

**CS238 – ASSEMBLY LANGUAGE PROGRAMMING**

**EXAM 1**

**TOTAL POINTS: 100 (+20 BONUS POINTS)**

1. Write the generic formula to translate unsigned binary integers to decimal? [4]

Decimal Value =

2. What is the minimum number of binary digits required to represent the following decimal numbers? [10]

a. 200

b. 6364

c. -10

3. What are the three basic steps in the instruction execution cycle? [2]

4. Physical address is also called has linear or absolute address. (**TRUE/ FALSE**) [2]

5. Write two differences between **virtual-8086 mode** and **real-address mode**? [2]

6. Find two's complement of the following numbers (**Final answer in HEX**)? [6]  
a. 100h

b. 200

7. The EFLAGS register consists of individual binary bits that control the operation of the CPU and reflect the outcome of ALU operations. (**TRUE/FALSE**). [2]

8. What is wrong with the given instruction syntax: [2]  
**[ label; ] mnemonic [ operands ] [:comments]**

9. Is CABh a valid hexadecimal number? (YES / NO) [2]

10. The \_\_\_\_\_ reads the source assembly file and produces an object file. [2]

11. Draw the truth table for **[(X OR Y) AND (NOT Z)]** [2]

12. Convert the following (**All are signed numbers**):

[15]

a. -35 to hex

b.  $235_{\text{O}}$  to Decimal

c.  $\text{BF0F}_{\text{H}}$  to Decimal

d. 0110 1111 1000 1011 to Octal

e. -130 to binary

13. Given a pipeline architecture with 5 execution stages, calculate total number of clock cycles and total time for a program having 10 instructions. Processor is driven by 10MHz internally? [10]

- a. Without pipelining
- b. With Superscalar pipelining.

14. For the given **selector:offset** pair (in Hex), calculate the physical address [7]

a. 1234:ABCD

b.  $ACBD_H = [ \text{_____} * 10_H ] + ABCD_H$

c.  $179B8_H = [ 4660 * 10_H ] + \text{_____}_H$

15. Given the following memory map, find the starting and ending addresses of each block? To which memory block does **0x6789Ah** address belong to? [10]

FFFFF <sub>h</sub>	VRAM 256K
	RAM 320K
	ROM 128K

16. State which of the following statements are valid / invalid. Consider the data segment given in Question 7. [10]

- |                     |                   |
|---------------------|-------------------|
| a. MOV DX, ECX      | - VALID / INVALID |
| b. MOV @stack , AX  | - VALID / INVALID |
| c. MOV CH, 220      | - VALID / INVALID |
| d. MOV CS, 1FFFh    | - VALID / INVALID |
| e. MOV Var1, Employ | - VALID / INVALID |

17. For the given data segment, list the offsets for all Variables and fill in the memory table.

Assume the data segment is starting at the offset address 0000h.

[12]

.data

Var1 **WORD** 200, 1010h, 30h

Employ **BYTE** 'John Doe', 43myDword **DWORD** 2 Dup (10)[illegible]

### BONUS QUESTIONS (20 Points)

**NOTE: Make sure you attempted all the above questions before answering the bonus questions.**

18. After executing following instructions which flags are set? (**Answer is in Word format**) [6]

i.  $F010_H + FED_H = \underline{\hspace{2cm}}_H$  ; CF =      SF =      ZF =

ii.  $1000000 + 2555 = \underline{\hspace{2cm}}_H$  ; CF =      SF =      ZF =

19. What is the usage/size of REAL4 data type?

20. What parameters are needed to do a READ and WRITE?

21. Declare a 32-bit signed variable and initialize it with the smallest possible negative decimal value.

22. What is Interrupt Service Routine?

23. Solve the given equation:  $(A2_H + 30_D) + 20_O = \underline{\hspace{2cm}}_D$