

CSE 3110
Digital System Design Sessional
ALU Online

Time: 35 min

Instruction:

Select your set by **last 3 digit of your roll mod 4**.

For example, if your roll is 180204200, you should answer the set $(200 \bmod 4) = \text{Set } 0$.

Please note that you won't get any marks if you do not answer the correct set.

Please remember that any sort of plagiarism will result in -20 marks without further explanation.

Set-0

Design the following 4-bit ALU (Arithmetic Logic Unit):

S2	S1	S0	Output	Function
1	1	0	$A_i - B_i$	Subtract
0	1	0	$A_i + 1 + 1$	Transfer A with Carry
1	1	1	$A_i + B_i$	Add
1	0	1	A_i'	Complement A
0	0	0	$A_i \text{ I } B_i$	OR

Submission Procedure:

- Report (PDF File)
 - Function table
 - Output functions for **X_i , Y_i , Z_i**
 - Circuit diagram for **X_i , Y_i , Z_i** (Hand drawing)
- Proteus implementation (.pdsprj File)

Set-1

Design the following 4-bit ALU (Arithmetic Logic Unit):

S2	S1	S0	Output	Function
0	0	0	$A_i - 1$	Decrement A
1	0	1	$A_i + 1 + 1$	Transfer A with Carry
0	0	1	$A_i - B_i - 1$	Subtract with Borrow
0	1	0	$A_i \text{ xor } B_i$	XOR
1	1	1	A_i'	Complement A

Submission Procedure:

- Report (PDF File)
 - Function table
 - Output functions for **X_i , Y_i , Z_i**
 - Circuit diagram for **X_i , Y_i , Z_i** (Hand drawing)
- Proteus implementation (.pdsprj File)

Set-2

Design the following 4-bit ALU (Arithmetic Logic Unit):

S2	S1	S0	Output	Function
0	1	1	A_i	Transfer A
0	0	1	$A_i + B_i + 1$	Add with Carry
0	1	0	$A_i - 1$	Decrement A
1	1	0	$A_i \text{ xor } B_i$	XOR
1	0	0	$A_i B_i$	OR

Submission Procedure:

- Report (PDF File)
 - Function table
 - Output functions for **X_i , Y_i , Z_i**
 - Circuit diagram for **X_i , Y_i , Z_i** (Hand drawing)
- Proteus implementation (.pdsprj File)

Set-3

Design the following 4-bit ALU (Arithmetic Logic Unit):

S2	S1	S0	Output	Function
0	0	0	$A_i + B_i$	Add
0	0	1	$A_i - B_i - 1$	Subtraction with Borrow
1	0	1	A_i	Transfer A
1	1	0	$A_i \cdot B_i$	AND
0	1	1	$A_i \mid B_i$	OR

Submission Procedure:

- Report (PDF File)
 - Function table
 - Output functions for **X_i , Y_i , Z_i**
 - Circuit diagram for **X_i , Y_i , Z_i** (Hand drawing)
- Proteus implementation (.pdsprj File)