

a. $f(a, b, c, d, e) = \sum_m (0, 2, 4, 6, 20, 22)$

①

de \ bc	000	001	011	010	110	111	101	100
00	1			1	1			1
01								
11								
10				1				1

$\bar{a}\bar{b}\bar{d}\bar{e}$ (pointing to 000)
 $\bar{a}\bar{b}d\bar{e}$ (pointing to 010)
 $\bar{a}b\bar{d}\bar{e}$ (pointing to 011)
 $\bar{b}cd\bar{e}$ (pointing to 110)
 $bcd\bar{e}$ (pointing to 100)

$w = \bar{a}\bar{b}\bar{e} + \bar{b}c\bar{e}$

b. $f(a, b, c, d, e) = \sum_m (1, 4, 6, 9, 14, 17, 22, 27, 28) + d(12, 15, 20, 30, 31)$

de \ bc	00	01	11	10
00		1	1	
01	1			1
11			1	
10		1	1	

$\bar{a}\bar{c}d\bar{e}$ (pointing to 001)
 $\bar{a}c\bar{d}\bar{e}$ (pointing to 011)
 $\bar{a}\bar{b}c\bar{d}\bar{e}$ (pointing to 010)
 $\bar{a}b\bar{c}d\bar{e}$ (pointing to 101)
 $\bar{a}c\bar{d}e$ (pointing to 110)
 $\bar{a}b\bar{c}de$ (pointing to 100)

de \ bc	00	01	11	10
00		1	1	
01	1			1
11			1	
10		1	1	

$a\bar{c}d\bar{e}$ (pointing to 001)
 $a\bar{c}de$ (pointing to 101)
 $ab\bar{c}d\bar{e}$ (pointing to 100)
 $ab\bar{c}de$ (pointing to 110)

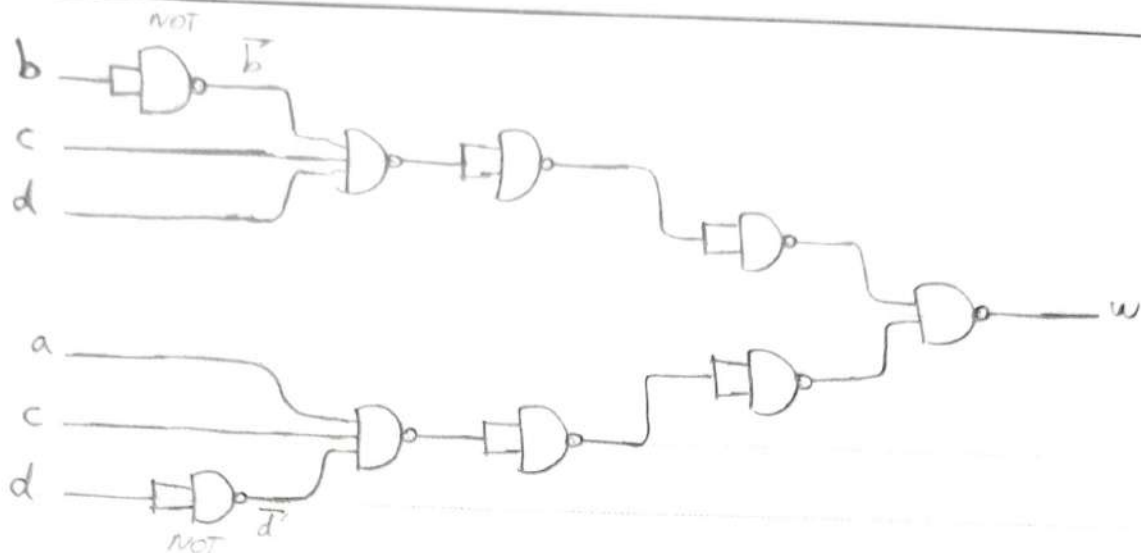
$w = cd\bar{e} + \bar{b}c\bar{d}\bar{e} + \bar{a}\bar{c}d\bar{e} + c\bar{d}\bar{e} + abde + \bar{a}\bar{c}de$

$f(a, b, c, d) = \sum_m (3, 4, 14) + d(0, 2, 10, 12)$

②

ab \ cd	00	01	11	10
00	-		-	
01				
11	1			1
10	-		-	

$w = \bar{b}cd + ac\bar{d}$

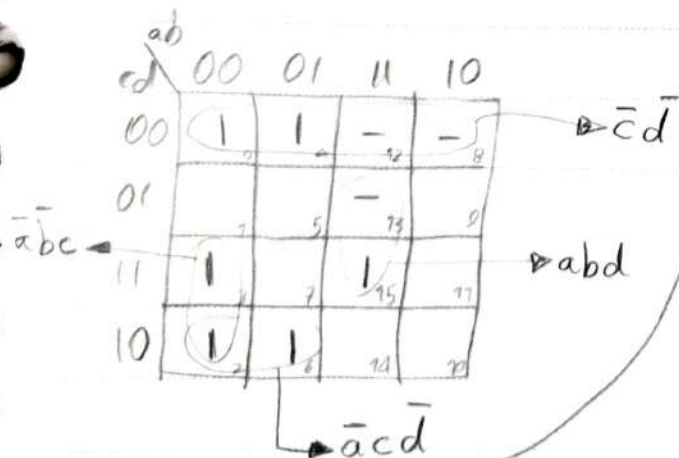


Verilog: Module func(input a, b, c, d, output w)

assign w = ((b == 0 & c == 1) & (d == 1)) | ((a == 1 & c == 1) & (d == 0));

endmodule

$$f(a, b, c, d) = \sum_m(0, 2, 3, 4, 6, 15, 25, 28, 29) + d(8, 12, 13, 17)$$



$$w = \bar{c}\bar{d} + abd + \bar{a}c\bar{d} + \bar{a}\bar{b}c$$

module func1(input a, b, c, d, output w)

assign w = ((c == 0 & d == 0) | (a == 1 & b == 1 & d == 1) | (a == 0 & c == 1 & d == 0) | (a == 0 & b == 0 & c == 1));

endmodule