Assignment 2, Semester 2

QUESTION 1 **[40]**

1.1 Convert the Hexadecimal number C6B to Octal. (6)

1.2 Convert the Binary number 1000101 to BCD. (6)

1.3 Draw the truth table of a 2 input NAND gate and draw the logic symbol of the NAND gate. (8)

1.4 Determine the 2's complement of 8 bit binary number 11111000 (4)

1.5 Develop a truth table for the standard SOP expression. (8)

$X(_{ABC})=(\overline{A}BC+ AB\ \overline{C} + \overline{A}\ \overline{B}\ \overline{C}\ )$

1.6 Perform the following Addition(show all steps).

a. $11110_2 + 10111_2$ (4)

b. $67_8 + 54_8$ (4)

QUESTION 2 **[30]**

2.1 Simplify the expression

$\overline{W}\ X\ \overline{Y}\ \overline{Z} + \overline{W}\ X\ Y\ \overline{Z} + W\ X\ Y\ Z + W\ \overline{X}\ \overline{Y}\ \overline{Z} + W\ \overline{X}\ Y\ \overline{Z} + W\ X\ \overline{Y}\ Z + \overline{W}\ \overline{X}\ \overline{Y}\ Z + \overline{W}\ \overline{X}\ Y\ Z$ using a Karnaugh map. Please note: use WX in the rows and YZ in the columns. (14)

2.2 Write the expanded forms of the terms in the given expression : (4)

$F_{(ABCD)} = A\,B\,D + A\,C\,\overline{D}$

2.3 Design the logic circuit for the expression

$F_{(ABCD)} = \overline{A}\,\overline{B}\,C + A\,BC + \overline{A}\,B\,\overline{C} + A\,\overline{B}\,\overline{C}$ (8)

2.4 Perform the Hexadecimal addition of two numbers (4)

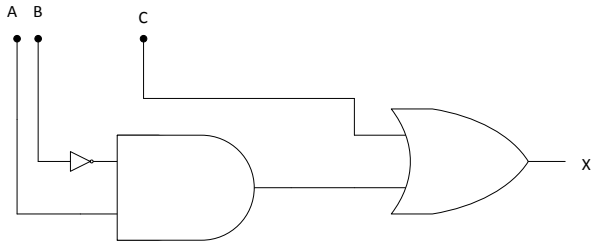
$9B4_{16}$ and $F38_{16}$

QUESTION 3. **[30]**

3.1 a. Convert the following Boolean expression into standard Product of Sum(POS) form.

$X= (A+B+C)(\overline{A}+C+D)(A+\overline{B}+C+\overline{D})$ (6)

b. Write the Boolean expression for the following logic circuit. (4)



3.2 a. Discuss the Positive edge triggered S-R flip flop and provide the logic symbol. (4)

b. Draw the truth table of a positive edge triggered S-R Flip flop. (6)

3.3 Apply Boolean Laws of Algebra to each one of the given expressions and simplify:

(a) $X = (\overline{\overline{A}\,\overline{A}\,\overline{\overline{B}}})C$ (5)

(b) $X = A(B + C + \overline{\overline{D} + \overline{E}})E$ (5)