

1. Nov/2021/Paper_11/No.1

(b) (i) Perform the following binary addition. Show your working.

$$\begin{array}{r} 10101010 \\ + 00110111 \\ \hline \end{array}$$

[2]

(ii) State how an overflow can occur when adding two binary integers.

.....
..... [1]

(c) Convert the hexadecimal value F0 into denary.

.....
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Bobby is recording a sound file for his school project.

(a) He repeats the recording of the sound several times, with a different sample rate each time.

(i) Describe the reasons why the sound is closer to the original when a higher sample rate is used.

.....

.....

.....

..... [2]

(ii) Describe the reasons why the sound file size increases when a higher sample rate is used.

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.....

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..... [2]

(b) Bobby wants to email the sound file to his school email address. He compresses the file before sending the email.

(i) Explain the reasons why Bobby compresses the sound file.

.....

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..... [2]

(ii) Bobby uses lossless compression.

Describe how lossless compression can compress the sound file.

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..... [2]

A register stores the following binary number:

1	1	0	0	1	1	0	1
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- (a) The binary value in the register represents an unsigned binary integer.

Convert the unsigned binary integer into denary.

..... [1]

- (b) The binary value in the register represents a two's complement binary integer.

Convert the two's complement binary integer into denary.

..... [1]

- (c) The binary value in the register represents a hexadecimal number.

Convert the binary number into hexadecimal.

..... [1]

- (d) State why the value in the register cannot be interpreted as a Binary Coded Decimal (BCD).

..... [1]

- (e) The binary contents of two registers are:

Register 1	0	0	1	1	1	1	0	1
Register 2	0	0	1	0	1	1	0	1

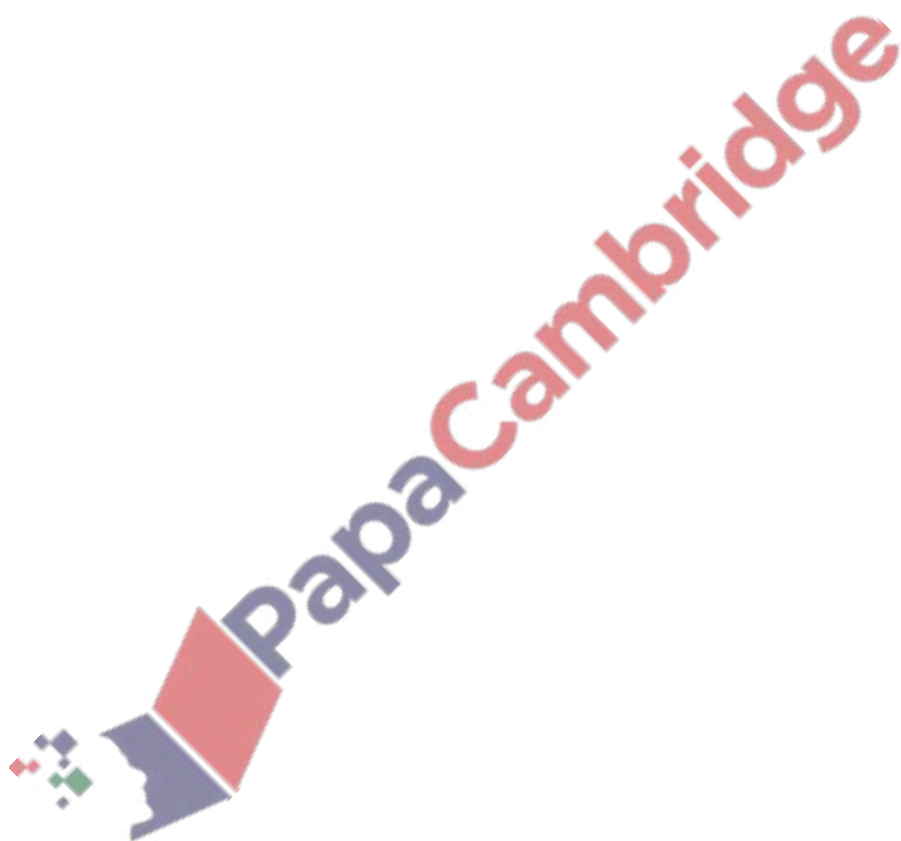
- (i) Add the contents of **Register 1** and **Register 2**. Show your working.

