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Course: Digital Electronics Code: 18CS33

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Open Book Assignment -1.

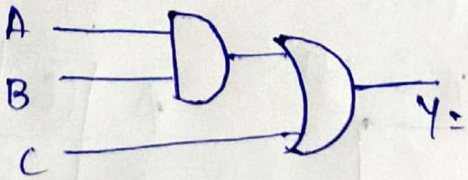
1) $f(A,B,C,D) = \Sigma m\,(2,3,6,7,10,11,12,13,14,15)$

Minterm	1st level	2nd level	3rd level
2 - 0010 ✓	2,3 -(1) ✓	2,3,6,7 -(1,4) ✓	2,3,6,7,10,11,14,15 -(1,4,8)
3 - 0011 ✓	2,6 -(4) ✓	2,3,10,11 -(1,8) ✓	↓
6 - 0110 ✓	2,10 -(8) ✓	2,6,10,14 (4,8) ✓	Q.
10 - 1010 ✓	3,7 -(4) ✓	3,7,11,15 (4,8) ✓	
12 - 1100 ✓	3,11 -(8) ✓	6,7,14,15 (1,8) ✓	
7 - 0111 ✓	6,7 -(1) ✓	10,11,14,15 (1,4) ✓	
11 - 1011 ✓	6,14 -(8) ✓	12,13,14,15 (1,2) → P	
13 - 1101 ✓	10,11 -(1) ✓		
14 - 1110 ✓	10,14 -(4) ✓		
15 - 1111 ✓	12,13 -(1) ✓		
	12,14 -(2) ✓		
	7,15 -(8) ✓		
	11,15 -(4) ✓		
	13,15 -(2) ✓		
	14,15 -(1) ✓		

$f = P + Q$

$\boxed{f = A\cdot B + C}$

Logic circuit



2) $f(A,B,C,D) = \Sigma m(0,1,4,5,8,9,10,11,12)$.

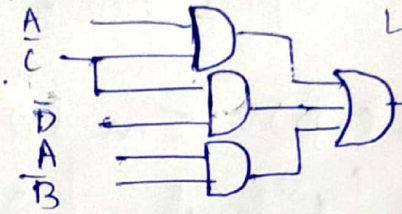
AB \ CD	00	01	11	10
00	1	1	0	0
01	1	1	0	0
11	1	0	0	0
10	1	1	1	1

K-map

$f = P + Q + R$

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

∴ SOP form.



3) $f(A,B,C) = \pi M(0,1,4,5,6)$.

$f(A,B,C) = M_0 \cdot M_1 \cdot M_4 \cdot M_5 \cdot M_6$

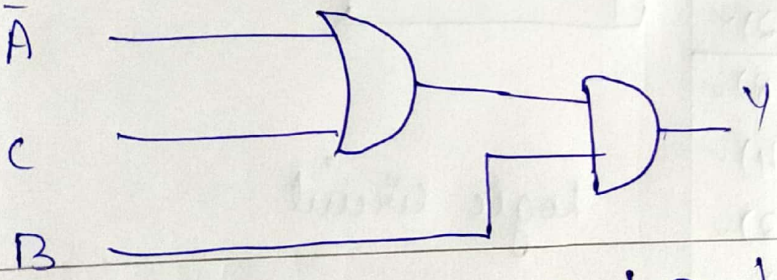
Using K-Map,

A \ BC	00	01	11	10
0	0	0	1	1
1	0	0	1	0

$f = P \cdot Q$

$f = B \cdot (\bar{A} + C)$ – POS form

Logic circuit



4) $\Sigma m(0,3,7)$ A is MEV

Implementation table.

	D_0	D_1	D_2	D_3
A	0	1	2	3
A	4	5	6	7
	$\bar{A}$	0	0	1