National University

of Computer & Emerging Sciences Peshawar Campus

Student Name: SOLUTION Roll No: _____

Program: _____ (e.g. EE12ABC)
Semester: Fall-2022
Time Allowed: 01 hour
Course: Computer Organization & Assembly Language

Examination: Sessional-I
Total Marks: 25 Weightage: 15
Date: 28th September, 2022
Instructor: Omar Bin Samin

22/9/22

NOTE: Attempt all questions.

NO ANSWER SHEET REQUIRED

Q1. Give short answers to the following questions: (Marks: 5)

1. In term of bits, how long is Data bus of 8086?

   16-bits

2. Which flag allows setting the operation of the processor in single step mode?

   Trap Flag (TF)

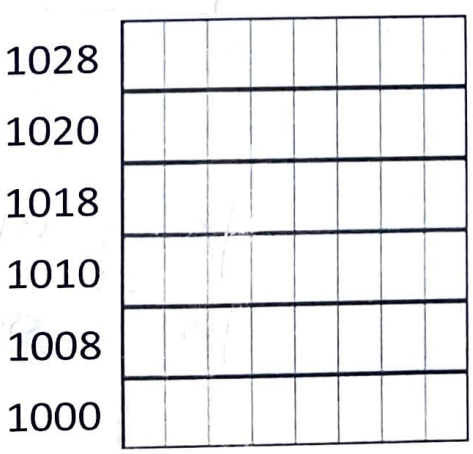
3. Which segment contains all the instructions to be executed?

   Code Segment (CS)

4. Which addressing mode is represented by "mov ax,[Label]"?

   Direct Addressing

5. How many bits are present in a single segment of the given main memory representation.



64-bits

(Marks: 2)

Q2. Calculate the physical addresses for "A134 : A9FE".

```
        (1)
  A  1  3  4  0
+    A  9  F  E
----------------
0x A  B  D  3  E
```

Q3. Assume that AL contains the value 40 in hexadecimal, what should be the value of BL, which will cause Sign Flag and Overflow Flag to be set, when the processor executes the instruction ADD AL, BL?

(Marks: 2)

```
[org 0x0100]
mov al, 0x40
mov bl, 0x40
add  al, bl
mov  ax, 0x 4c00
int  0x21
```

```
    1
    0100  0000
+   0100  0000
--------------
    1000  0000
```

SF=1
OF=1

Q4. State whether the assembly language programs given below are valid or not? Show output (Final Value of AX/ BX) if the program is valid, else correct the program first and then show its output.

(Marks: 2)

a. **[org 0x0100]**
mov al, 0x731 ; Invalid
add al,2
mov ax,0x4c00
int 0x21

```
[org 0x0100]
mov ax, 0x731
add ax, 2
mov ax, 0x4c00
int 0x21
```

AX : 07 33

BX : 00 00

(Marks: 2)

b. **[org 0x0100]**
mov al, 2
mov ah, 1
add ax, bx
mov ax,0x4c00
int 0x21

AX : 01 02

BX : 00 00

c. **[org 0x0100]** (Marks: 2)

```
xor ax,ax
mov ax, 3
xor ax,3
mov ax,0x4c00
int 0x21
```

AX: 00 00

BX: 00 00

Q5. Show the values of AX, BX and given flags for all executable instructions. (Marks: 10)

	AX	BX	OF	DF	IF	SF	ZF	AF	PF	CF
[org 0x0100]										
xor ax,ax ;0100	00 00	00 00	0	0	1	0	1	0	1	0
mov ax,11 ;0102	00 0B	00 00	0	0	1	0	1	0	1	0
mov [Tag],ax ;0105	00 0B	00 00	0	0	1	0	1	0	1	0
mov bx,3 ;0104 ;0108	00 0B	00 03	0	0	1	0	1	0	1	0
mov [Tag+2],bx ; 010B	00 0B	00 03	0	0	1	0	1	0	1	0
add ax,[Tag+2] ;010F	00 0E	00 03	0	0	1	0	0	0	0	0
mov [Tag+4],ax ;0113	00 0E	00 03	0	0	1	0	0	0	0	0
sub bx,3 :0116	00 0E	00 00	0	0	1	0	1	0	1	0
mov ax,0x4c00 ;011A										
int 0x21 :011D										
Tag: db 0, 1, 2, 3, 5, 9 ;011F										

Address	011F	0120	0121	0122	0123	0124
Tag	0B	00	03	00	0E	00

```
    0000 0000 0000 1011
+   0000 0000 0000 0011
-------------------------
    0000 0000 0000 1110
```