AQA GCSE Physics | 8463

SPECIFICATION POINT 4.7.1.2

Magnetic fields

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**16**
Available paper years	**2006–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.7.1.2 Magnetic fields

Answer 01 · Mark scheme

November 2006 | PHY1B | Original Q5 | Legacy

Five	**A**	a distant galaxy	**3**
	B	a satellite	**1**
	C	the Earth	**2**
	D	the Universe	**4**

4.7.1.2 Magnetic fields

Answer 02 · Mark scheme

Question 2

question	answers	extra information	mark
2(a)	C → B (1st two boxes) D → A (end two boxes)	allow **1** mark for either linkage in any position	1 1
2(b)	any **two** from: • more powerful / stronger magnet • smaller gap between coil and magnet • coil with more turns / longer coil • coil with bigger area	do **not** accept just bigger magnet accept more coils do **not** accept just bigger coil do **not** accept just more wire do **not** accept shake faster do **not** accept shake for longer	2
2(c)(i)	the longer the torch is shaken, the longer the light lasts	accept the converse accept it is a (strong) positive (non-linear) relationship do **not** accept '.... are (directly) proportional ....'	1

Question 2 is continued on the next page . . .

4.7.1.2 Magnetic fields

Answer 02 · Mark scheme

PHY3H

Question 2

question	answers	extra information	mark
2(c) (ii)	any **two** from: • if this investigation is repeated the result would not be the same • rate / amplitude / angle of shaking could vary • personal judgement when the LED / light has 'gone out' • results / data / measurements have not been repeated / averaged		2
Total			**7**

4.7.1.2 Magnetic fields

Answer 02 · Mark scheme

June 2009 | PHY3H | Original Q2 | Legacy

PHY3H

4.7.1.2 Magnetic fields

Answer 03 · Mark scheme

June 2009 | PHY3H | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	any **two** from: • to (electrically) connect • stationary and moving parts • without tangling the wires	 accept to complete the circuit accept to allow a current / charge to flow	2
7(b)	current (induced) is reversed / changes in direction / alternates every half turn	accept (induced) p.d. <u>across</u> the coil do **not** accept p.d. <u>in</u> the coil	1 1
7(c)	by rotating / moving a magnetic field / magnet relative to a coil	accept by doing the converse / opposite	1
Total			**5**

4.7.1.2 Magnetic fields

Answer 04 · Mark scheme

June 2010 | PHY1BP | Original Q7 | Legacy

Seven	1	2	2	1

Answer 05 · Mark scheme

November 2010 | PHY1BP | Original Q8 | Legacy

Eight	**2**	**2**	**4**	**2**

4.7.1.2 Magnetic fields

Answer 06 · Mark scheme

Question 7

question	answers	extra information	mark
7(a)(i)	generator (effect)	accept 'induction'	1
7(a)(ii)	(metal) cable is (an electrical) conductor (which) cuts / moves through the (magnetic) field (lines) / lines of force	mention of heat conduction negates this mark	1 1
7(a)(iii)	conductor / cable is part of a (complete) circuit	'it' refers to conductor	1
7(b)	any **two** from: • shorter cable • reduced speed • different planet (in the Solar System) • increased distance (from planet) • weaker magnetic field	 accept smaller cable accept smaller planet do **not** accept bigger planet do **not** accept smaller magnetic field Jupiter has the strongest magnetic field is insufficient	2
Total			**6**

4.7.1.2 Magnetic fields

Answer 06 · Mark scheme January 2011 | PHY3H | Original Q7 | Legacy

PHY3H

Answer 07 · Mark scheme March 2011 | PHY1AP | Original Q8 | Legacy

Eight	**2**	**4**	**2**	**4**

Answer 08 · Mark scheme June 2011 | PHY1BP | Original Q6 | Legacy

Six	**1**	**4**	**4**	**3**

4.7.1.2 Magnetic fields

Answer 09 · Mark scheme

June 2016 | PH2HP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	2 protons and 2 neutrons	accept 2p and 2 n accept (the same as a) helium nucleus symbol is insufficient do not accept 2 protons and neutrons	1	AO1 2.5.2c
2(b)(i)	gamma rays		1	AO1 2.5.2e
2(b)(ii)	loses/gains (one or more) electron(s)		1	AO1 2.5.1d
2(c)	any **one** from: • wear protective clothing • work behind lead/concrete/glass shielding • limit time of exposure • use remote handling	accept wear mask/gloves wear goggles is insufficient wear protective equipment/gear is insufficient accept wear a film badge accept handle with (long) tongs accept maintain a safe distance accept avoid direct contact	1	AO2 2.5

Answer 09 · Mark scheme

June 2016 | PH2HP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(d)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 4 and apply a 'best-fit' approach to the marking.		6	AO1 2.5.2e 2.5.2f

