

**[20 marks]**

A pattern of binary digits can be interpreted in several different ways.

Show how the pattern **01011000** will be expressed under each of the following interpretations. [1 each]

unsigned integer	
2's complement	
excess 128 notation	
Hexadecimal notation	
Floating Point notation	
ASCII	

**Perform the following calculation in binary:**

$$\begin{array}{r} 01101001 \\ + 01100010 \\ \hline \end{array}$$

**Express the answer above in decimal.**

**Perform the following calculation in Binary:**

$$\begin{array}{r} 0100.0101 \\ + 0001.0011 \\ \hline \end{array}$$

**Express the answer above in decimal.**

**Show how the answer from the previous question would be stored in 8-bit binary floating point notation.**

**Perform the following calculation in 8-bit binary.  
Show the steps and identify the quotient and the remainder. [4]**

$$10 \div 5$$

**Show an *optimised* calculation for the following binary multiplication.  
Show all your steps. [5]**

$$29 * 40$$