2.6 Data Representation: Images, Sound and Compression: 10-minute Pack

OCR J277 · Calculators not allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Colour depth affects how many different colours a bitmap image can display.

(a) Define the term 'colour depth'. **(1)**

(b) An image uses a colour depth of 4 bits per pixel. Calculate the maximum number of different colours that can be represented. **(2)**

(c) Circle the letter next to the colour depth that would allow an image to store the greatest number of different colours. **(1)**

- ☐ A) 1 bit
- ☐ B) 2 bits
- ☐ C) 4 bits
- ☐ D) 8 bits

(Total for Question 1 is 4 marks)

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2 An image editing program uses a palette of 32 different shades of grey. Each shade is given an index number, which is stored using binary.

(a) Calculate the minimum number of bits needed to store a palette index for one of the 32 shades. Show your working. **(2)**

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(b) Convert the denary palette index 19 into binary, using the number of bits found in part (a). **(2)**

(c) One pixel stores the binary value 11010 as its palette index. Convert this binary value to hexadecimal. **(2)**

(Total for Question 2 is 6 marks)

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Mark scheme · 2.6 Data Representation: Images, Sound and Compression: 10-minute Pack

Question 1

(a) the number of bits used to represent/store the colour of each pixel (oe) **B1**

(a) Answer: The number of bits used to represent the colour of each pixel.

(b) recognises number of colours = $2^{\text{colour depth}}$, i.e. 2^4 (oe) **M1**

(b) 16 cao **A1**

(b) Answer: 16 colours

(c) D cao **B1**

(c) Answer: D) 8 bits

Question 2

(a) recognises 2^n must be at least 32, e.g. tests $2^4 = 16$ (too small) and $2^5 = 32$ (oe) **M1**

(a) 5 (bits) cao **A1**

(a) Answer: 5 bits

(b) correct place value working shown using place values 16, 8, 4, 2, 1 (oe) **M1**

(b) 10011 cao (ft from part a for number of bits) **A1**

(b) Answer: 10011

(c) converts binary to denary or splits into a nibble/group for conversion, e.g. 11010 = 26 (oe) **M1**

(c) 1A cao (accept 0x1A oe) **A1**

(c) Answer: 1A

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