

**CDA 3103 – Computer Organization**  
**Spring 2005**  
**Quiz # 1 – Solution**

Last Name : \_\_\_\_\_ First Name : \_\_\_\_\_  
 NID : \_\_\_\_\_

**Question # 1:** Using 2's complement representation, Convert **-53** into an 8-bit binary number. [5 points]

2	53
2	26 – 1
2	13 – 0
2	6 – 1
2	3 – 0
2	1 – 1
	0 – 1



$$(53)_{10} = (110101)_2 = \text{8-bit number } (00110101)_2$$

It is a negative number, so we will take complement of number and then will add 1.

$$\begin{array}{lcl} 00110101 & = \text{complement} & 11001010 \\ & = \text{add 1} & 11001011 \end{array}$$

**Final Answer**

1	1	0	0	1	0	1	1
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**Question # 2:** What is the decimal equivalent of this 8-bit 1's complement binary number? [5 points]

$$\begin{array}{c} (11100101)_2 \\ \longleftarrow \uparrow \end{array}$$

Last '1' shows that it's a negative number. Number is in 1's complement form so its complement will give us its magnitude.

$$\begin{array}{lcl} 11100101 & = \text{complement} & 00011010 \quad (\text{no need to add 1 as it is NOT 2's complement}) \\ & = & 2^4 + 2^3 + 2^1 \\ & = & 16 + 8 + 2 = 26 \quad (\text{it is magnitude of negative number}) \end{array}$$

**Final Answer** ( -26 )<sub>10</sub>