King Fahd University of Petroleum & Minerals
Department of Electrical Engineering

EE200-(01/03) (101)

Solution

Homework # 5

1. Problem 4.3(a) in your textbook
Write the Boolean functions for the four outputs in terms of the input variables for the circuit shown in Fig. 4.26(section 4.11)

2. Problem 4.4(b) in your textbook
Design s combinational circuit with three inputs (x, y, z) and one output (F). The output is 1 when the binary value of the inputs is an odd number.

3. Problem 4.12(a) in your textbook
Design a half subtractor circuit with inputs x and y and outputs Difference (D) and Borrow (B). The circuit subtracts x – y and places the difference in D and the borrow in B.

4. Problem 4.15 in your textbook
Derive the two-level Boolean expression for the output carry C4 shown in the look ahead carry generator of Fig. 4.12.

5. Problem 4.28 in your textbook
Using a decoder and external gates, design the combinational circuit defined by the following three Boolean functions:

   a. $F1 = x'y'z' + xz, \; F2 = xy'z' + x'y, \;$ and $F3 = x'y'z + xy$
   b. $F1 = (x + y')z, \; F2 = y'z' + xy' + yz', \;$ and $F3 = (x' + y)z$

4.3 **(a)** $Y_i = (A_iS' + B_iS)E'$ *for* $i = 0, 1, 2, 3$

4.4 **(b)** $F(x, y, z) = \sum(1, 3, 5, 7)$ $\quad$ ***Using k − map*** $\quad F = z$

4.12 **(a)**

x	y	B	D
0	0	0	0
0	1	1	1
1	0	0	1
1	1	0	0

$D = x'y + xy'$
$B = x'y$

4.15 $C_4 = G_3 + P_3C_3 = G_3 + P_3(G_2 + P_2G_1 + P_2P_1G_0 + P_2P_1P_0C_0)$

$$= G_3 + P_3G_2 + P_3P_2G_1 + P_3P_2P_1G_0 + P_3P_2P_1P_0C_0$$

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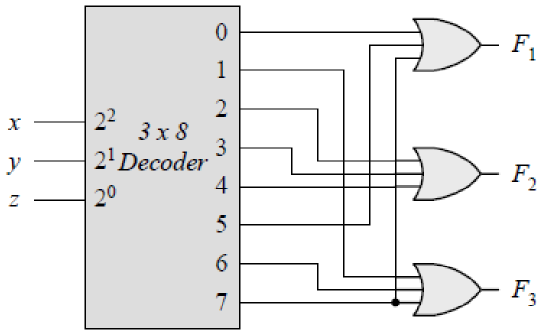
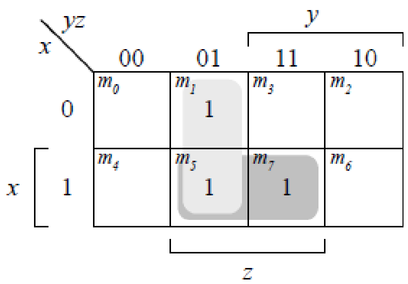
4.28 **(a)**

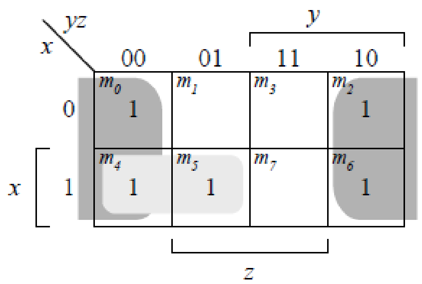
$F_1 = x(y + y')z = x'y'z' = \Sigma(0, 5, 7)$
$F_2 = xy'z' + x'y + x'y(z + z') = \Sigma(2, 3, 4)$
$F_3 = x'y'z + xy(z + z') = \Sigma(1, 6, 7)$



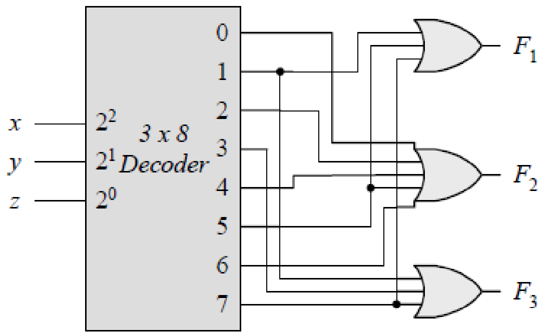
(b)

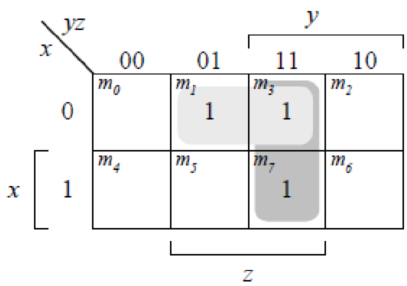


$F_1 = y'z + xz = \Sigma(1, 5, 7)$



$F_2 = y'z' + xy' + yz' = \Sigma(0, 2, 4, 5, 6)$





$F_3 = x'z + yz = \Sigma(1, 3, 7)$