MODULE C DATA REPRESENTATION · C4

Converting binary and hexadecimal: mark scheme

20 marks · Cambridge 0478 syllabus 1.1.2(b)(iii)

How to use. One mark per creditworthy point up to the maximum shown. **//** separates alternative answers. Words in (brackets) are not needed for the mark. Working is shown for the teacher; a correct final answer with no working gets full marks (marks here are for the answer digits, so none are withheld). Never credit digits in the wrong order, a reversed bit pattern, or a denary value (e.g. 15) written in place of a hex digit.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 1.1.2(b)(iii)	4 // a nibble	**1**	Correct answer only.
1(b) 0478 1.1.2(b)(iii)	4	**1**	16 ÷ 4 = 4.
2(a) 0478 1.1.2(b)(iii)	C (1100 = 8 + 4 = 12) A (1010 = 8 + 2 = 10)	**2**	Answer CA. 1 mark per correct digit in the correct position. AC = 0. 1210 = 0.
2(b) 0478 1.1.2(b)(iii)	3 (0011 = 2 + 1) E (1110 = 8 + 4 + 2 = 14) 8 (1000) 5 (0101 = 4 + 1)	**4**	Answer 3E85. 1 mark per correct digit in the correct position. 14 written for E does not earn the E mark. Digits in reverse order (58E3) = 0.
3(a) 0478 1.1.2(b)(iii)	1001 (9 = 8 + 1) 1111 (F = 15)	**2**	Answer 1001 1111 // 10011111. 1 mark per correct nibble in the correct position.
3(b) 0478 1.1.2(b)(iii)	0010 (2) 1011 (B = 11 = 8 + 2 + 1) 0000 (0) 1101 (D = 13 = 8 + 4 + 1)	**4**	Answer 0010 1011 0000 1101 // 0010101100001101. 1 mark per correct 4-bit nibble in the correct position: "10" for the first nibble, or a missing 0000 nibble, does not earn that mark. Reversed pattern = 0.
4(a) 0478 1.1.2(b)(iii)	Left out the (second) nibble 0000 // did not write 0 for the group of four zeros	**1**	Accept: missed out a digit for 0000. Do not accept "wrong conversion" alone.
4(b) 0478 1.1.2(b)(iii)	D0A3	**1**	1101 = 13 = D; 0000 = 0; 1010 = 10 = A; 0011 = 3.

QUESTION	ANSWER	MARKS	GUIDANCE
5(a) 0478 1.1.2(b) (iii)	0110 1111 → 6F B4 → 1011 0100 0001 0010 1100 1110 → 12CE 8E07 → 1000 1110 0000 0111	**4**	1 mark per row. 6F: 0110 = 6, 1111 = 15 = F. B4: B = 11 = 1011, 4 = 0100. 12CE: 0001 = 1, 0010 = 2, 1100 = 12 = C, 1110 = 14 = E. 8E07: 8 = 1000, E = 14 = 1110, 0 = 0000, 7 = 0111. Binary must have the number of bits shown (8 // 16). Do not accept 121214 for 12CE.

Total: 20 marks