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|---------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------|
| Taibah University                                 |  | College of Computers science and Engineering |
| Computer Organization and Architecture<br>COE 224 |                                                                                  | Date: 26 Feb 2019                            |
| Quiz: 06 X86 Addressing Modes                     |                                                                                  | Total Marks: 20                              |
| Name:                                             |                                                                                  | ID:                                          |

### Question 01

[10 Marks]

|                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(a) Find the memory address of the next instruction executed by the microprocessor for the following CS:IP combinations:<br/>CS = 1000H and IP = 2000H<br/><b><math>PA = CS \times 10 + IP</math></b><br/><b><math>PA = 10000 + 2000 = 12000H</math></b></p>      | <p>(b) A <b>data segment</b> is to be located from address A0000 to AFFFF. What value must be loaded into DS?<br/><b>DS = A000</b></p>                                                                                                                                                                       |
| <p>(c) Write a program to subtract a hex number in offset address 0055H from a hex number in offset address 0065H and store the result to location addressed by offset address 0070H<br/><b>MOV AX,[0065]</b><br/><b>SUB AX, [0055]</b><br/><b>MOV [0070],AX</b></p> | <p>(d) If the current values in the <b>code segment register</b> and the <b>instruction pointer</b> are 0200 and 01AC, respectively, what <b>physical address</b> is used in the next instruction fetch?<br/><b><math>PA = CS \times 10 + IP</math></b><br/><b><math>PA = 2000 + 01AC = 21ACH</math></b></p> |

### Question 02

[7 Marks]

Regarding the assembly program shown below— written for 8086 Microprocessor

```

1399:0100 B401      MOV     AH,01
1399:0102 CD21      INT      21
1399:0104 88C3      MOV     BL,AL
1399:0106 80CB20     OR       BL,20
1399:0109 B402      MOV     AH,02
1399:010B 88DA      MOV     DL,BL
1399:010D CD21      INT      21
1399:010F B44C      MOV     AH,4C
1399:0111 CD21      INT      21

```

- The program will be saved to memory starting at physical address of
  - 13A90**
  - B401
  - 1399
  - 0100
- The machine code of the instruction INT 21 is
  - CD21**
  - 0102
  - 1399
  - B402
- The complete machine instruction that is saved to starting from memory address 13A96 H is
  - 80CB20**
  - 88DA
  - B44C
  - B402
- The instruction OR BL,20 is \_\_\_\_\_ Byte (s)  
Instruction
  - One
  - Two
  - Three**

- zero
- The end of the program is at effective address equal to
    - 1399
    - 0111
    - 010F
    - 0112**
  - What is the function of the first INT
    - Read character**
    - Print character
    - Print message
    - halt
  - After executing the 8th instruction, AH register =
    - 4C**
    - BL
    - 02
    - 20

### Question 03

[3 Marks]

Given that DS = 1200H, CS = 1100, IP = 0100, and memory content is

What is the result of executing the following instruction?

**MOV AX, [IP]** → AX = **36C5**

**MOV AX, [0100]** → AX = **0020**

**MOV [0103], IP** → Physical address = **12103 - 12104**

|       |    |
|-------|----|
| 11100 | C5 |
| 11101 | 36 |
| 11102 | 00 |
| 11103 | 20 |
| 11104 | xx |

|       |    |
|-------|----|
| 12100 | 20 |
| 12101 | 00 |
| 12102 | 00 |
| 12103 | 13 |

