Department of Electronics & Communication Engineering

Faculty of Engineering, Integral University, Lucknow

Assignment Sheet 4

Basic Electronics (EC-101)

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Due Date : October 04, 2012 (Group 1) & October 05, 2012 (Group 2)

Section : EC-3

Problems : 18

1. Realized Ex-OR & Ex-NOR Gate output from NAND & NOR GATES (Use minimum number of gate for the realization of the output).
2. Realized the four variable expressions
   (I) $Z(A,B,C,D) = \Sigma(0,1\ 7,8,13,14) + d(3,4,5,15)$
   (II) $F(W,X,Y,Z) = \Sigma(0,1,2,4,5,6,8,9,12,13,14)$
   (III) $F(W,X,Y,Z) = \Sigma(0,1,2,4,5,7,11,15)$
   (IV) $F(W,X,Y,Z) = \Sigma(0,2,4,5,6,7,8,10,13,15)$
   (V) $Z(A,B,C,D) = \Sigma(3,7,11,13,14,15)$
3. List the first 16 numbers in base 12. Use letter X & Y to represent the last two digits.
4. List down the Boolean Laws in details with appropriate mathematical expressions for each..
5. Simplify the Boolean function in (a) Sum of product & (b) Product of sum
   $F(A,B,C,D) = \Sigma(0,1,2,5,8,9,10)$
6. Generate the truth table of 3 & 4 input AND, OR, NAND, NOR, Ex-OR & Ex-NOR Gate.
7. Implement the following expression with the help of NAND & NOR gate(s)
   $$F = AB + CD + E$$
8. Add the following expressions(Use any numeric base)
   (I). $(12)_8 + (41)_5 + (AA)_{16}$
   (II) $(AAFDA)_{16} + (44)_{10} + (44)_8 + (44)_5$
   (III). $(33)_{10} + (33)_8 + (33)_6 + (33)_4$

9. Solve the following

   (I). $(44)_{10} - (44)_8$

   (II) $(AAAA)_{16} - (9AAF)_{16}$

   (III). $(FEEF)_{16} - (34F4)_{16}$

10. Solve the following with the help of 9's complement.

    (I). 77- 65

    (II). 121 – 156

    (III). 122 – 98

11. Solve the following with the help of 1's complement.

    (I). 11111- 01111

    (II). 1111 – 11111

    (III). 1000111 – 1100011

12. Simplify the following Boolean expression using four variable K map

    (I). $\bar{w}z + xz + \bar{x}z + w\bar{x}z$

    (II). $A\bar{B}C + \bar{B}\,\bar{C}\,\bar{D} + BCD + AC\bar{D} + \bar{A}\,\bar{B}\,C + \bar{A}\,B\,\bar{C}\,D$

13. Determine the value of x in the below expression

$$(211)_x = (512)_8$$

14. Find 9s & 10s complement of the following digits

    (I). 12349876

    (II). 90009951

    (III).25000000

    (IV). 00000000

15. Find 1s & 2s complement of the following digits

    (I). 10000001

    (II). 00000000

    (III). 11011010

    (IV). 01110110

16. Add & multiply the following without converting the digits

    (I). $(367)_8$ & $(715)_8$

    (II). $(15F)_{16}$ & $(A7)_{16}$

    (III). $(110110)_2$ & $(110101)_2$

17. Realized the four variable expressions

    (I). F(W,X,Y,Z) = Π(1,3,5,7,13,15)

    (II). F(W,X,Y,Z) = Π(0,1,2,3,4,10,11)

18. Draw the logic diagram using only NAND gates to implement the following expression

$$F(A,B,C,D) = \sum(0,1,2,3,4,8,9,12)$$

Do the assignment on A-4 sheets only. Use both side of the page.

After the date of submission, assignment will not be accepted and zero marks will be allotted to the student who fail to submit the assignment on due date.

For help students can take the reference reading of the book "Digital Design" by M. Morris Mano, PHI Publication or Pearson Publication, Third Edition.