**ECE3210 Microprocessor Engineering - Practice Exam1**

**Name: Olasumbo Babalola**

1. (20 pts) Assume the 80386 is running in protected mode with the state given below.

DS = 0010 H

ESI = 00001202

EBP = 0000FC4

Global Descriptor Table

|  |
| --- |
| 1F |
| FF |
| 03 |
| D0 |
| 92 |
| 00 |
| 00 |
| 00 |
| 2F |
| FF |
|  |

DS

0010

* 1. What physical address does the following instruction access?

MOV AX, [ESI]

03000000 Base

00001202 [ESI]

03001202H

* 1. Is memory physical address 06500000H within this segment?

Based on the descriptor, DS segment base is: 03000000H, limit is 02FFFFFFH, so memory address 06500000H is not in this segment. The highest address will be 05FFFFFH

1. (40 points) For each data transfer instruction, list all register final contents, or memory (physical addresses and contents) that are modified. Assume real mode operation.

Consider each instruction separately. Use hexadecimal format.

Register initial state:

|  |  |  |  |
| --- | --- | --- | --- |
| AX: 0000H | BX: 0008H | CX: 021EH | DX: FF00H |
| SI: 0002H | DI: 0101H | DS: 1201H |  |

Memory

Address

|  |  |  |  |
| --- | --- | --- | --- |
| 20 | 13 | 80 | 40 |
| FF | AF | BC | 13 |
| 99 | 88 | 77 | 66 |
| A8 | B1 | F0 | 43 |
| 78 | D6 | 32 | 33 |
| 23 | 35 | 12 | 26 |
| 83 | 03 | 8C | EF |
| FF | A2 | C3 | 00 |

12000H

12004H

12008H

1200CH

12010H

12014H

12018H

1201CH

1. MOV AX, [BX+01H]

AX\_\_038C\_\_\_\_\_\_\_\_\_

1. MOV WORD PTR [DI], -6

12010H

0101H

12111H

Memory physical addresses \_12111H

Memory contents FFFAH

1. MOV DI, OFFSET [SI + 0A2BH]

DI \_0A2DH

1. MOV AL, [BX+SI]

AL \_\_\_8C

1. (20 points) Write a program which swaps the contents of two memory variable x and y

.data

x dw 1234h

y dw 5678h

.code

MOV AX, 1234h

MOV BX, 5678h

MOV x, BX

MOV y, AX

.end

1. (20 points)

Assume SP = 0100H. What will be the content of SP, AX, and EBX after executing the following two instructions?

**POP AX**

**POP EBX**

SP\_\_FFH AX\_\_\_4232H EBX\_\_45H Stack segment is shown below:

|  |  |
| --- | --- |
| Offset Address SP | Value(H) |
| 0108H | 99 |
| 0107H | 12 |
| 0106H | 45 |
| 0105H | 3B |
| 0104H | 42 |
| 0103H | 32 |
| 0102H | 8C |
| 0101H | 5B |
| 0100H | FF |
| 00FFH | AC |
| 00FEH | 85 |
| 00FDH | 2D |
| 00FCH | 78 |
| 00FBH | 5B |
| 00FAH | 9F |
| 00F9H | 1A |