Answer [2]

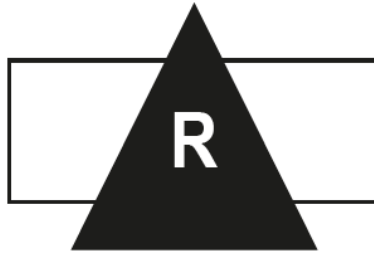
(ii) Subtract the contents of **Register 2** from the contents of **Register 1**. Show your working.

Answer

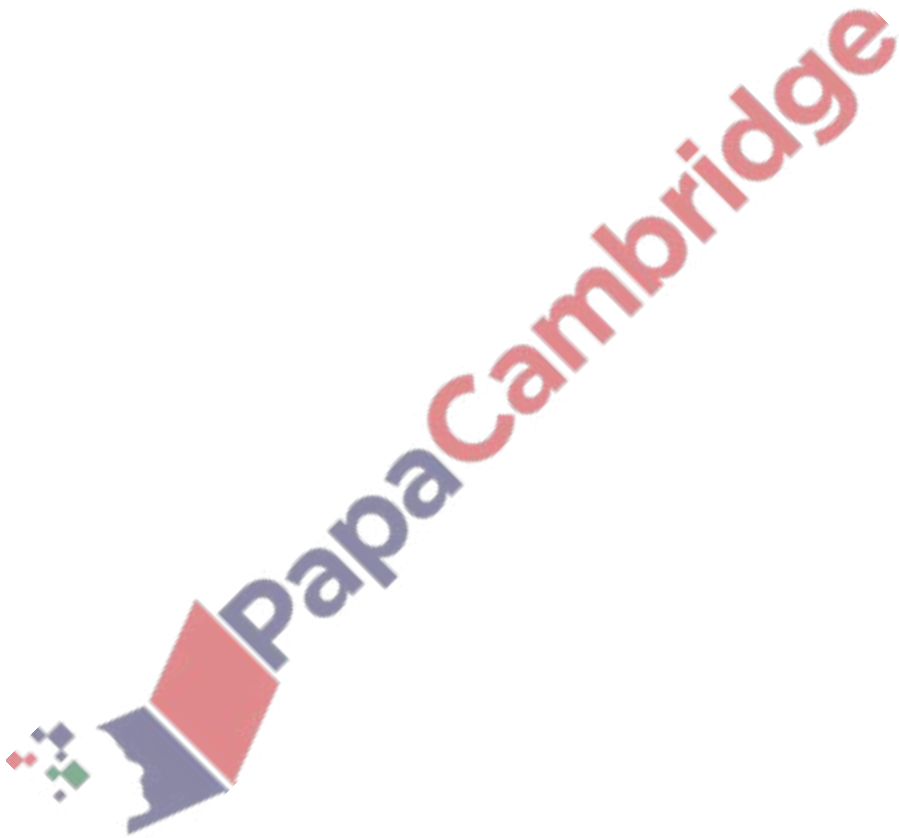
[2]



Riya has created the following logo as a vector graphic.



- (a) Complete the table by writing a description of each vector graphic term **and** give an example for this logo.



Term	Description	Example from logo
Property		
Drawing list		

[4]

(b) Riya takes a photograph using a digital camera. The photograph is stored as a bitmap image.

(i) Describe **two** differences between a vector graphic and a bitmap image.

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2

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[4]

- (ii) Riya needs to email the photograph. She compresses the photograph before sending it using an email.

Describe **two** lossy methods that Riya can use to compress the image.

