Sounds

Total Marks: 14

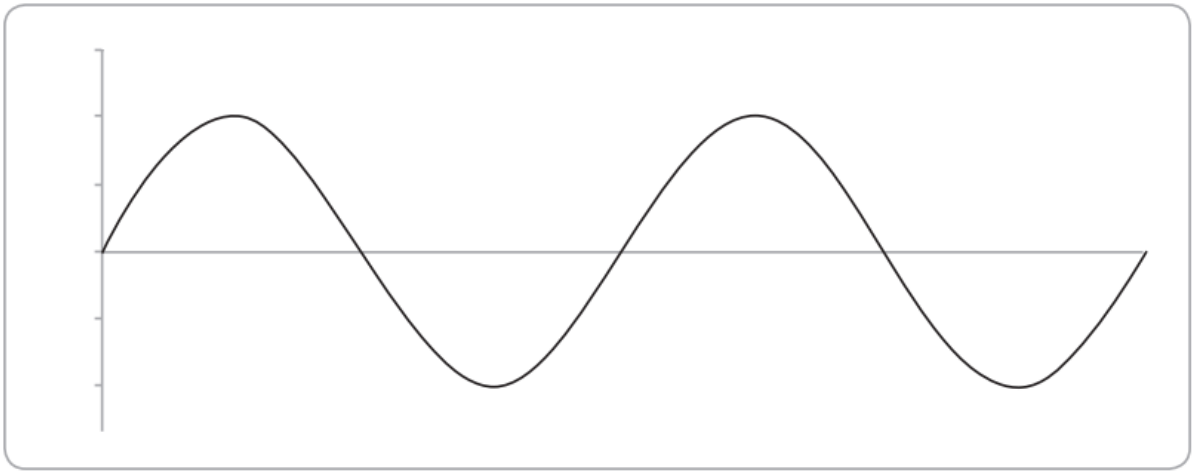
Question 1:

A baby monitor uses a microphone to record sound.

(a) An analogue to digital converter is used to change the sounds received by the microphone into a form that can be processed by a computer.

(i) Complete the diagram to show sampling frequency and label both axes.

(3)



(ii) State the advantage of using a bit depth of 16 rather than a bit depth of 8.

(1)

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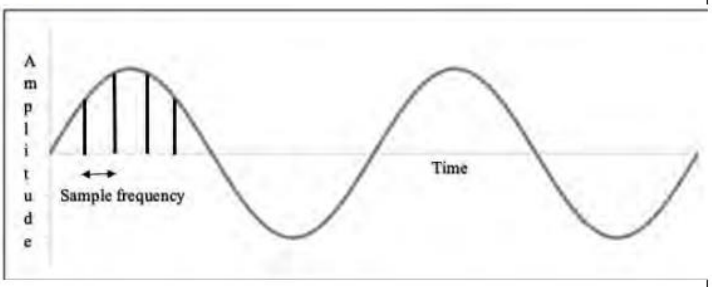
.....

Answer:

(a) (i)	X axis correctly labelled (1) Y axis correctly labelled (1) Sample frequency indicated (1) Do not award marks if wavelength is labelled, rather than sample frequency. Accept for sample frequency if two points given that are shorter than the wavelength.  		3

Question number	Answer	Additional Guidance	Mark
(a)(ii)	The amplitude / original sound can be represented more accurately. Accept: • Better (sound) quality • Higher fidelity • Clearer (sound)		1

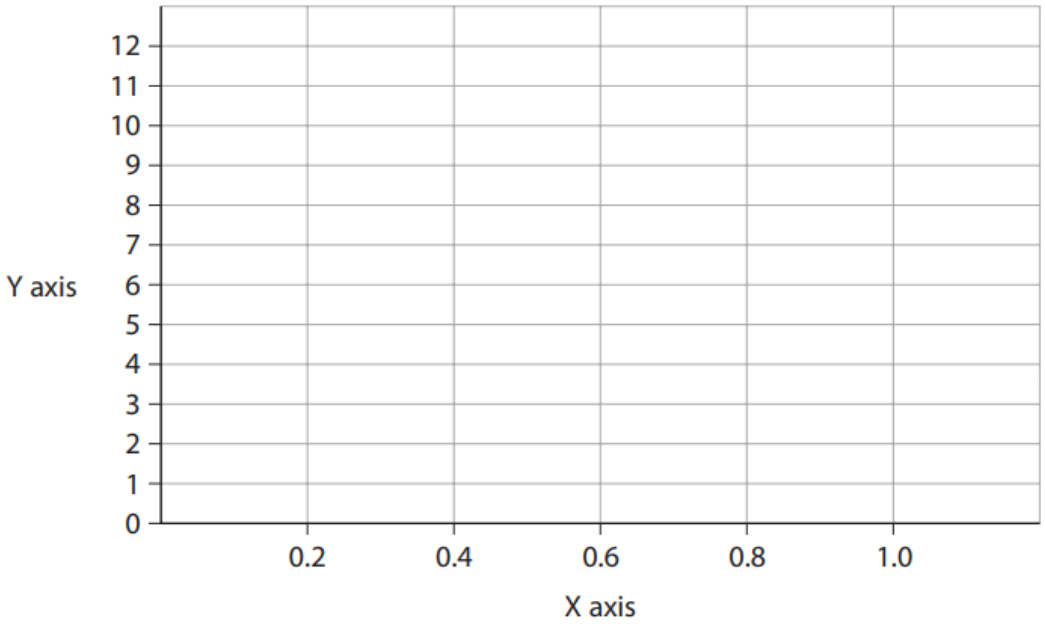
Question 2:

Alyssa is a music producer.

(a) **Figure 1** shows the denary values of five samples of an analogue sound using a sample interval of 0.2 seconds.

Sample number	Denary value
1	1
2	10
3	12
4	5
5	3

Figure 1



(i) Complete this graph using the sample information from **Figure 1** to show the digital sound wave.

(3)

(ii) Give a suitable label for the X axis.

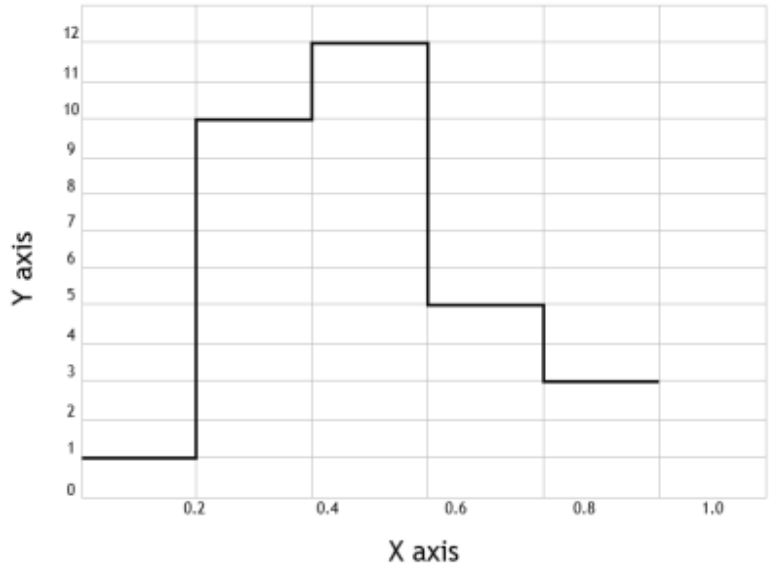
(1)

.....

(iii) Give a suitable label for the Y axis.

(1)

Answer:

(i)	Award **one** mark for each of: • At least four conversions plotted at the correct amplitude (1) • Correct start point (1) 0 – 1 digital. 0 – 0 analogue • Digital sound wave drawn (1) using candidate's plots **Sample number** / **Denary value** 1 / 1 2 / 10 3 / 12 4 / 5 5 / 3  	MP1 does not have to start at 0.2 - 1	3

(ii)	Award **one** mark for: • Time (1) • Sample interval/period (1) • Seconds (1)		1
(iii)	Award **one** mark for: • Amplitude / sound level / volume (1) • Metres/centimetres/nanometres (1) • m/cm/nm (1)		1

Question 3:

A band is recording their new song. They need to consider the sample rate and sample resolution of their recording.

(a) Give **one** benefit of using a higher sample rate to record the song.

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..... [1]

(b) Give **one** drawback of using a higher sample rate to record the song.

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..... [1]

(c) Describe what is meant by sample resolution.

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..... [2]

(d) The band wants to compress the sound file, but they do **not** want any data to be permanently removed.

Identify the compression method that should be used.

..... [1]

Answer:

(a)	Any **one** from: – The recording of the song is more accurate/closer to original	**1**
(b)	Any **one** from: – The file size will be increased – The file will require more **storage** space	**1**
(c)	Any **two** from: – The number of bits that are used **per sample** – … that provides the variation in amplitude that can be stored for each sample // defines the number of different amplitudes that can be recorded – … that determines how quiet/loud the sounds are that can be recorded – Example e.g. 16-bit	**2**
(d)	– Lossless	**1**