Name: KEY **Id#**

COE 205, Term 022

Computer Organization & Assembly Programming

Quiz# 2

Date: Sunday, March 16, 2003

Q1. Consider an 8-bit register that has the binary number 11100010. Determine the decimal value of the number if it represents:

i. An unsigned number.

128 + 64 + 32 + 2 = 226

ii. A signed number in sign-magnitude representation.

- (64 + 32 + 2) = - 98

iii. A signed number in 1's complement representation.

The 1's complement is 00011101
So, the number is -29

iv. A signed number in 2's complement representation.

The 2's complement is 00011110
So, the number is -30

Q2. Perform the following arithmetic operations assuming that numbers are represented using 8-bit 2's complement representation. Indicate in your answer when an *overflow* occurs.

i. 7F + 01

```
      1
      7   F
+     0   1
    ---------
      8   0
```

There is overflow since the sign bit of the result is negative while it should be positive.

ii. FE – 7F

The 2's complement of 7F is 81

```
      F  E
+     8  1
    ----------
      7  F
```

There is overflow since the sign bit of the result is positive while it should be negative.

Q3. Fill the blanks in the following questions:

(i) The binary number 01000100 represents character **_____D_______,** and uses an **____Even_____** parity bit. Note that the ASCII code of character **A** is 41H and that of character **a** is 61H.

(ii) Assuming 7-bit 2`s complement representation, the smallest (negative) number is **_____1000000_____** in binary and **____-64_____** in decimal and the largest (positive) number is **___0111111____** in binary and **_____+63_______** in decimal**.**

(iii) If you type the phrase Abc2 on your keyboard, the binary sequence sent to the computer using 8-bit ASCII code with the 8th bit being an even parity bit is **___01000001 11100010__01100011__10110010__**. Note that the ASCII code for character 0 is 30H.