Qu		Marks	
1	1	**Marks are for AO2 (apply)** **1 mark** for correct conversions between representations, allowing follow through for final answer. $27_{16} = 0010\ 0111_2$ $C9_{16} = 1100\ 1001_2$ Final answer: $F0_{16}$ **1 mark** for binary addition 11110000_2 allowing follow through if conversion was incorrect.	**2**
1	2	**Mark is for AO2 (apply)** -2048;	**1**

Qu		Marks	
02	1	**Marks are for AO2 (apply)** **1 mark** for whole number 19 **1 mark** for decimal number: .53125 // 17/32	2
02	2	**Marks are for AO2 (apply)** The (positive number) 00100111 must be converted to its negative equivalent/11011001; The (negative number) 11011001/result must then be added to the second number/01001001 (equalling 00100010); **Note:** Award 1 mark if both working **and** correct answer shown but no explanation	2

3	1	**2 marks are for AO2 (apply)** Mark as follows: **1 mark** for any relevant working out such as multiplying one number on a bit-wise basis by the other **or** summing the results of (incorrect) bitwise multiplications: 10110100 101101 **1 mark** for final answer: 11100001 **Alternative Method** 10100000 101000 10100 101 **MAX 2** **MAX 1 if no working is shown**	2
3	2	**2 marks are for AO2 (apply)** 110;01011;	2

Qu	Pt	Marking Guidance	Marks
4	1	**Mark is for AO2 (application)** 1011 0001;	1

Qu	Pt	Marking Guidance	Marks
5	1	**Marks are for AO1 (understanding)** 0; 65535; **A.** $2^{16}-1$	2

Qu	Pt	Marking Guidance	Marks
5	2	**Marks are for AO2 (application)** **1 mark** for showing three correct products 00010101 00101010 01010100; // 00000111 00011100 01110000; **A.** Omitted leading zeros. **1 mark** for the correct answer if some relevant working is shown. 10010011;	2

Qu	Pt	Marking Guidance	Marks
6	1	**Mark is for AO1 (knowledge)** **E** (mega); **R**. More than one lozenge shaded.	1

Qu	Pt	Marking Guidance	Marks
6	2	**Mark is for AO2 (application)** Mark is for result and carry mark completed as shown **A.** Missing 0s in carry row.	1

Number 1	0	0	0	1	1	0	1	1
Number 2	0	0	0	0	0	1	1	1
Result	0	0	1	0	0	0	1	0
Carry	0	0	1	1	1	1	1	

Qu	Pt	Marking Guidance	Marks
6	3	**Marks are for AO2 (application)** **1 mark** for correct conversion of `00100100` (36) to `11011100` (–36); **1 mark** for binary addition of `00011011` and `11011100` producing `11110111`; **A.** Follow through of incorrect representation of –36 for second mark. // **2 marks** if correct answer and any relevant working shown which indicates an attempt at using two's complement to solve the problem. **R.** Reject both marks if only decimal subtraction has been used.	2

Qu	Pt	Marking Guidance	Marks
6	4	**Mark is for AO1 (understanding)** Lowest: –128 Highest: (+)127 **Note:** Both answers must be correct to award mark.	1

Qu	Pt	Marking Guidance	Marks
6	5	**Marks are for AO2 (application)** $3\frac{29}{64}$ // $\frac{221}{64}$ // 3.453125 **Mark as follows:** **1 mark** for correct integer part (3) **1 mark** for correct fractional part ($\frac{29}{64}$ or .453125) // **2 marks** for $\frac{221}{64}$	2

Qu	Pt	Marking Guidance	Marks
7	1	**Mark is for AO2 (application)** 8A;	1

Qu	Pt	Marking Guidance	Marks
7	2	**Mark is for AO2 (application)** 1000 1011;	1

Qu	Pt	Marking Guidance	Marks
7	3	**Marks are for AO2 (application)** Answer = 0100 1110; Carry row = 0010 0011; The 1 carry bits (or some similar notation) must be shown in the correct columns (or correct sequence) but 0 carry bits can be omitted.	2

Qu	Pt	Marking Guidance	Marks
7	4	**Marks are for AO2 (application)** **1 mark** for correct conversion from 00011100 (28) to 11100100 (-28) **1 mark** for binary addition of 00111011 (59) to 11100100 (-28) to give 00011111 // **2 marks** for a correct final answer provided relevant working is shown and the working uses two's complement in an attempt to solve the problem **A.** If no other marks awarded, award 1 mark for correct conversion of 00111011 (59) to 11000101 (-59) **R.** Reject both marks if decimal subtraction has been used	2

Qu	Pt	Marking Guidance	Marks
7	5	**Marks are for AO2 (application)** 7.34375 // 7 11/32 // 235/32; **1 mark** for correct integer part (or a numerator that produces the correct integer part when an improper fraction shown) **1 mark** for correct fractional part	2