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant information	There is a description of at least one type of radiation in terms of one or more properties.	There is a description of at least two types of radiation in terms of some properties **or** a full description of one type of radiation in terms of all three properties **or** the same property is described for all three radiations	There is a description of all three types of radiation in terms of at least two of their properties **or** a full description of two types of radiation in terms of all three properties.

examples of physics points made in the response	extra information
alpha particles • are least penetrating • are stopped by paper / card • have the shortest range • can travel (about) 5cm in air • are (slightly) deflected by a magnetic field • alpha particles are deflected in the opposite direction to beta particles by a magnetic field	
beta particles • (some are) stopped by (about) 2mm (or more) of aluminium/metal • can travel (about) 1 metre in air • are deflected by a magnetic field • beta particles are deflected in the opposite direction to alpha particles by a magnetic field	accept (some are) stopped by aluminium foil
gamma rays • are the most penetrating • are stopped by (about) 10cm of lead • have the longest range • can travel at least 1 km in air • are not deflected by a magnetic field	

Total			10

4.7.1.2 Magnetic fields

Answer 09 · Mark scheme

June 2016 | PH2HP | Original Q2 | Legacy



4.7.1.2 Magnetic fields

Answer 10 · Mark scheme

June 2018 | 8463/2H | Original Q10

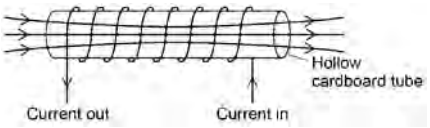
Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	at least three circles drawn clockwise arrows on circles	 allow **1** mark for one or two circles with clockwise arrows	1 1	AO1 4.7.2.1
10.2	4×10^{-6}		1	AO1 4.7.2.1
10.3	the sides of the coil (parallel to the magnet) experience a force (in opposite directions) the forces cause moments that act in the same (clockwise / anticlockwise) direction **or** the moments cause the coil to rotate (clockwise / anticlockwise) (each half-revolution) the two halves of the (rotating) commutator swap from one (carbon) brush to the other (each half-revolution) the commutator reverses the current (in the coil) **or** keeping the forces in the same direction (keeping the coil rotating)	allow the current creates a magnetic field ignore Fleming's Left Hand Rule allow the magnetic fields interact to create a pair of forces (acting in opposite directions) **or** allow the magnetic fields interact causing the coil to rotate allow keeps the current in the same direction relative to the (permanent) magnetic field	1 1 1 1	AO1 4.7.2.3
Total			**7**	

4.7.1.2 Magnetic fields

Answer 11 · Mark scheme

June 2019 | 8463/2H | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.1	field lines going in, (through) and out of the solenoid arrow(s) in correct direction	 allow field lines only visible outside the cardboard tube allow a bar magnet shaped field with lines above and below the solenoid	1 1	AO1/1 4.7.2.1
4.2	the rods become (induced) magnets with the same polarity (at each end)	allow the rods are (temporarily) magnetised ignore rods repel do not accept rods become charged	1 1	AO1/1 4.7.1.1
4.3	changed two (independent) variables (at the same time) so it is not possible to know the effect of one (independent) variable or the other	allow need to keep current or number of turns constant allow should only change one variable (at a time) allow current and number of turns both changed ignore fair test	1 1	AO3/1b 4.7.2.1 WS2.7
4.4	(increasing the current) increases the strength until the strength reaches a maximum value	allow weight (held) for strength of electromagnet ignore a given current value for when maximum strength happens	1	AO3/2b 4.7.2.1 WS3.5
4.5	increasing the number of turns from 10 to 20 increases the strength more than increasing from 20 to 30	a general trend is required	1	AO3/2b 4.7.2.1 WS3.5
Total			**8**	

4.7.1.2 Magnetic fields

Answer 12 · Mark scheme

November 2021 | 8463/2H | Original Q9

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	hold thumb first finger and second finger (of left hand) at right angles to each other	allow first two fingers/index and middle for first and second finger throughout	1	AO1
	second finger represents the current pointing out of the paper		1	AO1
	first finger represents the field pointing downwards		1	AO3
	thumb points in the direction of the force / thrust / acceleration		1	AO3
	(therefore) the rod moves left to right	allow correct description (eg away from the magnet) dependent on scoring marking point 3 or 4	1	AO3 4.7.2.2
09.2	decrease the resistance of the variable resistor	allow increase the current/pd	1	AO3 4.7.2.2
	use a stronger magnet	allow use a magnet with a greater flux density	1	

