**Number systems 1.1 TEST**

Student Name: …………………………

**1. Base conversions**

a) Convert the denary number 178 to 8-bit binary and to hexadecimal.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Convert the hexadecimal number 3F to 8-bit binary and to denary.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Convert the binary number 100110101011 to hexadecimal and to denary.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2. Shifts and unsigned overflow**

a) Apply a logical left shift by 3 to the 8-bit value 00101110. Give the 8-bit result and its denary value. State whether any information is lost in 8-bit storage.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Apply a logical right shift by 2 to the 8-bit value 11001010. Give the 8-bit result and its denary value.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Perform 8-bit unsigned addition: 11100101 + 11110011. Give the 8-bit result and state whether there is a carry out of the ninth bit.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2. Two’s complement**

a) Obtain the 8-bit two’s-complement representation of −58

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) State the denary value of the 8-bit two’s complement number 10010111.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_