Department of Computer Science and Engineering
Quiz 02
Fall 2024
CSE340 : Computer Architecture

Total Marks: 15   **Duration: 30 Minutes**

Name: **ID:**

Question 01:

$$f [5] = 5*A[5] - 7*A[3] - 10;$$

Base address of array f in x18, base address of array A in x19. Write the RISC-V code and convert all I-format instructions into machine code in the following section. First write the instruction and then the machine code.

Write your code here [7] :

```
Ld x5,   24(x19)     ; a[3] -> value
Slli x6,x5,3         ; a[3]*8
Sub x6,x6,x5         ; a[3]*8 - a[3] = a[3]*7
Addi x6,x6,-10       ; A[3]*7 - 10
Ld x5, 40(x19)       ; A[5] → value
Slli x7,x5,2         ; A[5]*4
Add x7,x5,x7         ; A[5]*4+A[5] = A[5]*5
sub x7,x7,x6         ;  A[5]*5 - A[3]*7 - 10
Sd x7, 40(x18)       ; f[5]= A[5]*5 - A[3]*7 - 10
```


Machine code [8] :

opcode = 55
funct3 = 3

Ld x5,   24(x19)

000000011000	10011	011	00101	0110111

Addi x6,x6,-10

000000001010
11111111 0101
**   +1**
——----------------
11111111 01 10

11111111 01 10	00110	011	00110	0110111

Ld x5, 40(x19)

000000101000	10011	011	00101	0110111