AQA GCSE Physics | 8463

SPECIFICATION POINT 4.7.2.4

Loudspeakers (physics only) (HT only)

Past-paper questions

Tier	**Higher**
Question groups	**4**
Available paper years	**2014–2023**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.7.2.4 Loudspeakers (physics only) (HT only)

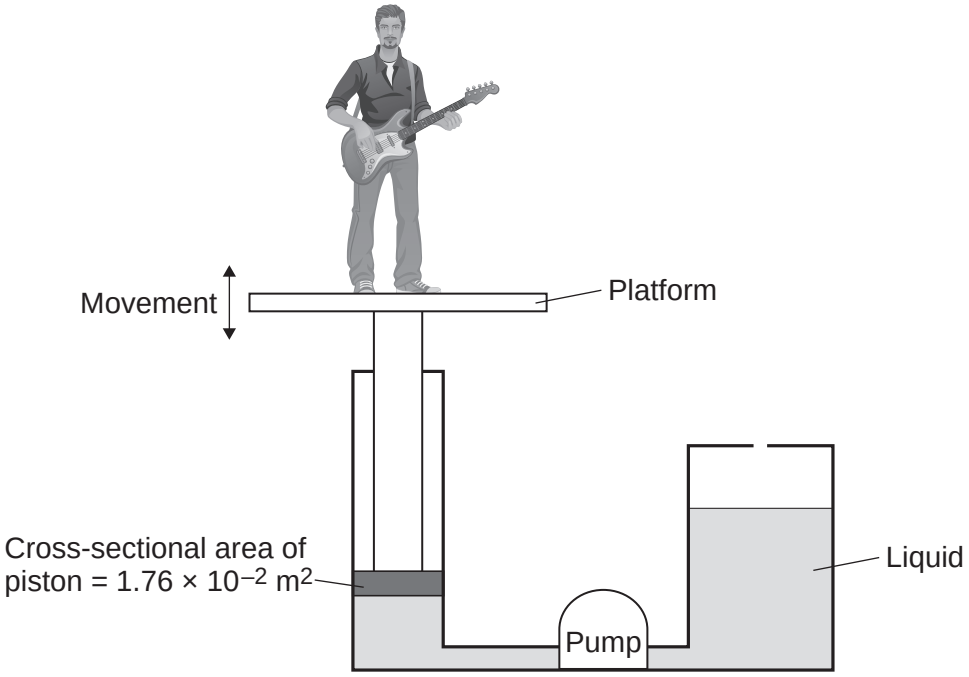
Question 01

June 2014 | PH3HP | Original Q8 | Legacy

8 Musicians sometimes perform on a moving platform.

Figure 13 shows the parts of the lifting machine used to move the platform up and down.

Figure 13



8 (a) What type of system uses a liquid to transmit a force?

[1 mark]

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8 (b) The pump creates a pressure in the liquid of 8.75 x 10^4 Pa to move the platform upwards.

Calculate the force that the liquid applies to the piston.

Use the correct equation from the Physics Equations Sheet.

[2 marks]

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.....

.....

Force = ... N

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 01 · continued

8 (c) The liquid usually used in the machine is made by processing oil from underground wells. A new development is to use plant oil as the liquid.

Extracting plant oil requires less energy than extracting oil from underground wells.

Suggest an environmental advantage of using plant oil.

[1 mark]

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Question 8 continues on the next page

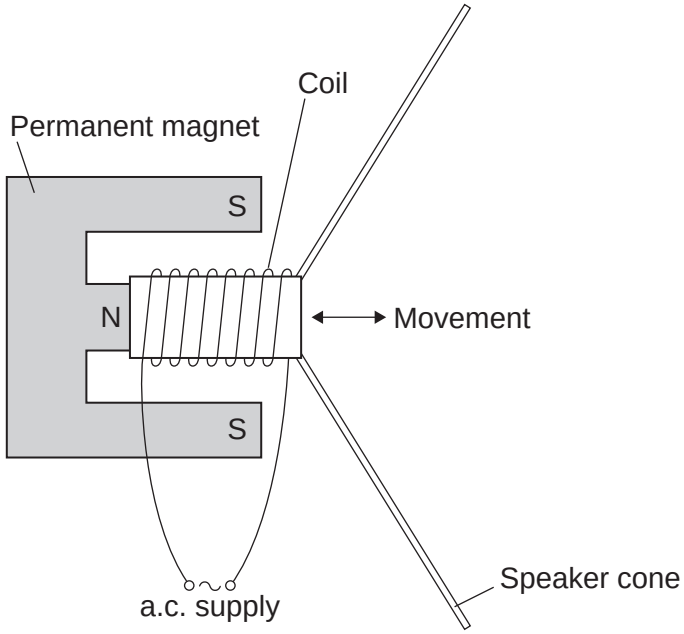
4.7.2.4 Loudspeakers (physics only) (HT only)

Question 01 · continued

8 (d) Musicians often use loudspeakers.

