Qu	Part	Marking guidance	Total marks
01	1	**Mark is for AO2 (apply)** 156;	1
01	2	**2 marks for AO2 (apply)** 9C;; If the answer given is not 9C then award as follows: 1001 converted to 9; 1100 converted to C; **Max 1 mark** if final answer is not correct.	2

Qu	Part	Marking guidance	Total marks
02	1	**1 mark for AO2 (apply)** 1100 0101;	1
02	2	**2 marks for AO2 (apply)** 164;; If incorrect answer is given then maximum of 1 mark for working. • determining that A is worth 10 irrespective of it being in the correct column (place value); • multiplying an incorrect conversion of A by 16; • converting to binary to give 1010 0100;	2
03	1	**1 mark for AO2 (apply)** 31 // 2^5-1;	1
03	2	**2 marks for AO2 (apply)** 24 000 000;; If incorrect answer is given then maximum of 1 mark for working. • 3 000 000//3*1000*1000 to calculate the correct number of bytes; • Multiplying an incorrect number of bytes by 8; • 3 000 000 * 8 with incorrect result;	2

Qu	Part	Marking guidance	Total marks
04	1	**Mark is for AO2 (apply)** 148;	1
04	2	**Mark is for AO2 (apply)** 94;	1
04	3	**2 marks for AO2 (apply)** 8F;; If the answer given is not 8F then award a **maximum of 1 working mark** for any of the following: • converted 143 to `10001111`; • converted 143 to an incorrect 8-bit binary number but converted this correctly to hexadecimal; • attempted division of 143 by 16 to get a quotient of 8 and a remainder of 15 but incorrectly represented this in hexadecimal; • either the 8 or the F are present anywhere within the answer;	2
04	4	**2 marks for AO2 (apply)** `10111110`;; If the answer given is not `10111110` then award a **maximum of 1 working mark** for any of the following: • converted B to 1011; • converted E to 1110; • converted BE to 190 and then incorrectly converted this value to binary;	2

Qu	Part	Marking guidance	Total marks
04	5	**2 marks for AO1 (understanding)** A **maximum of 2 marks** can be awarded. Examples include: • hexadecimal is easier (for humans) to read (than binary); **A.** easier to understand • numbers are displayed in a more compact way (in hexadecimal than in binary); • it is quicker to type in (hexadecimal numbers than binary numbers); • it reduces the risk of typing errors (hexadecimal numbers than binary numbers); **R.** individual points that imply less memory is used.	2

Qu	Part	Marking guidance	Total marks
05	1	**Mark is for AO2 (apply)** 212;	1

Qu	Part	Marking guidance	Total marks
05	2	**2 marks for AO2 (apply)** B; (This must be the left digit to gain the mark) 9; (This must be the right digit to gain the mark)	2

Qu	Part	Marking guidance	Total marks
05	3	**Mark is for AO2 (apply)** 63; // $2^6 - 1$;	1

Qu	Part	Marking guidance	Total marks
02	1	**2 marks for AO2 (apply)** 1110; 1001;	2

Qu	Part	Marking guidance	Total marks
06	1	**Mark is for AO2 (apply)** 1010 1011; **I.** Leading zeros	1

Qu	Part	Marking guidance	Total marks
06	2	**2 marks for AO2 (apply)** 0010; 1101; If the answer given is not fully correct then award **a maximum of 1 working mark** as follows: • 2 converted to 0010 • D converted to 1101 • D converted to decimal 13 • Conversion to decimal 45 **A.** missing leading zeros **I.** additional leading zeros	2

Qu	Part	Marking guidance	Total marks
07	1	**Mark is for AO2 (apply)** 78;	1
07	2	**All marks AO2 (apply)** 4; (This must be the left hand digit to gain the mark) E; (This must be the right hand digit to gain the mark) **Maximum 1 mark:** If final answer not correct.	2
07	3	**All marks AO1 (understanding)** (The answer is incorrect because) the number will (still) be represented using binary in a computer's memory; so it will take up the same amount of memory space;	2
07	4	**All marks AO1 (understanding)** (Shifting the bit pattern) three places; to the left; **Mark as follows:** **1 mark:** for correct direction of shift **1 mark:** for correct number of times to shift	2
07	5	**Mark is for AO2 (apply)** **B** F; **R.** If more than one lozenge shaded	1
07	6	**All marks AO1 (understanding)** **Advantages:** Can represent a wider range of characters; Can represent characters from a wider range of languages; Can represent characters used in scientific / mathematical / technical / specialist documents;	2

Qu	Part	Marking guidance	Total marks
07	7	**All marks AO2 (apply)** | Character	Huffman coding
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O	111
SPACE	10
B	00110	 **Mark as follows:** **1 mark** per correct response	3
07	8	**1 mark for AO1 (understanding) and 2 marks for AO2 (apply)** 7; * 26; = 182 182 – 83; = 99 **Mark as follows:** **1 mark for AO1:** identifying number of bits (7) used to represent an ASCII character; **1 mark for AO2:** multiplying by 26; **1 mark for AO2:** subtracting 83 from their answer for the number of bits used to represent the ASCII version of the text; **A.** Incorrectly calculated number of bits used for ASCII version **Maximum 1 mark:** for correct answer with no working out shown	3

Question	Part	Marking guidance	Total marks
08	**1**	**Mark is for AO2 (apply)** 183;	1

Question	Part	Marking guidance	Total marks
08	**2**	**2 marks for AO2 (apply)** 70;; If the answer given is not fully correct then award **a maximum of 1 working mark** as follows: • writing 07 instead of 70; • converted 112 to 01110000; • converted 112 to an incorrect 8-bit binary number but converted this correctly to hexadecimal; • attempted division of 112 by 16;	2