

## Number Systems and Arithmetic

**Part A** Convert the following numbers from one notation to another.

$$765.321_8 = 1F5.688_{16}$$

$$BC.A_{16} = 188.625_{10}$$

$$99.625_{10} = 1100011.101_2$$

$$2^{23} = 8,000,000_{10}$$

**Part B** For each problem, (a) compute the operation using the rules of addition, expressing your answer in binary notation, (b) indicate whether an error occurs assuming all numbers are expressed using a **six** bit, two's complement representation, and (c) indicate whether an error occurs assuming all numbers are expressed using a **six** bit, unsigned binary representation. All number are expressed in binary notation.

$\begin{array}{r} 1\ 0\ 1\ 0\ 0\ 1 \\ +\ 1\ 0\ 1\ 1\ 1\ 0 \\ \hline 0\ 1\ 0\ 1\ 1\ 1 \end{array}$	$\begin{array}{r} 1\ 1\ 0\ 1 \\ +\ 1\ 0\ 1\ 1 \\ \hline 1\ 1\ 0\ 0\ 0 \end{array}$	$\begin{array}{r} 1\ 1\ 0\ 1\ 1 \\ +\ 1\ 1\ 0\ 1\ 0\ 1 \\ \hline 0\ 1\ 0\ 0\ 0\ 0 \end{array}$	$\begin{array}{r} 1\ 1\ 0\ 1\ 1 \\ +\ 1\ 1\ 0\ 1\ 1 \\ \hline 1\ 1\ 0\ 1\ 1\ 0 \end{array}$
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signed error?	YES	signed error?	NO	signed error?	NO	signed error?	YES
unsigned error?	YES	unsigned error?	NO	unsigned error?	YES	unsigned error?	NO