Figure 14 shows how a loudspeaker is constructed.

Figure 14



The loudspeaker cone vibrates when an alternating current flows through the coil.

Explain why.

[4 marks]

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8

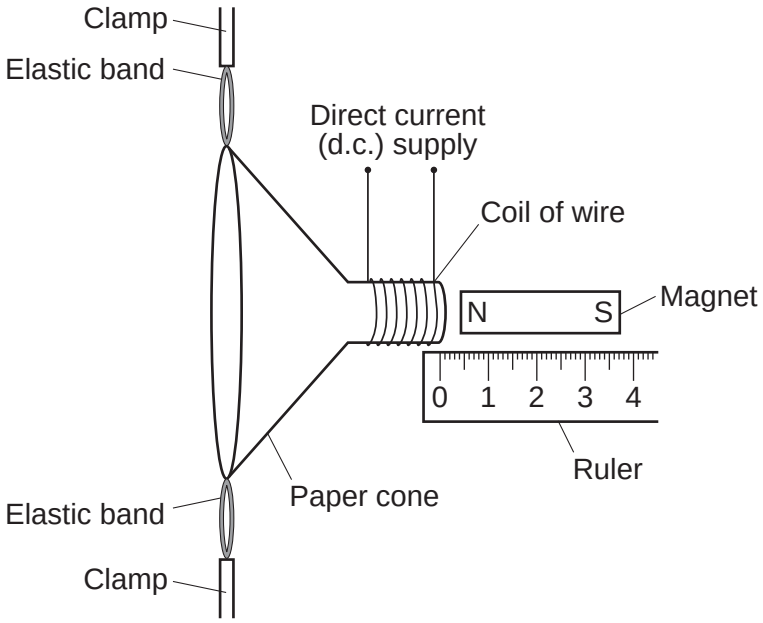
4.7.2.4 Loudspeakers (physics only) (HT only)

Question 02

June 2017 | PH3HP | Original Q1 | Legacy

1 **Figure 1** shows a loudspeaker made by a student. When there is a current in the coil the paper cone moves.

Figure 1



The student investigates how changing the size of the current in the coil of wire affects the distance moved by the paper cone.

1 (a) State **two** variables the student should control.

[2 marks]

1 _____

_____

2 _____

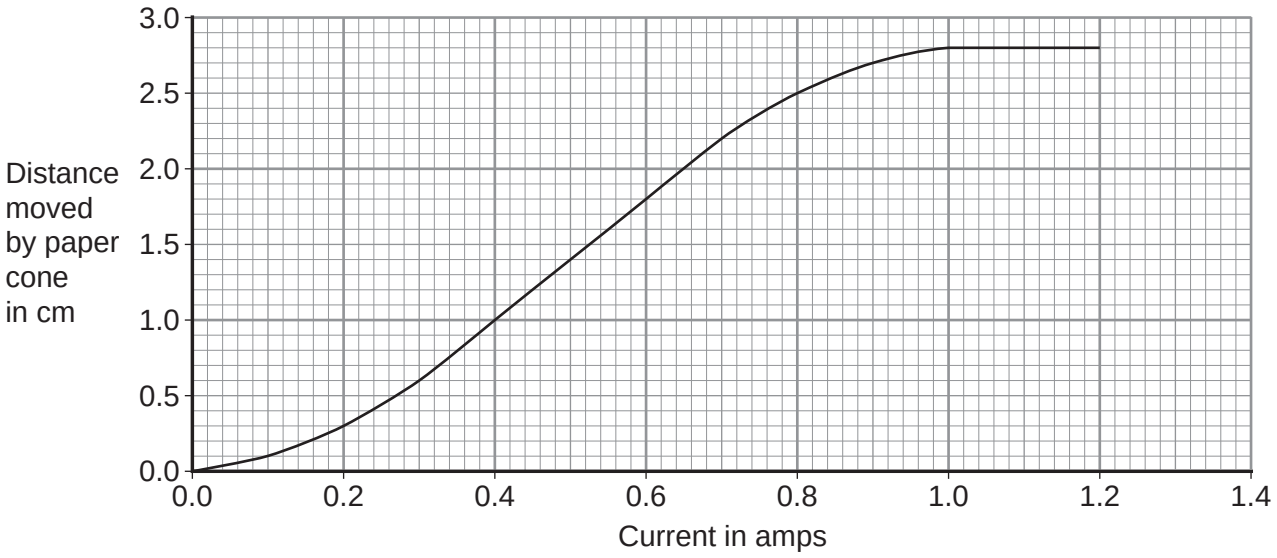
_____

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 02 · continued

1 (b) The results of the student's investigation are shown in **Figure 2**.

