



Oxford Cambridge and RSA

**GCSE Physics B (Twenty First Century Science)**  
**J259/03** Depth in physics (Higher Tier)

**Question Set 6**

1

James and Mia investigate their hearing.

James uses an app on his phone to make sounds with different frequencies.

For each frequency, he starts with the volume on his phone set at zero.

Then he turns the volume up step by step until Mia can just hear the sound.

The results show the volume setting needed before Mia can hear the noise for each frequency.

Frequency (Hz)	Volume setting
55	13
110	11
220	7
440	1
880	1
1760	1

(a) Explain why Mia finds it easier to hear some of these frequencies.

[2]

(b) They repeat the experiment.

This time there is a wall between the phone and Mia. They want to see what effect the wall has on the results.

(i) Suggest **one** variable that should be controlled to make this new experiment a fair comparison with the first experiment.

[1]

(ii) The volume setting needed for each frequency is higher in the new experiment.

Describe how the sound waves reach Mia and why they sound more faint.

[2]

(c) Mia reads on the internet that the human ear is most sensitive at a frequency about 2000Hz.

Describe how James and Mia could improve their experiment to test this hypothesis.

[3]

**Total Marks for Question Set 6: 7**

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