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Electronics-I Quiz 2

Name: **Roll No:** **Max Marks. 10**

Attempt ant 2 out of 3 questions.

Q1: a)Convert $(4310)_{16}$ to decimal: [1]
b) Determine the base of the numbers in each case for the following operations to be correct: [2+2]
(i) 14/2 = 5,
(ii) 54/4 = 13,

1.a $(4310)_{16} = 4\times16^3 + 3\times16^2 + 1\times16^1 + 0$

$= 16384 + 768 + 16 + 0$

$(4310)_{16} = (17168)_{10}$ [1]

1.b.i Let us assume that x is the base.

$\frac{x+4}{2} = 5$

$\therefore x+4 = 10$

$x = 6$ [2]

1.b.ii $\frac{5x+4}{4} = x+3$

$5x+4 = 4x+12$

$x = 8$ [2]

Q2:

a) Perform the mathematical operation 38 – 5 using 2's complement method. [2]
b) Obtain the expressions for 3 bit binary to gray converter system [2]
c) Implement the function F(A,B,C) = AB + BC using only NAND gates. [1]

2.a $38 = 0100110$

$5 = 0101$

$38 - 5 =$ 38 + 2's Comp of 5

$\therefore 0100110$

$+$ 2's Comp 0000101

$= 1111011$

$$\begin{array}{r} 0100110 \\ +\ 1111011 \\ \hline 10100001 \end{array}$$

$= 0100001 = +33$

[2]

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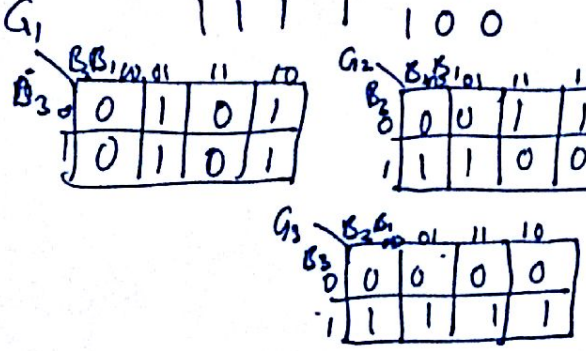
2.b

$B_3B_2B_1$	$G_3G_2G_1$
000	000
001	001
010	011
011	010
100	110
101	111
110	101
111	100



or use any method to optimise.

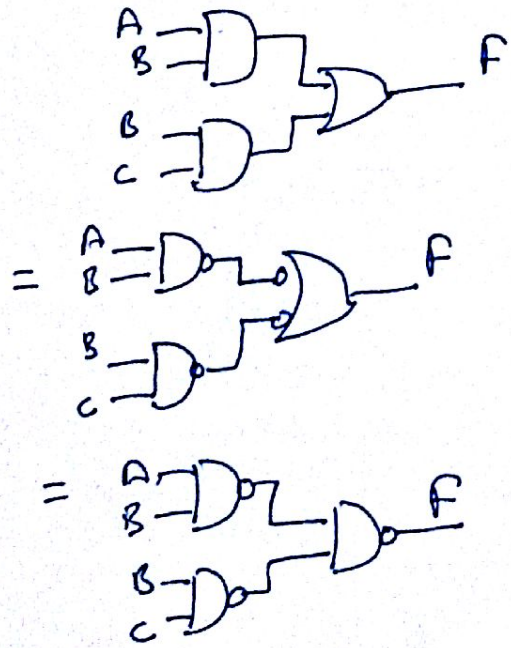
$G_3 = B_3$

$G_2 = \bar{B}_3 B_2 + B_3 \bar{B}_2 = B_3 \oplus B_2$

$G_1 = \bar{B}_2 B_1 + B_2 \bar{B}_1 = B_2 \oplus B_1$ [2]

2.C

$F = AB + BC$



[1]

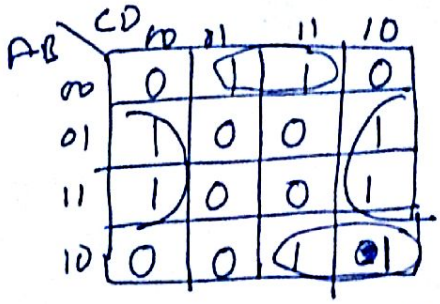
Q 3:

a) Find the optimum SoP for the function $F(A, B, C, D) = \Pi (0, 2, 5, 7, 8, 9, 13, 15)$ using Karnaugh Map method. [3]

b) Simplify the expression $F(A, B, C) = A(B + C') + A'(B' + C)$ using a K-map [2]

a)

$F = \Pi(0, 2, 5, 7, 8, 9, 13, 15)$



[2]

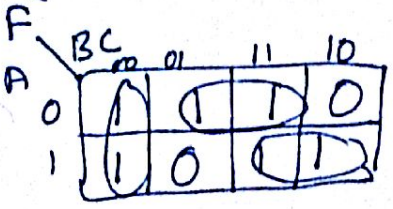
$F = B\bar{D} + A\bar{B}C + \bar{A}\bar{B}D$ [1]

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

$= AB + A\bar{C} + \bar{A}\bar{B} + \bar{A}C$

$= ABC + AB\bar{C} + AB\bar{C} + A\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}\bar{B}\bar{C} + \bar{A}BC + \bar{A}\bar{B}C$

$= \sum (0, 1, 3, 4, 6, 7)$ [1]



[1]

$= \bar{B}\bar{C} + \bar{A}C + AB$

or equivalent SoP with 3 product terms.