


Philadelphia University Faculty of Engineering Department of Computer Engineering		Date:- 05/02/2014 Allowed time:- 2 Hours
Microprocessors Final Exam		
Student Name: -		ID: -

Question 1:- Chose the correct answer for the following 10 points

1- A 64 bit data type can be defined as:

- a). WORD b). DWORD c). QWORD d). TBYTE

2- the size of addressable memory in real addressing mode is

- a). 1 MB b). 2 MB c). 4 MB d). 8 MB

3- the content of ECX register after executing the following code will be

```
.data
Array1        DWORD    10DUP(?)
.code
MOV   ECX , SIZEOF Array1
```

- a). 10 b). 20 c). 30 d). 40

4- Which of the following is an illegal 80x86 instruction?

- a) ADD AX , [ESI] b) MOV AX, [BX] c) INC [ESI] d) ADD DX, [EDI]

5- the content of AX register after executing the following code will be

```
MOV   AL , 87h
CBW
```

- a). 0087h b). 0F87h c). 87FFh d). 0FF87h

6- the size of addressable memory in protected addressing mode is

- a). 1 GB b). 2 GB c). 4 GB d). 8 GB

7- to jump to a label if unsigned value X larger than unsigned value Y you can use

- a). JA b). JG c). JAE d). JC

8- the LOOP instruction will continue repeat as long as

- a). ECX > 0 b). ECX < 0 c). ECX == 0 d). ECX <> 0

9- the instruction (XOR AL , 0FFh) will cause the value of AL register to be

- a). set b). clear c). no change d). invert

10- The flag that indicates whether or not the upper half of the product contains significant digits.

- a). OF b). ZF c). CF d).PF

Question 2:- Determine the content of the required registers after executing the following segments of code.
10 points

```
MOV    DX , 0
MOV    AX , 222h
MOV    CX , 100h
MUL    CX          DX=          AX=          CF=
MOV    EDX , 0
MOV    EAX , C478A677h
MOV    EBX , 100h
IDIV   BX          EDX=          EAX=
```

```
MOV    AL , 0D4h
SHR    AL , 2      AL=
MOV    AH , C3h
SAR    AH , 2      AH=
```

```
MOV    CH , 0A6h
ROR    CH , 3      CH=
RCL    CH , 2      CH=
```

```
MOV    AX , 6Fh
AND    AX , 10h
JZ     L1
MOV    BX , 0
JMP    L2
L1:   MOV    BX , 7Fh
L2:   EXIT          BX=
```

```
MOV    AX , 87h
MOV    BX , 7Fh
CMP    AX , BX
JG     L1
MOV    CX , 0FFh
JMP    L2
L1:   MOV    CX , 0
L2:   EXIT          CX=
```

Question 3:- Write the instructions that perform the following operation

5 points

$$\text{var3} = ((\text{var1} * -\text{var2}) \% \text{var4}) / (\text{var3} - \text{var1})$$

Question 4:- perform the following multiplication operation using shift operations, use the appropriate registers to avoid overflow.

2.5 points

$$37\text{h} * 10\text{h}$$

Question 5:- After performing the following sequence of instructions what will be the values stored in Flag. 2.5 points

MOV AX, 0C24h

SUB AL, 25h **CF=** **ZF=** **SF=** **OF=**

ADD AH, 0F3h **CF=** **ZF=** **SF=** **OF=**

MOV BX, 3h

IMUL BX **SF=** **OF=**

Question 6:- Write a complete program that define four signed double word variables A , B , C and D and initialize them of your choice your program should perform the following operation. 5 points

$$D = \begin{cases} 0Ah & A > B \ \& \ B \ \< \ C \\ 0Dh & A > C \ \& \ C > 0 \\ 0Fh & \textit{otherwise} \end{cases}$$

Question 7:- Write a program that defines an array of 10 unsigned double word integer values and initialize it by numbers of you choice and define two double word integer values called MAX (which will contain the maximum value in the array) and MIN (which will contain the minimum value in the array), your program should define 2 procedures one of them will find the maximum value in the array and store it in MAX variable and the second procedure will find the minimum value and store it in MIN variable.

5 points