**ICS 233-01 Sample Quiz 01 Key – Term 182**

1. For the following indicate whether or not the 8-bit operation will result in unsigned overflow or not, and whether it will result in signed overflow or not. Show your steps, and give your answers in terms of the the Carry Flag (CF) or the Overflow Flag (OF).

41H + 22H

41H + 22H = 63H

**No unsigned overflow 63H < FFH 🡺 CF = 0**

**No signed overflow because the sign of the result is the same as the signs of the addends 🡺 OF = 0**

1. Perform the following 16-bit signed subtraction and determine whether there is signed overflow or not. Show all steps and provide reason for your answer.

9003H - 2002H

**9003H – 2002H = 9003H + (FFFFH – 2000H + 1H)**

**=9003H + DFFEH**

**= (1) 7001H**

**Discard the final carry**

**The sign of the result is +ve is different from the signs of the addends 🡺 Signed overflow**

**OF = 1**

1. Provide the decimal representation of the following IEEE 32-bit floating point values. Show the steps.

* 11000001110011100000000000000000

**Sign-bit = 1 🡺 negative number**

**E = 10000011 = 27 + 21 + 20 = 131**

**n = 131 – 127 = 4**

**F = 10011100000000000000000**

**00000000 < E < 11111111 🡺 normal number**

**N = -1 \* 1. 100111 \* 24**

**= - 11001.11**

**11001.11 = 24 + 23 + 20 = 32 + 16 + 1 + 2-1 + 2-2 = 25.75**

**N = -25.75**

* 01111111100000000000000000000000

**Sign bit = 0 🡺 +ve number**

**E = 11111111 and F = 00000000000000000000000 🡺 ∞**

**N = + ∞**

* 11111111111100000000000000000000

**Sign bit = 1 🡺 -ve number**

**E = 11111111 and F ≠ 0 🡺 NaN**

**N = -NaN**

1. Provide the hexadecimal, IEEE 32-bit floating point representation of the following floating point value. Show all steps.

-35.75

**Negative number 🡺 Sign-bit = 1**

**35 = 100011**

**0.75 \* 2 = 1.5**

**0.5 \* 2 = 1.0**

**100011.11 = 1.0001111 \* 25**

**Exponent = 5 + 127 = 132 = 27 + 24**

**= 10000100**

**F = 00011110000000000000000**

**N = 1 10000100 00011110000000000000000**

**= 1100 0010 0000 1111 0000 0000 0000 0000**

**= C20F0000H**