**4.2.8 Section Review**

***Use the following data for the next several questions:***

.data

val1 BYTE 10h

val2 WORD 8000h

val3 DWORD 0FFFFh

val4 WORD 7FFFh

1. Write an instruction that increments **val2**.

inc val2

2. Write an instruction that subtracts **val3** from EAX.

sub EAX, val3

3. Write instructions that subtract **val4** from **val2**.

sub val4, val2

4. If **val2** is incremented by 1 using the ADD instruction, what will be the values of the Carry and Sign flags?

CF = 0

SF = 1

5. If **val4** is incremented by 1 using the ADD instruction, what will be the values of the Overflow and Sign flags?

OF = 1

SF = 1

6. Where indicated, write down the values of the Carry, Sign, Zero, and Overflow flags after each instruction has executed:

mov ax,7FF0h

add al,10h ; a. CF = 1 SF = 0 ZF = 1 OF = 0

add ah,1 ; b. CF = 0 SF = 1 ZF = 0 OF = 1

add ax,2 ; c. CF = 0 SF = 1 ZF = 0 OF = 0

7. Implement the following expression in assembly language: AX = (-val2 + BX) - val4.

Mov ax, val2

Neg ax

Add ax, bx

Sub ax, val4

8. *(Yes/No):* Is it possible to set the Overflow flag if you add a positive integer to a negative integer?

No

9. *(Yes/No):* Will the Overflow flag be set if you add a negative integer to a negative integer and produce a positive result?

Yes

10. *(Yes/No):* Is it possible for the NEG instruction to set the Overflow flag?

Yes

11. *(Yes/No):* Is it possible for both the Sign and Zero flags to be set at the same time?

No

12. Write a sequence of two instructions that set both the Carry and Overflow flags at the same time.

Mov al, 80h

Add al, 80h

13. Write a sequence of instructions showing how the Zero flag could be used to indicate unsigned overflow after executing INC and DEC instructions.

Mov al, 0FFh

Inc al

Jz overflow\_offurred

Mov bl, 1

Del dl

Jz overflow\_occrred

14. In our discussion of the Carry flag we subtracted unsigned 2 from 1 by negating the 2 and adding it to 1. The Carry flag was the inversion of the carry out of the MSB of the sum. Demonstrate this process by subtracting 3 from 4 and show how the Carry flag value is produced.

Mov al, 4

Sub al, 3 ; CP = 0