

Draw **two** lines from each change to the impacts it has on the sound file.

Change	Impact
increase the duration of the recording	the file size gets bigger
	no change in the file size
	the file size gets smaller
increase the sampling rate	the accuracy of the sound file improves
	no change to the accuracy of the sound file
decrease the sampling resolution	the accuracy of the sound file worsens

[3]

Explain how text is represented by the ASCII character set.

..... [2]

1

2

①

[2]

7 A digital video camera records students in a classroom. The data is transferred from the digital video camera over the internet to a server. Artificial Intelligence (AI) is used to analyse the video on the server to identify when students are interacting with the lesson and the teacher.

(a) Describe **one** ethical impact of this use of AI in the classroom.

..... [2]

(b) A video is made of many bitmap images called frames. 30 frames are recorded every second.

Each frame is 4000 pixels wide by 3000 pixels high. The video records using 16-bit colour depth.

Calculate an estimate for the file size for **one** second of the video in gigabytes.

Show your working.

[illegible]

File size gigabytes

[2]

(c) Identify **and** describe **one** method of data verification that can be used when transferring data from the digital video camera to the server.

Method

Description

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[3]

[3]

②

3 A computer stores images and text files.

(a) One of the images is a bitmapped image.

Complete the table by writing the answer for each statement.

Statement	Answer
the term for the smallest element that makes up an image	
the largest number of different colours that can be represented with a bit depth of 8 bits	
the term for the dots per inch (dpi) when an image is displayed	

[3]

(b) The text in the files is stored using the Unicode character set.

(i) Give **two** advantages of using the Unicode character set instead of using the ASCII character set.

- 1
-
- 2
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[2]

(ii) The Unicode character 'K' has the binary value: 0010 0111 0110 1110

Convert the binary value for the character 'K' into denary.

..... [1]

(iii) The Unicode character 'Σ' has the hexadecimal value 2140

Convert the hexadecimal code for the character 'Σ' into denary.

..... (3) [1]

1 (a) A student paints a picture in an art class.

The student takes a photograph of the picture using a digital camera. The digital camera creates an image with a resolution of 2 million pixels and uses a bit depth of 16 bits.

(i) Calculate the file size of the image created by the digital camera in megabytes (MB).

Show your working.

Working space

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Answer MB [2]

(ii) The student takes a second photograph with a lower bit depth.

Explain the effect of decreasing the bit depth on the image and on the image file.

Effect on image

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Effect on image file

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[4]

(b) A teacher records an audio file of the student playing the piano during a music lesson.

Complete the table by giving the term for each description about sound representation on a computer.

Description	Term
the number of times the amplitude is measured per time interval	
the number of bits used to store each amplitude measurement	
the type of sound wave before it is recorded by a computer	(4)

(c) The student types a report on a computer in a history lesson.

(i) The computer uses the Unicode character set.

Give **two** characteristics of the Unicode character set.

1

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2

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[2]

(ii) Some of the school's computers use the extended ASCII character set.

The table gives some characters from the extended ASCII character set, their denary, 8-bit binary and hexadecimal numbers.

Complete the table by filling in the missing numbers.

Character	Denary	8-bit Binary	Hexadecimal
!	33		21
L		01001100	4C
ü	252	11111100	

[3]

7 A student takes a photograph of a science experiment.

(a) The photograph is saved as a bitmapped image.

(i) Define the following bitmap terms.

Colour depth

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File header

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[2]

(ii) Explain why changing the image resolution will affect the image quality and file size.

Image quality

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File size

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[2]

(iii) Identify **one** lossless method of compressing an image.

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[1]

(b) The student draws a picture on paper that is scanned into the computer and saved as a vector graphic.

Define the vector graphic terms property and drawing list.

Property

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Drawing list

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[2]

2 A computer game is being designed that users will be able to play using a virtual reality (VR) headset.

(d) The computer can transmit a video made from bitmap images and vector graphic animations to the VR headset.

(i) Describe how the data for a bitmapped image is encoded.

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..... [3]

(ii) Describe the contents of a vector graphic drawing list.

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..... [2]

(iii) The bitmap video is **not** compressed before transmission to the VR headset.

Give **two** reasons why the video does **not** need to be compressed.

1

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2

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