Method 1

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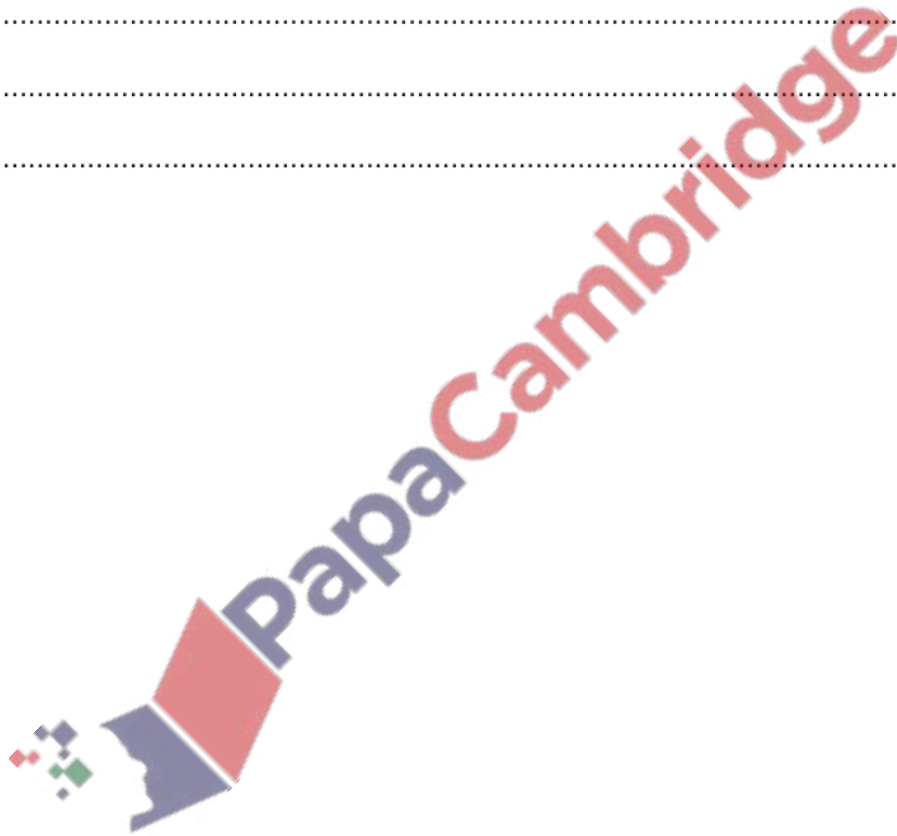
Method 2

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[4]



(a) Draw **one** line from each binary value to its equivalent (same) value on the right.

Binary value	
8 bits	1 kibibyte
8000 bits	1 gigabyte
1000 kilobytes	1 byte
1024 mebibytes	1 kilobyte
8192 bits	1 gibibyte
	1 megabyte
	1 mebibyte

[5]

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 10101010 \\
 + 00110111 \\
 \hline
 \end{array}$$

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.....

.....

.....

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(ii) Bobby uses lossless compression.

Describe how lossless compression can compress the sound file.

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.....

..... [2]

Anya scans an image into her computer for a school project.

(a) The scanned image is a bitmapped image.

(i) Complete the following table to describe the two terms about graphics.

Term	Description
Pixel	<p>.....</p> <p>.....</p> <p>.....</p>
File header	<p>.....</p> <p>.....</p> <p>.....</p>

[2]

(ii) The image is scanned with an image resolution of 1024×512 pixels, and a colour depth of 8 bits per pixel.

Calculate an estimate for the file size, giving your answer in mebibytes. Show your working.

Working

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.....

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Answer mebibytes

[3]

(b) The image is compressed using lossless compression.

Identify **one** method of lossless compression that can be used to compress the image **and** describe how the method will reduce the file size.

Lossless compression method

Description

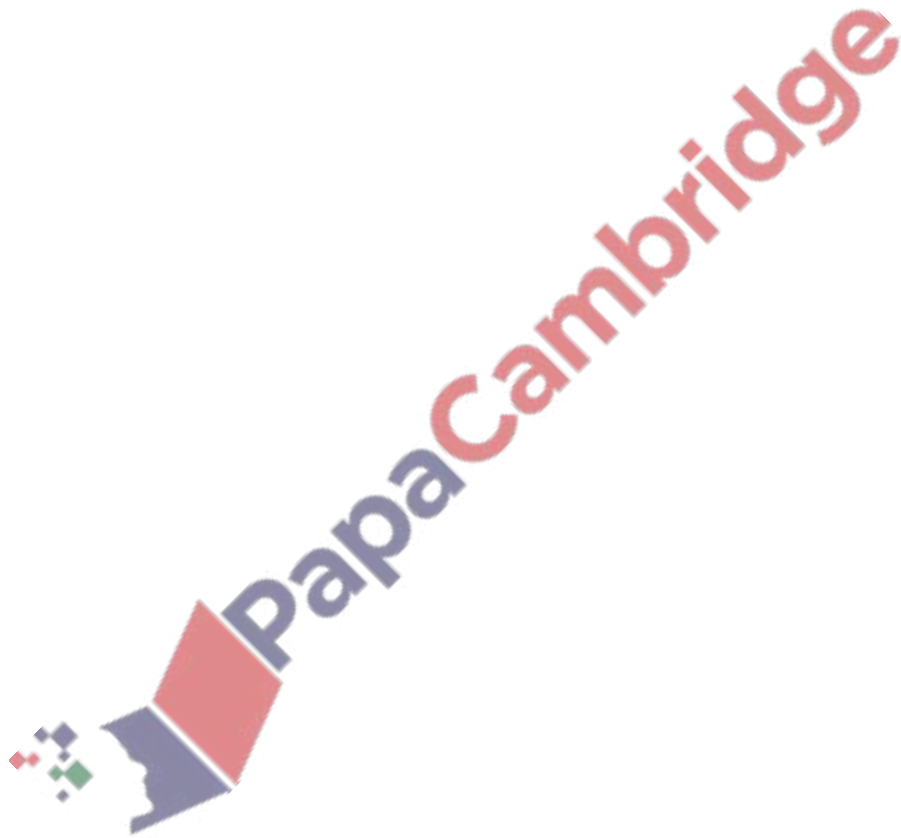
.....

