MODULE C DATA REPRESENTATION · C11

Compression, lossy and lossless: mark scheme

20 marks · Cambridge 0478 syllabus 1.3.3, 1.3.4

How to use. Any N from the points listed, up to the max shown. **/** separates alternative words; **//** separates alternative answers. Words in (brackets) are not needed for the mark. Every RLE answer was checked by program. A correct final answer with no working earns full marks. Credit the type or method the syllabus names, not a file format.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 1.3.3	Reduces the file size Takes up less storage space Uses less bandwidth Shorter transmission time // quicker to send / download Can be sent where there is a file size limit	**3**	Any 3 from, max 3. Do not accept "more secure".
2(a) 0478 1.3.4	Lossy permanently removes data // the original file cannot be restored Lossless reduces the file size without permanently losing data // the original file can be restored exactly	**2**	1 mark for each type. A reversed description (e.g. "lossless removes data") scores 0 for that mark.
3(a) 0478 1.3.4	6W 3B 4W 3G	**2**	Working: runs of 6 + 3 + 4 + 3 = 16 pixels. 2 marks: all four pairs correct and in the correct order. 1 mark: two or three pairs correct and in the correct order. Accept W6 B3 W4 G3 for 1 mark max (format given in the instructions). Do not credit the runs in a different order.
3(b) 0478 1.3.4	8	**1**	4 counts + 4 colours = 8 values (instead of 16 pixels). Follow through from (a).
3(c) 0478 1.3.4	R R R R W W R W W W W W	**2**	Working: 4 + 2 + 1 + 5 = 12 pixels. 2 marks fully correct; 1 mark for three of the four runs correct and in the correct order.
3(d) 0478 1.3.4	There are no runs (of the same colour) // each run is only 1 pixel long Each pixel would need a count and a colour So 16 values would be stored instead of 8 // the data would get bigger, not smaller	**2**	Any 2 from. Working: 1B 1W 1B 1W 1B 1W 1B 1W = 8 pairs = 16 values.

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) 0478 1.3.4	Reduce the resolution // reduce the number of pixels Reduce the colour depth // reduce the number of bits per pixel / number of colours	**2**	1 mark each. Do not accept RLE (lossless). Do not accept "make the image smaller" alone.
4(b) 0478 1.3.4	Reduce the sample rate // take fewer samples per second Reduce the sample resolution // use fewer bits per sample	**1**	Any 1. Do not accept "reduce the volume" or "shorten the sound".
5(a) 0478 1.3.4	Lossless: no data is permanently lost // the original file is restored exactly Lossy would permanently remove data Characters / words / numbers in the contract would be lost or changed The file could be corrupted / unreadable // the contract would no longer be accurate	**3**	Any 3 from. Do not accept "the text would be blurry".
6(a) 0478 1.3.4	Lossy (1) Much smaller file // web pages load faster // uses less bandwidth // a small loss of quality is unlikely to be noticed (1)	**2**	The reason mark depends on lossy. Lossless with "so no quality is lost" scores 1 mark only. Do not accept a file format in place of the type.

Total: 20 marks