MODULE C DATA REPRESENTATION · C1

Why computers use binary: mark scheme

20 marks · Cambridge 0478 syllabus 1.1.1

How to use. One mark per creditworthy point up to the maximum shown. **/** separates alternative words; **//** separates alternative answers. Words in (brackets) are not needed for the mark.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 1.1.1 / 1.1.2(a)	(base) 2	**1**	Accept "two". Do not accept 10 / 16.
1(b) 0478 1.1.1	bit	**1**	Do not accept byte / nibble.
1(c) 0478 1.1.1	logic gates // switches // transistors	**1**	Do not accept "the CPU" / "the processor" alone.
2(a) 0478 1.1.1	Sound converted: True Digits 1 and 2: False Registers: True Only numbers in binary: False	**4**	1 mark per correct row. More than one tick in a row: 0 for that row. Row 2: binary uses 0 and 1. Row 4: all forms of data, including text, are represented in binary.
3(a) 0478 1.1.1	Any three from: images // photographs sound // audio numbers // (temperature) readings text // characters	**3**	1 mark each, max 3. Accept program instructions. Two answers of the same type (e.g. "photos" and "pictures") score once.
3(b) 0478 1.1.1	register(s)	**1**	Do not accept RAM / memory / hard disk.
4(a) 0478 1.1.1	4 bits: 16 8 bits: 256 16 bits: 65 536	**3**	1 mark per row. Working: $2^4 = 16$; $2^8 = 256$; $2^{16} = 256 \times 256 = 65\,536$. Do not accept 15 / 255 / 65 535 (largest values, not number of patterns).
4(b) 0478 1.1.1 / 1.3.1	nibble	**1**	Do not accept byte / bit.

QUESTION	ANSWER	MARKS	GUIDANCE
5(a) 0478 1.1.1	Any two from: computers are made of / use logic gates // switches // transistors ... which only have two states // on and off two states can be represented by 1 and 0 data is stored in registers (as 1s and 0s)	**2**	max 2. "A computer can only understand binary" alone: 0 (too vague).
6(a) 0478 1.1.1	Any three from: the statement does not give a reason // is too vague data is processed using logic gates // switches // transistors each has only two states // on and off the two states are represented by 1 and 0 // binary so all forms of data (text, images, sound) must be converted to binary // stored in registers as binary	**3**	max 3. Repeating the statement in other words scores 0.

Total: 20 marks