Figure 2



1 (b) (i) When the current increases from 0.5 A to 0.9 A, how much does the distance moved increase?

[2 marks]

Increase in distance moved = _____ cm

1 (b) (ii) State **two** conclusions that can be made from the graph.

[2 marks]

1 _____

_____

2 _____

_____

6

4.7.2.4 Loudspeakers (physics only) (HT only)

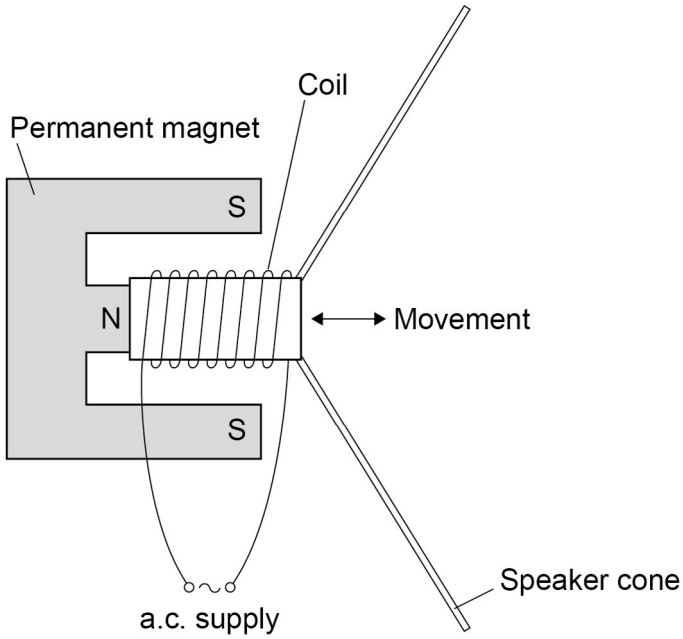
Question 03

November 2021 | 8463/2H | Original Q8

0 8 A student made a moving-coil loudspeaker.

Figure 15 shows a diagram of the loudspeaker.

Figure 15



0 8 . 1 What is the name of the effect used by the moving-coil loudspeaker to produce sound waves?

[1 mark]

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 03 · continued

0 8 . 2 Explain how a moving-coil loudspeaker produces a sound wave.

[4 marks]

Question 8 continues on the next page

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 03 · continued

0 8 . 3 A student investigated how the loudness of sound from the loudspeaker depends on:

- the number of turns on the coil
- the frequency of the supply.

Table 2 shows the results.

Table 2

Number of turns	Frequency of supply in Hz	Loudness of sound in arbitrary units
100	200	32
200	400	47
300	600	63

Explain why the results **cannot** be used to make a valid conclusion.

[2 marks]

7

4.7.2.4 Loudspeakers (physics only) (HT only)

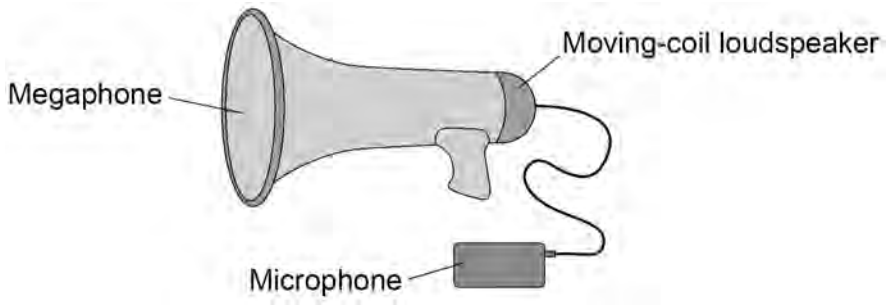
Question 04

June 2023 | 8463/2H | Original Q4

0 4 A megaphone uses a loudspeaker to amplify sounds that are detected by a microphone.

Figure 10 shows a megaphone and microphone.

Figure 10



0 4 . 1 Complete the sentence.

[1 mark]

The microphone is used to convert the pressure variations in sound waves into variations in _____ .

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 04 · continued

0 4 . 2 The loudspeaker contains a permanent magnet.

