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| **Cairo University** | **CMPN201** | **Total: 20 Points** |
| **Faculty of Engineering** | **Microprocessor Systems I** | **2017-2018** |
| **Computer Eng. Department** | **Midterm Exam** | **One Hour** |

**This is an open-book, open notes exam. All electronic devices - Except calculators - are forbidden.
Make any reasonable assumptions (if necessary)**

1. **[10] Identify the choice that best completes the statement or answers the question**

|  |  |
| --- | --- |
|   | **1- A 32-bit address bus allows access to a memory of capacity** |
| a) 64 MB | b) 16 MB | c) 1 GB | d) 4 GB |
|   | **2- The system bus is made up of** |
| A) data bus | b) data bus, control bus and address bus | c) data bus and address bus | d) data bus and control bus |
|   | **3- Which of the following is the pair of register used to access memory in string instructions?** |
| a) DI and BP  | b) SI and BP | c) DS and SI | d) DI and SI |
|   | **4- Pipelining improves CPU performance due to** |
| a) reduced memory access time | b) the introduction of parallelism | c) increased clock speed | d) additional functional units |
|   | **5- Which flags are NOT used for mathematical operations?** |
| a) Carry, Interrupt and Trap flag  | b) Direction, Interrupt and Sign flag  | c) Direction, Overflow and Trap flag  | d) Direction, Interrupt and Trap flag |
|   | **6- If CS = 0701H, SS = 0801H, SI = 0100H and IP = 0108H the address of the next instruction is:** |
| a) 07090H | b) 07811H | c) 07110H | d) 07118H |
|   | **7- Which of the following, when used in the data section of a MASM program, reserves 40 bytes of RAM(memory)?** |
| a) db 20 DUP (2) | c) db 20 DUP (20) | b) dw 40 DUP (1) | d) dw 20 DUP (1) |
|   | **8- The bus that defines the “size” of the processor is --------------** |
| a) The system bus | b) The data bus | c) The address bus | d)The size bus |
|   | **9- Which flag(s) does the 80x86 use to check for unsigned arithmetic overflow?** |
| a) Overflow | b) Direction | c) Interrupt | d) Carry |
|   | **10- The sp register is typically used for accessing** |
| 1. strings
 | 1. data segment
 | 1. memory
 | 1. stack
 |
|   | **11- What will be the contents of register AL after the following has been executedMOV BL, 8CMOV AL, 7EADD AL, BL** |
| 1. 0A and carry flag is set
 | 1. 6A and carry flag is set
 | 1. 0A and carry flag is reset
 | 1. 6A and carry flag is reset
 |
|   | **12- What will be the values of the Sign, and Zero flags after the following instructions have executed?mov ax,620hsub ah,0F6h** |
| 1. S=0,Z=0
 | 1. S=0,Z=1
 | 1. S=1,Z=0
 | 1. S=1,Z=1
 |
|   | **13- The BX register is used in multiplication operation to hold the upper 16-bits of the result.** |
| 1. Always
 | 1. Never
 | 1. Usually
 | 1. Rarely
 |
|   | **14- What is the largest signed integer that may be stored in 32 bits?** |
| 1. 232 - 1
 | 1. 232
 | 1. 231 - 1
 | 1. 231
 |
|   | **15- Which of the following will generate assembly errors?** |
| a) var1 db 1101b, 22, 35 | b) var2 db "ABCDE", 18 | c) var4 db 256, 19, 40 | d) None of the above |
|   | **16- To reserve 32-bits in memory \_\_\_ directive is used.** |
| 1. db
 | 1. dn
 | 1. dw
 | 1. dd
 |
|   | **17 - In the following data definition, assume that Count begins at offset 2002h. What is the offset of the third value (5)?Count DD 1,6,5,8,9** |
| 1. 2004h
 | 1. 2006h
 | 1. 2008h
 | 1. 200Ah
 |
|   | **18- One of the following is not a valid segment address** |
| 1. 00000
 | 1. 8CE90
 | 1. 8CE91
 | 1. E0840
 |
|   | **19- What is the result in AL after executing the following instructions?XOR AL, ALOR AL, 80H** |
| 1. 80H
 | 1. 88H
 | 1. 00H
 | 1. None of the above
 |
|   | **20 - Which of the following are performed when an interrupt occurs:(I) FLAGS register is pushed to the stack(II) CS register is pushed to the stack(III) IP register is pushed to the stack** |
| a) (I) and (II) and (III)  | b) (I) and (II) only | c) (II) and (III) only  | d) (I) and (III) only |

**2- [2] If the content of the register SS = 3500H and the content of the register SP= FFFEH, then**

1. Calculate the physical address.
2. Calculate the lower range of the stack.
3. Calculate the upper range of the stack segment.
4. Show the logical address of the stack.

**3- [2] Using one line**

1. Declare a byte containing the value 64. Label the memory location “var”.
2. Declare an unlabeled byte initialized to 10.
3. Set the most significant nipple of al
4. Declare 10 uninitialized bytes starting at the address label “bytes”.

**4- [2] Use the following data definitions to answer this question:**

.DATA

num1 DW 100

num2 DB 225

char1 DB ’Y’

num3 DD 0, 10,30,40,50

Identify whether the following instructions are **legal** or **illegal**. Explain the reason for each illegal
instruction.

|  |  |  |
| --- | --- | --- |
| Instruction  | Answer  | Reason |
| MOV num2, num1 |  |  |
| MOV DS, CS |  |  |
| SUB char1, ’A’ |  |  |
| INC num3, 1 |  |  |

**5- [4] Write complete assembly program that computes the following equations**

L=J+K and U3=U1-U2

In your code:
• Define the 2-bytes variables J, K and L. (; Initialize J to 3 and K to -2)
• Define the 2-bytes variables U1, U2 and U3. (; Initialize U1 to 254 and U2 to 22)
• DS must point to the segment address.