SL QUESTIONS ON BINARY REPRESENTATION:

3. (a) State the binary representation of the decimal number 24. 11000 *[1 mark]*

(b) Using 6 bits state the two's complement representation of the decimal number –24. *[1 mark]*
101000

(c) A register has 8 bits. State the binary representation of the hexadecimal number 5F in this register. *[2 marks]*
01011111

2. (a) Convert the decimal number 17 into 6-bit two's complement. *[1 mark]*

010001
(b) Convert the decimal number –17 into 6-bit two's complement. *[1 mark]*

(c) Convert the hexadecimal number $A3_{(16)}$ into binary. *[2 marks]*

7. A picture measures 70 by 100 pixels and is stored as a graphic file. The colour representation uses 5 bits for red, 5 bits for green and 5 bits for blue.

(a) Calculate how many different colours can be represented. *[1 mark]*

(b) Each pixel is stored in two bytes. Calculate the size of the graphic file. *[1 mark]*

(c) State **two** ways of storing the file in 12 kB RAM. *[2 marks]*

6. (a) Convert the decimal number 20.5 into binary. *[2 marks]*

(b) Convert the binary number 1010 1001 into hexadecimal. *[1 mark]*

3. A code for representing colours is used, where each colour is stored using 8 bits.

(a) State the number of different colours that can be represented. *[1 mark]*

(b) The *binary* representation of a particular colour is shown below.

0	0	0	1	1	1	0	0

(i) State the *decimal* representation of this colour. Show all of your working. *[2 marks]*

(ii) State the *hexadecimal* representation of this colour. *[1 mark]*

7. Integers are represented in an 8-bit register using the *two's complement* method.

1	1	1	1	0	0	0	1

(a) State the *decimal* value of the integer represented. *[2 marks]*

(b) State the *binary* representation of the largest possible positive integer. *[1 mark]*

8. Convert $FA71_{16}$ into binary. *[1 mark]*

HL QUESTIONS ON BINARY REPRESENTATION:

2. (a) Calculate $DE + 3C$, giving your answer in hexadecimal. *[2 marks]*

(b) State the answer to part (a) in binary. *[1 mark]*

(c) State the error that would occur when this result is stored in an 8 bit register. *[1 mark]*

4. (a) Convert the decimal number 17 into 6-bit two's complement. *[1 mark]*

(b) Convert the decimal number –17 into 6-bit two's complement. *[1 mark]*

5. (a) Determine the representation of the decimal number 12.25, in *fixed-point*, using 8 bits, where 3 bits are used for the fractional part. *[2 marks]*

(b) Determine the representation of –12.25, in *fixed-point*, using 3 bits for the fractional part, in *two's complement*. *[1 mark]*

6. (a) Convert the decimal number 20.5 into binary. *[2 marks]*

(b) Convert the binary number 1010 1001 into hexadecimal. *[1 mark]*

7. Numbers can be stored in a computer in either *integer* or *floating-point representation*.

(a) State **one** reason for using floating-point representation. *[1 mark]*

(b) State **one** reason for using integer representation. *[1 mark]*

8. (a) State the register in which the results of all arithmetic operations are stored. *[1 mark]*

(b) Define the term *overflow error*. *[2 marks]*

5. Describe how a *parity check* is used to ensure data integrity in the transmission of data. *[3 marks]*

8. Numbers are represented in *floating point* format that uses 8 bits for the mantissa and 4 bits for the exponent.

(a) Describe how the binary number 1110.011 would be represented in this format. *[3 marks]*

(b) Define the term *overflow*. *[1 mark]*