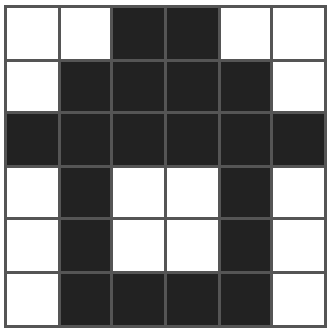
MODULE C DATA REPRESENTATION · C9

Representing images: 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. Every bit pattern and power of 2 was checked by program. A correct final answer with no working earns full marks.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.4	The smallest element / single point / single (coloured) square of a (bitmap) image	**1**	Accept "one dot of colour in an image". Do not accept "a bit".
1(b) J277 1.2.4	The number of bits used (to store the colour of) each pixel	**1**	Accept "bits per pixel". Do not accept "the number of colours" on its own.
1(c) J277 1.2.4	The number of pixels in the image / width × height in pixels	**1**	Accept the height or width in pixels, or the number of pixels per inch / pixel density (ppi). Do not accept "how clear the image is" on its own.
2(a) J277 1.2.4	Data about data / about the image	**1**	Accept "extra information stored about the image".
2(b) J277 1.2.4	Width (in pixels) Height (in pixels) Colour depth / bits per pixel Resolution File type / format Date taken / created (Camera) location / GPS	**2**	Max 2. 1 mark per item. Accept "dimensions" for one mark only. Do not accept the pixel data itself.
2(c) J277 1.2.4	So the computer knows where each row ends / how many pixels are in a row / how to arrange the pixels (width / height) So the computer knows how many bits make one pixel / how to read each pixel's colour (colour depth) So the image is reconstructed / displayed correctly	**2**	Max 2. 1 mark for a reason, 1 for expansion linked to width / height or colour depth.

QUESTION	ANSWER	MARKS	GUIDANCE
3(a) J277 1.2.4	All 6 rows correct (see grid below) At least 4 rows correct 	**2**	Rows: 001100, 011110, 111111, 010010, 010010, 011110 (36 bits, 6 per row, checked by program). 2 marks all six rows; 1 mark four or five rows correct. Inverted colours (0s shaded) = 0.
3(b) J277 1.2.4	2 (bits)	**1**	$2^2 = 4$. Do not accept 4.
3(c) J277 1.2.4	8	**1**	$2^3 = 8$. Do not accept 6 or 3.
4(a) J277 1.2.4	6 (bits)	**1**	$2^5 = 32$ is too few; $2^6 = 64$, which is at least 50. Do not accept 5 or 50.
5(a) J277 1.2.4	True False False True	**4**	1 mark per row. Row 2: 8 bits give $2^8 = 256$ colours. Row 3: colour depth changes the bits per pixel, not the number of pixels. Two ticks in one row = 0 for that row.
6(a) J277 1.2.4	Lower resolution means fewer pixels / less detail ... so the image looks blockier / more pixelated / lower quality (especially when enlarged) Lower colour depth means fewer bits per pixel / fewer colours can be shown ... so colours are less accurate / shading is less smooth / lower quality Both changes mean fewer bits are stored ... so the file size is smaller / uploads faster / uses less storage	**4**	Max 4. Max 3 if only quality or only file size is addressed. Max 3 if only one of resolution / colour depth is addressed. Do not credit "blockier" for colour depth, or any claim that file size increases. (Calculating the file size is covered in B8.)

Total: 21 marks