AQA
Realising potential

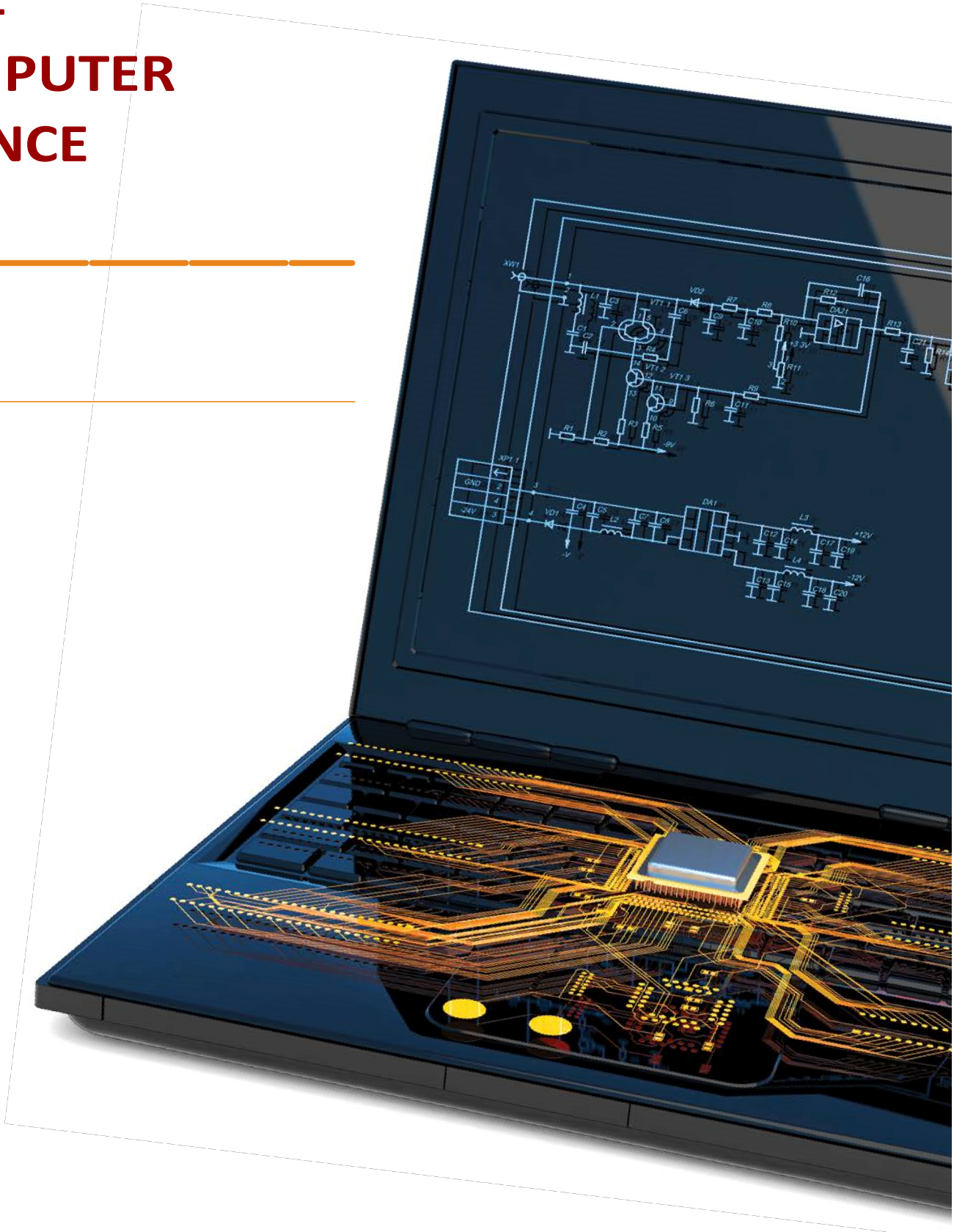
LANGLEY PARK SCHOOL FOR BOYS

MORES ET STUDIA

GCSE COMPUTER SCIENCE

GCSE (8520)

UNIT 3.7



3.7 Representing sound

Content	Additional information
Understand that sound is analogue and that it must be converted to a digital form for storage and processing in a computer.	
Understand that sound waves are sampled to create the digital version of sound.	Understand that a sample is a measure of amplitude at a point in time.
Describe the digital representation of sound in terms of: • sampling rate • sample resolution.	Sampling rate is the number of samples taken in a second and is usually measured in hertz (1 Hertz = 1 sample per second). Sample resolution is the number of bits per sample.
Calculate sound file sizes based on the sampling rate and the sample resolution.	File size (bits) = rate x res x secs rate = sampling rate res = sample resolution secs = number of seconds

SPECIMEN MATERIAL 2015

0 5 . 1 Calculate the file size in bits for a two minute sound recording that has used a sample rate of 1000 Hertz (Hz) and a sample resolution of 5 bits.

You should show your working.

[3 marks]

0 5 . 2 Another sound file has a size of 24,000 bits. What is 24,000 bits in kilobytes?

You should show your working.

[2 marks]

SPECIMEN PAPER 2 ADDITIONAL MATERIAL 2015

0 2 One way of representing sound digitally is to take samples of the original sound.

0 2 . 1 Define sampling rate.

[2 marks]

0 2 . 2 Define sampling resolution.

[2 marks]

0 2 . 3 To calculate the storage requirements that will be needed to store sound samples you need to know both the sampling rate that will be used and the sampling resolution that will be used. Explain how to calculate the storage requirements for the sampled sound data.

[2 marks]

SPECIMEN PAPER 1 SUPPLEMENTAL MATERIAL 2015

1 (e) **Table 1** shows four stages in converting sound into a digital form.

Show the correct order for the stages by labelling them with the numbers 1 – 4 (1 being the first stage).

[3 marks]

Table 1

Stage	Order (1 – 4)
binary representation of level stored	
microphone picks up sound waves	
value read at specific point and rounded to a level	
converted to an electrical analogue signal	

PAPER 1 JUNE 2018

0 4 A sound engineer is recording a singer.

0 4 . 1 Describe why the sound must be converted to a digital format before it can be stored on a computer system.

[2 marks]

0 4 . 2 The sound engineer is using a sampling rate of 2000 Hz and a sample resolution of 4 bits. What is the minimum file size of a 5 second recording? Your answer should be given in bytes.

You should show your working.

[4 marks]

Answer: _____

0 4 . 3 The sound engineer currently uses a sample resolution of 4 bits which enables a sample to be stored as one of 16 different bit patterns. She wants to increase the number of bit patterns available from 16 to 32. Shade **one** lozenge which shows the **minimum** sample resolution (in bits) she can choose that will allow her to do this.

[1 mark]

A 3 bits ⬭

B 5 bits ⬭

C 8 bits ⬭

D 16 bits ⬭

0 4 . 4 Shade **one** lozenge to show which of the following correctly states the effects of increasing the sampling rate.

[1 mark]

A Decreases both the quality of the recording and the file size ⬭

B Has no effect on the quality of the recording or the file size ⬭

C Improves the quality of the recording and has no effect on file size ⬭

D Improves the quality of the recording and increases the file size ⬭