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[3]



(c) One of the colours used in the image has the hexadecimal colour code:

#FC238A

FC is the amount of red, 23 is the amount of green and 8A is the amount of blue in the colour.

(i) Convert the hexadecimal code FC into denary.

..... [1]

(ii) The amount of green in binary is 00100011. This has the denary number 15 added to it to create a second colour.

Add the denary number 15 to the binary number 00100011 and give your answer in binary.

Perform the addition in binary. Show your working.

Working

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Answer (in binary)

[3]

(iii) Hexadecimal 23 in two's complement representation is 00100011. The denary number 10 needs to be subtracted from this value.

Subtract the denary number 10 from the two's complement representation 00100011.

Give your answer in binary. Show your working.

Working

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Answer (in binary)

[3]

(d) Anya made sure that the image was not subject to any copyright before scanning it.

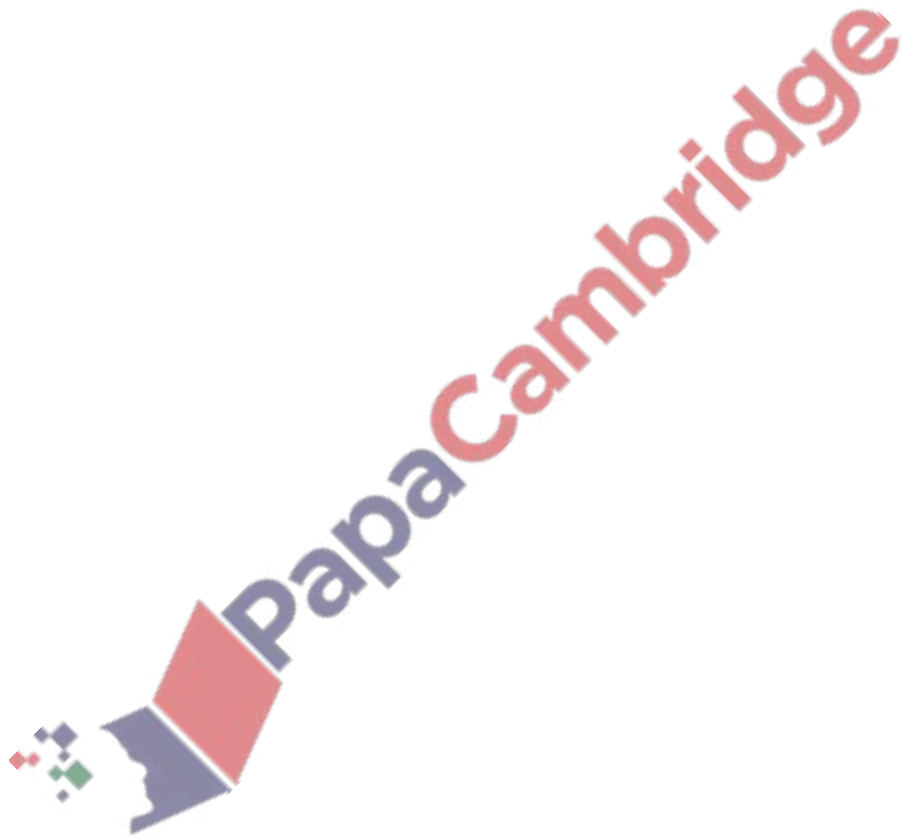
Describe what is meant by **copyright**.

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.....

.....

..... [2]



A computer uses the ASCII character set.

- (a) State the number of characters that can be represented by the ASCII character set and the extended ASCII character set.

ASCII

Extended ASCII

[2]

- (b) Explain how a word such as 'HOUSE' is represented by the ASCII character set.

.....
.....
.....
..... [2]

- (c) Unicode is a different character set.

The Unicode value for the character '1' is denary value 49.

- (i) Write the hexadecimal value for the Unicode character '1'.

..... [1]

- (ii) Write the denary value for the Unicode character '5'.

..... [1]

