MODULE C DATA REPRESENTATION · C10

Representing sound: mark scheme

21 marks · OCR J277 spec 1.2.4

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative answers. Words in (brackets) are not needed for the mark. J277 uses "bit depth"; accept "sample resolution". Accept "accuracy" for playback quality.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.4	The number of samples taken per second / each second	**1**	Do not accept "how often the sound is sampled" without "per second". Do not accept the frequency/pitch of the sound wave (common error).
1(b) J277 1.2.4	Hertz / Hz	**1**	Accept kHz.
1(c) J277 1.2.4	The number of bits (used) to store each sample	**1**	Accept "bits per sample". Do not accept "number of bits in the file".
2(a) J277 1.2.4	analogue amplitude regular binary	**4**	1 mark per gap, in this order. Do not accept "digital" for gap 1 or "frequency" for gap 2 (the frequency of the wave is not what is measured).
3(a) J277 1.2.4	8	**1**	Working: $2^3 = 8$.
3(b) J277 1.2.4	16	**1**	Working: $2^4 = 16$ (each extra bit doubles the number of values). Do not accept 9 or 12.
4(a) J277 1.2.4	Sample rate increased: quality better, file larger Bit depth decreased: quality worse, file smaller Duration increased: quality same, file larger Sample rate decreased: quality worse, file smaller	**4**	1 mark per row; both ticks in the row must be correct. More than one quality tick or more than one size tick in a row = 0 for that row.

QUESTION	ANSWER	MARKS	GUIDANCE
5(a) J277 1.2.4	Fewer samples are taken per second / samples are further apart so the digital copy is less like / less accurate to the original (analogue) wave / changes in the sound between samples are missed	**2**	1 mark per bullet. The second mark needs the link to accuracy. Do not accept "lower bit depth" (both have the same bit depth).
5(b) J277 1.2.4	The file size increases / doubles so more storage space is needed / it takes longer to send or download	**2**	1 mark for the effect, 1 for the consequence. Doubling checked: 16 ÷ 8 = 2, with sample rate and duration unchanged. Working out actual file sizes is practised in B8 and not required here.
6(a) J277 1.2.4	The file size is larger / doubled	**1**	Accept twice as big. Checked: 4 ÷ 2 = 2, so twice as many samples.
6(b) J277 1.2.4	The sample rate and bit depth are the same so each second is stored with the same accuracy / the extra length only adds more samples	**2**	1 mark per bullet. Do not accept "because it is longer" alone.
6(c) J277 1.2.4	Decrease the sample rate / decrease the bit depth	**1**	Must give the setting and the direction. Do not accept shortening the recording (it must stay 4 minutes). Do not accept compression (C11).

Total: 21 marks