

(d)Minimum SOP F'=B'C'D' +A'CD' +A'BC +BDE +A'B'C'E' +AD'E' +AC'E

(e)Minimum POS F=(B+C+D)(A+C'+D)(A+B'+C')(B'+D'+E')(A+B+C+E)(A'+D+E)(A'+C+E')

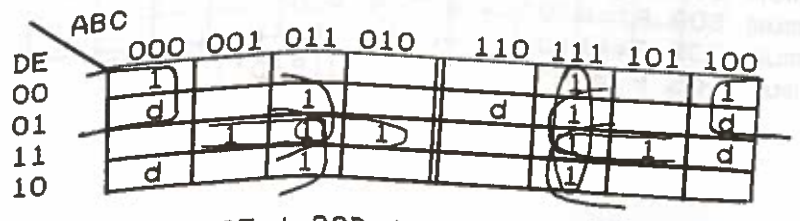
(f)Minimum POS F'=(A+B+D'+E')(B+C'+D')(A'+D'+E)(A+B'+C+D)(A'+C'+D+E')(B'+C+D'+E)

3.10 (a)$F(A,B,C,D)=\sum m(2,3,4,10,12,13) + d(11,14,15)$



F=AB + B'C + BC'D'

(b)$F(A,B,C,D,E)=\sum m(0,7,11,13-16,23,28-31) + d(1,2,17,19,25)$



F=ABC + BCE + BCD + CDE + B'C'D' + A'BDE

3.11 (i)$F(A,B,C,D)=\sum m(1,4,5,6,8,9,11) + d(7,15)$

Steps 1 and 2:

	ABCD
1	0001
4	0100
8	1000
5	0101
6	0110
9	1001
7	0111
11	1011
15	1111

Step 3:

(1,5)	0-01
(1,9)	-001
(4,5)	010-
(4,6)	01-0
(8,9)	100-
(5,7)	01-1
(6,7)	011-
(9,11)	10-1
(7,15)	-111
(11,15)	1-11

Step 4:

(4,5,6,7)	01--	Same as (4,6,5,7)

(1,5)	0-01	PI_1
(1,9)	-001	PI_2
(8,9)	100-	PI_3
(4,5,6,7)	01--	PI_4
(9,11)	10-1	PI_5
(7,15)	-111	PI_6
(11,15)	1-11	PI_7

Prime Implicants

(Don't-care)

Step 5: Prime Implicant Chart

Minterms

	1	4	5	6	8	9	11
PI_1	×		×				
PI_2	×					×	
PI_3					⊗	×	
PI_4		⊗	×	⊗			
PI_5						×	×
PI_7							×

Step 6:

Essential PIs: PI_3, PI_4

Steps 7 and 8:

$F=PI_3 + PI_4 + PI_1$ or $PI_2 + PI_7$ or PI_5

=AB'C' +A'B +A'C'D(orB'C'D) +ACD(orAB'D)