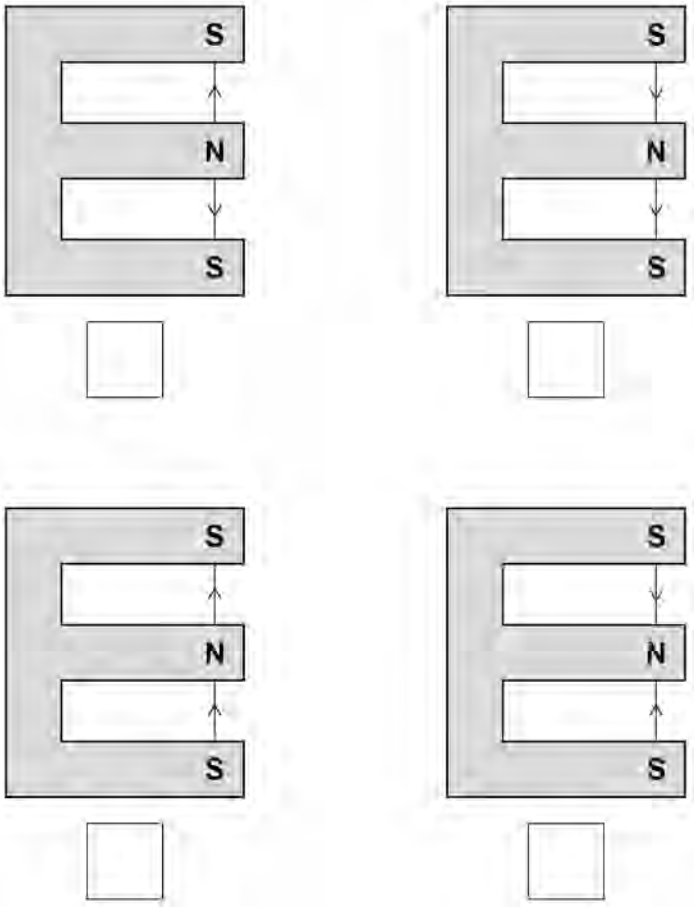
Which diagram in **Figure 11** shows the direction of the magnetic field between the north pole and the south pole of the magnet?

The magnets are shown in cross-section.

[1 mark]

Tick (✓) **one** box.

Figure 11



0 4 . 3 Some magnets are permanent magnets and some are induced magnets.

What is an induced magnet?

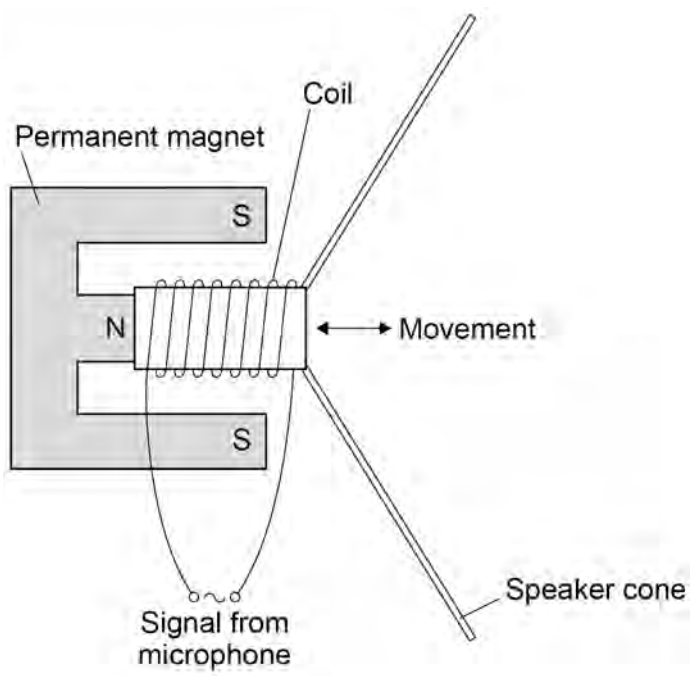
[1 mark]

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 04 · continued

Figure 12 shows the parts of the loudspeaker in the megaphone.

Figure 12



A current in the coil of the loudspeaker causes the coil to move.

0 4 . 4 What is the name of the effect that causes the coil to move?

[1 mark]

Tick (✓) **one** box.

- Electromagnet effect ☐
- Induction effect ☐
- Motor effect ☐
- Speaker effect ☐

4.7.2.4 Loudspeakers (physics only) (HT only)

Question 04 · continued

0 4 . 5 When the current in the coil is 16 mA, the force on the coil is 0.013 N.

The length of the wire that makes up the coil is 6.5 m.

