GURU TEGH BAHADUR INSTITUTE OF TECHNOLOGY
SEMESTER: 3rd
BRANCHES: ECE,CSE,IT
DLCD

Assignment 2

Ques1: Design EXOR gate with minimum number of NAND gates?

Ques 2: Show that positive logic NAND gate is negative logic NOR gate?

Ques 3: For a gate with N inputs, how many combinations of inputs are possible? State general rules to obtain the possible combination?

Ques 4: Implement the following expression in AOI logic and then convert them into

a) NAND logic b) NOR logic

(1) (A + B́C) + D

(2) A + B +Ċ Ḋ

Ques 5: If one of the inputs to an OR gate is permanently kept 'high' what would be the shape of the output waveform when the remaining inputs are applied?

Ques 6: Show that A B + A B́ C + B Ć = A C + B Ć

Ques 7: Distinguish between positive logic and negative logic.

Ques8: Explain De-Morgan's Law.

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ASSIGNMENT 1

Q1. Convert $(47.25)_{10}$ to
a) Binary
b) Octal
c) Hexadecimal

Q2. Find the value of X when
a) $(2X)_8 = (34)_x$
b) $(211)_x = (152)_8$

Q3. Convert $(101011000.1101)_2$ to
a) Octal
b) Decimal
c) Hexadecimal

Q4. Convert the following into gray code and excess-3 code:

1) 1101 2) 1010

Q5. Using 1's and 2's complement, perform subtraction X-Y and Y-X
Where X= 1010100
Y=1000011

Q6. Differentiate
a) Weighted and Non-Weighted codes
b) Positive Weighted and Negative Weighted codes
c) Cyclic and Reflective codes
d) Straight Binary and 8421 BCD codes
e) Positive logic and Negative logic

Q7. Using 10's Complement Subtract 52532-3250

Q8. Find Binary equivalent of -16 if number is representated in
a) Sign Magnitude
b) 1's complement representation
c) 2's complement representation

Q9. Justify the following statement:

1) Excess-3 code is self complementary code
2) Gray code is a reflected code.

Q10. Find the 9's complement of following decimal numbers
a) 19
b) 146
c) 469

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Assignment 4

Ques 1: Design FULL ADDER using two HALF ADDER? Write its truth table also?

Ques 2: Design FULL SUBRATOR using two HALF SUBTRATOR? Write its truth table also?

Ques 3: Design a combinational circuit with three inputs X, Y and Z & three outputs A, B and C. When the binary input is 0, 1, 2 or 3, the binary outputs is one greater than the input. When the binary input is 4, 5, 6 or 7, the binary output is one less than input?

Ques 4:You are presented with a set of requirements under which an insurance policy can be issued. The applicant must be:

1) a married female 25 years old or over , or
2) a female under 25 , or
3) a married male under 25 who has not been involved in a car accident , or
4) a married male under 25 who has been involved in a car accident, or
5) a married male 25 year or over who has not been involved in a car accident.

Find an algebraic expression which assumes a value 1 whenever the policy is issued. Simplify the expression obtained.

Ques 5: In an application 4 inputs A, B, C, D are available in true and complement Form .These are fed at a logic circuit which operates a relay. The relay is ON for ABCD = 0000, 0010, 0101, 0110, 1101 and 1110. The states 1000 and 1001 don't occur. For remaining states the relay is OFF.

a) prepare truth table and minimize outputs F using K map
b) Realize F using 3 input NAND gates.

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Assignment 3

Ques 1: Find the values of the two valued variables A , B , C and D by solving the set of simultaneous equations :

$\bar{A} + A B = 0$

$A B = A C$

$A B + A \check{C} + C D = \check{C} D$

Ques 2: Simplify logic function using Q – M minimization technique

$Y(A , B , C, D) = \sum m (0, 1, 3, 7, 8, 9,11,15)$

Ques 3: Simplify the Boolean expression using four variables:

$w' z + x z + x' y + w x' z$

Ques 4: Simpify the following Boolean expression using Don't Care in

a) SOP form

b) POS form

(1) $F(A , B , C, D) = \sum (0 , 6, 8 , 13, 14)$

(2) $d (A, B, C ,D) = \sum (2 , 4, 10)$

Ques 5: Simpify the boolean expression:

a) $F(A, B ,C, D) = \Pi (1, 5,4, 7, 12, 14)$

b) $F(A, B ,C, D) = \Pi (0, 2, 3,8)$