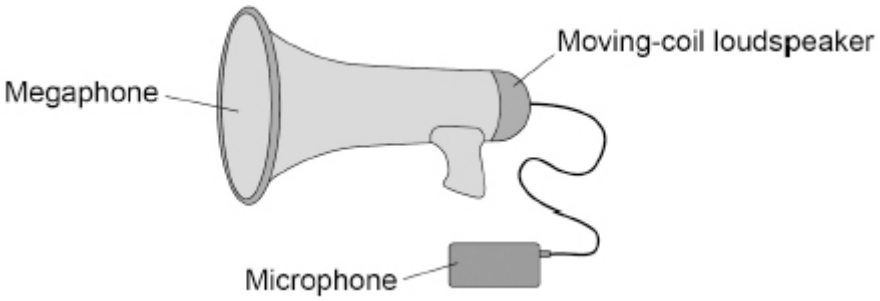
Questions are for both separate science and combined science students unless indicated in the question

Q1.

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

Figure 1 shows a megaphone and microphone.

Figure 1



(a) Complete the sentence. **(Physics only) (HT only)**

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

(1)

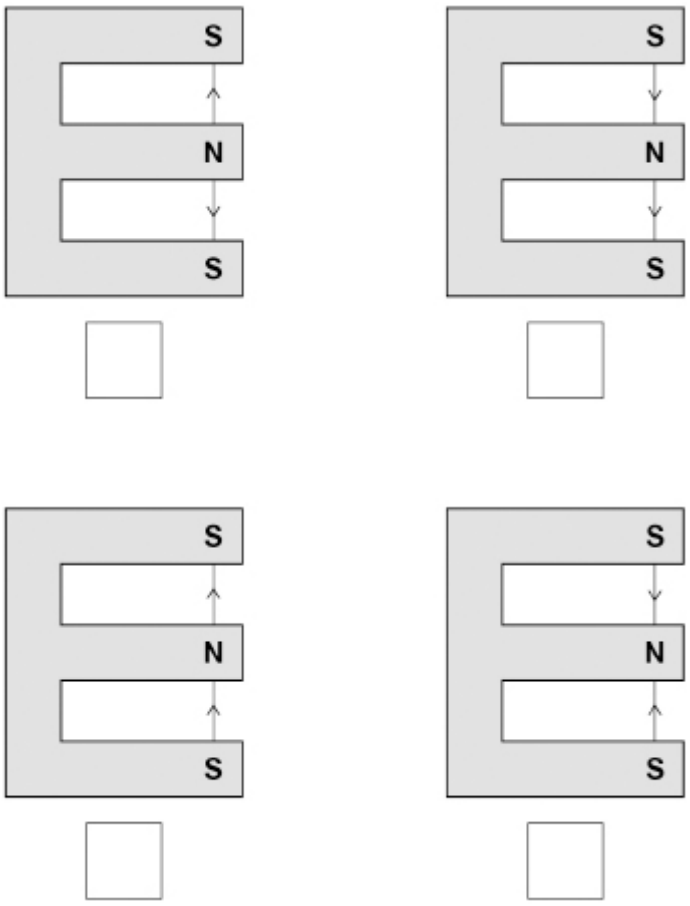
(b) The loudspeaker contains a permanent magnet.

Which diagram in **Figure 2** 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.

Tick (✓) **one** box.

Figure 2



(1)

(c) Some magnets are permanent magnets and some are induced magnets.

What is an induced magnet?

_____

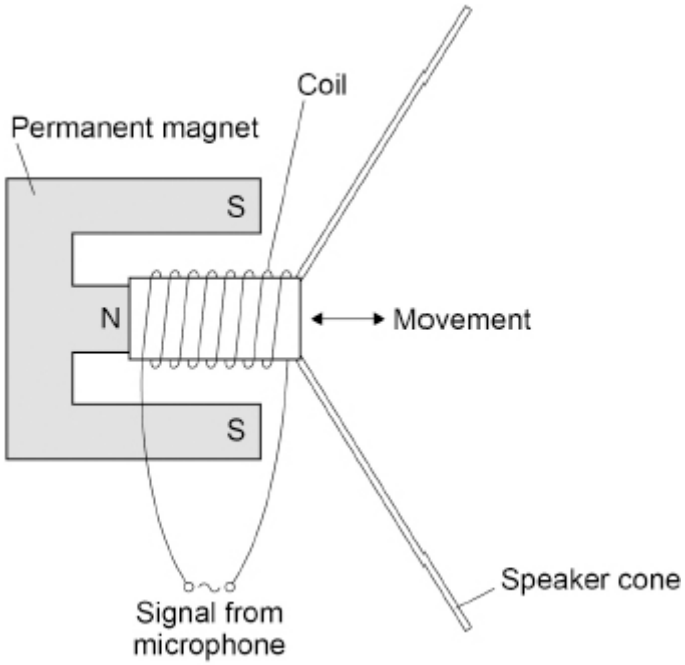
_____

_____

(1)

Figure 3 shows the parts of the loudspeaker in the megaphone.

Figure 3



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

(d) What is the name of the effect that causes the coil to move? **(HT only)**

Tick (✓) **one** box.

Electromagnet effect ☐

Induction effect ☐

Motor effect ☐

Speaker effect ☐

(1)

(e) 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. **(HT only)**

_____

_____

_____

_____

_____

_____

_____

Magnetic flux density = _____ T

(4)

(Total 8 marks)