Calculate the magnetic flux density around the coil in the electromagnet.

Use the Physics Equations Sheet.

[4 marks]

Magnetic flux density = _____ T

Question 4 continues on the next page

4.7.2.4 Loudspeakers (physics only) (HT only)

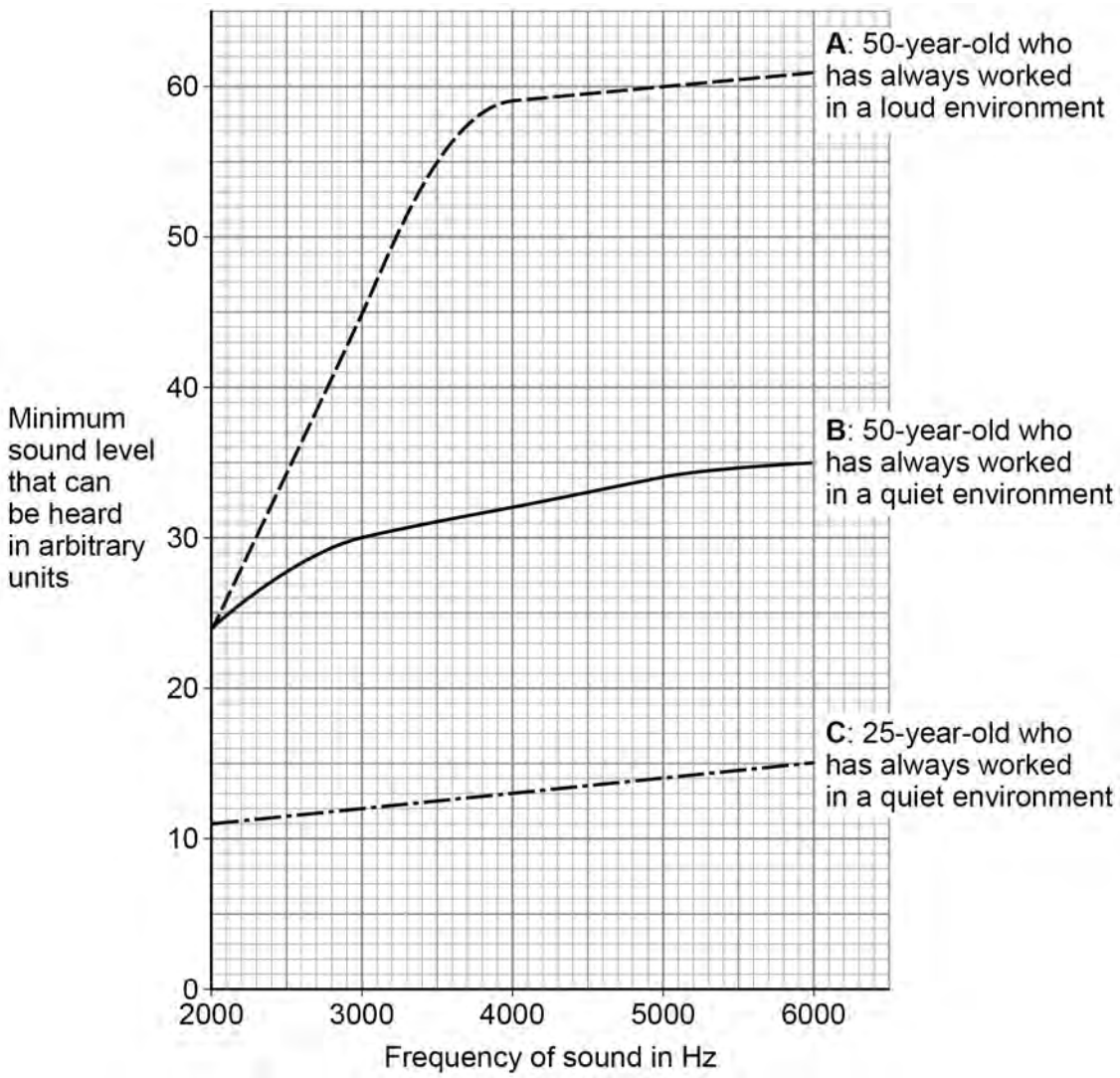
Question 04 · continued

0 4 . 6 Megaphones can produce very loud sounds.

A person's hearing can be affected by age and by working in a loud environment.

Figure 13 shows how frequency affects the minimum sound level that can be heard by three different people, **A**, **B** and **C**.

Figure 13



4.7.2.4 Loudspeakers (physics only) (HT only)

Question 04 · continued

Compare how different factors affect the minimum sound level that these people can hear.

[4 marks]

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