Quiz 1 (20 points)

(1) $(4310)_{10}$ = ( )$_5$

(2) $(41.6875)_{10}$ = ( )$_2$

(3) $(10110101)_2$ = ( )$_{16}$ = ( )$_8$

Quiz 2 (20 points)

(1) Find the 10's complement of 47803

(2) Find the 2's complement of 11010

(3) Represent -15 in 2's complement form (using 8 bits).

(4) What is the data range of a 5-bit signed number, in 2's complement form?

Quiz 3 (20 points)

1. $N = 1010101_2$

   (1) What is the decimal number, if N is an unsigned number?

   (2) What is the decimal number, if N is a signed number, using 2's complement form?

2. (1) Convert the following decimal numbers to binary and add, using the 2's complement form (using 8 bits): -46 and 25

   (2) Verify the result obtained in (1) is -21_{10}.

Quiz 4 (20 points)

The content of a register is "00110011".

(1) What is the decimal number, if it is a signed number, using 2's complement representation?

(2) What is the decimal number, if it is a BCD code?

(3) What is the character, if it is an ASCII code?

(Digits 0 to 9 span Hexadecimal values 30_{16} to 39_{16})

(4) Determine the parity used in (3): odd or even?

Quiz 5 (20 points)

1. Prove the identity (x y)' = x' + y', by means of truth table.

2. List the truth table for the Boolean expression F = a'bc + abc' + abc + a'bc'.

3. Given a Boolean expression F = (x + y)' (x' + y')

   (1) Simplify it to a minimum number of literals.

   (2) Draw the circuit diagram, using AND/OR/NOT gates, that implements the simplified expression.

Quiz 6 (20 points)

1. Reduce the following Boolean expression to one literal.
   A'B(D' + C'D) + B(A + A'CD)

2. Express the Boolean function F(A, B, C, D) = A + B'C + AD

   (1) as a sum of minterms: F(A, B, C, D) = Σ ( ).

   (2) as a product of maxterms: F(A, B, C, D) = Π ( ).

Quiz 7 (20 points)

1. Simplify the Boolean expression F.

   F(A,B,C,D) = A'B'C'D' + AC'D' + B'CD' + A'BCD + BC'D

2. Simplify the Boolean function F with the don’t-care condition d.

   F(A,B,C,D) =Σ(0, 4, 8, 10, 14), d(A,B,C,D) =Σ(2, 6, 12)