



CSE Department, North South University
ETE131: Introduction to Telecommunications
& Computer Engineering (SyR)
Problem Sheet 2: Negative Binary Numbers - Solutions

Q1 Using a 8-bit 2's Complement system, $M=10001100_2$ and $N=01011101_2$
Show how $M-N$ is computed and give the result's binary and decimal representations.

$$\begin{array}{r} M \quad 10001100_2 \quad -116 \\ -N \quad \underline{10100011_2} \quad -93 \text{ (Since } N = +93) \\ \text{Ans: } M-N \quad 00101111_2 \quad 47 \text{ (Expected } -209) \end{array}$$

Q2 Using a 8-bit 2's Complement system, $M=10001100_2$ and $N=10100001_2$
Show how $M-N$ is computed and give the result's binary and decimal representations.

$$\begin{array}{r} M \quad 10001100_2 \quad -116 \\ -N \quad \underline{01011111_2} \quad +95 \text{ (Since } N = -95) \\ \text{Ans: } M-N \quad 11101011_2 \quad -21 \text{ (Expected } -21) \end{array}$$

Q3 Show the representation of the number -117 with 8-bits using:

- a) sign/magnitude b) 1's complement

Ans: 11110101 (S/M) and 10001010 (1C)

Q4. Show the representation of the number -125 with 8-bits using:

- a) sign/magnitude b) 2's complement

Ans: 11111101 (S/M) and 10000011 (2C)

Q5. Give the interpretation (i.e. decimal value) of 11101110, if it is stored with 8-bits using

- a) 2's complement b) unsigned integers

Ans: -18 (2C) and 238 (unsigned)

Q6 Give the interpretation (i.e. decimal value) of 11001100, if it is stored with 8-bits using

- a) 1's complement b) sign/magnitude

Ans: -51 (1C) and -76 (S/M)