09.3	F = 0.30 × 1.7 × 0.050		1	AO2 4.5.6.2.2
	F = 0.0255 (N)		1	4.5.6.1.5 4.7.2.2
	m = 0.004(0 kg)		1	
	0.0255 = 0.0040 × a	this mark may be awarded if *m* is incorrectly / not converted and / or *F* is incorrectly calculated	1	
	a = 0.0255 / 0.0040 **or** a = 6.375	this mark may be awarded if *m* is incorrectly / not converted and / or *F* is incorrectly calculated	1	
	Δv = 6.375 × 0.15 = 0.95625 (m/s)	allow a correct calculation using an incorrectly / not converted *m* and / or an incorrectly calculated *F* allow 0.96 **or** 0.956 (m/s)	1	
	<u>alternative method</u> *F* = 0.30 × 1.7 × 0.050 (1) *F* = 0.0255 (N) (1) m = 0.004(0 kg) (1) 0.0255 = $\frac{0.0040 \times \Delta v}{0.15}$ (1) $\Delta v = \frac{0.0255 \times 0.15}{0.0040}$ (1) Δv = 0.95625 (m/s) (1)	this mark may be awarded if *m* is incorrectly / not converted and / or *F* is incorrectly calculated this mark may be awarded if *m* is incorrectly / not converted and / or *F* is incorrectly calculated allow a correct calculation using an incorrectly / not converted *m* and / or an incorrectly calculated *F* allow 0.96 **or** 0.956 (m/s)		

Total			**13**

Answer 13 · Mark scheme

June 2022 | 8463/2HR | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	**A** primary coil **and** **B** secondary coil		1	AO1 4.7.3.4
	C iron core		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	$\frac{230}{V_s} = \frac{200}{1200}$		1	AO2 4.7.3.4
	$V_s = \frac{1200 \times 230}{200}$		1	
	$V_s = 1380$ (V)		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	(the alternating current causes) a changing magnetic field around the primary (coil)		1	AO2 4.7.3.4
	creates magnetic field that changes direction in the core	allow creates a changing magnetic field in the core	1	
	this induces an alternating potential difference across the secondary (coil causing an alternating current)		1	

4.7.1.2 Magnetic fields

Answer 13 · Mark scheme

June 2022 | 8463/2HR | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	down		1	AO2 4.7.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	$B = 60 \times 10^{-6}$ (T)		1	AO2 4.7.2.2
	$0.045 = 60 \times 10^{-6} \times 50 \times l$	allow correct substitution of incorrectly / not converted value of B	1	
	$l = \dfrac{0.045}{60 \times 10^{-6} \times 50}$	allow correct rearrangement using an incorrectly / not converted value of B	1	
	$l = 15$ (m)	allow a correct calculation using an incorrectly / not converted value of B	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.6	the wire / force is at right angles to the magnetic field	allow the current is constant allow the cable is straight allow the field is uniform allow the force is constant	1	AO3 4.7.2.2

Total Question 7		**14**

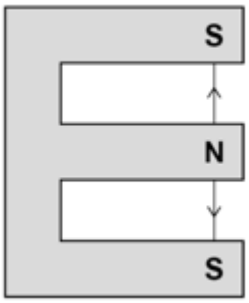
4.7.1.2 Magnetic fields

Answer 14 · Mark scheme

June 2023 | 8463/2H | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	current **or** potential difference	allow charge flow	1	AO1 4.7.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2			1	AO1 4.7.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	an induced magnet is a material that becomes a magnet when it is placed in a magnetic field **or** an induced magnet loses most / all of its magnetism (quickly) when removed from a magnetic field	allow 'when close to another magnet' for 'when it is placed in a magnetic field' allow 'no magnets are nearby' for 'removed from a magnetic field' 'temporary magnet' alone is insufficient	1	AO1 4.7.1.1

4.7.1.2 Magnetic fields

Answer 14 · Mark scheme

June 2023 | 8463/2H | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	motor effect		1	AO1 4.7.2.2 4.7.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	16 mA = 0.016 A	allow 1.6×10^{-2} (A)	1	AO2 4.7.2.2
	$0.013 = B \times 0.016 \times 6.5$	allow correct substitution using incorrectly / not converted current	1	
	$B = \frac{0.013}{0.016 \times 6.5}$	allow correct re-arrangement using incorrectly / not converted current	1	
	$B = 0.125$ (T)	allow correct calculation using incorrectly / not converted current allow 0.13 (T)	1	

Question	Answers	Mark	AO / Spec. Ref.
04.6	**Level 2**: Scientifically relevant features are identified; the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.	3-4	AO3 4.6.1.4
	Level 1: Relevant features are identified and differences noted.	1-2	
	No relevant content	0	
	Indicative content: • for all three people, the minimum sound level that can be heard increases as frequency increases **Age** • the minimum sound level that can be heard increases with age • between 2000 and 3000 Hz the minimum sound level that can be heard increases more in **B** compared to **C** • **C** has very little variation in the minimum sound level that can be heard at all frequencies **Working in a loud environment:** • increases the minimum sound level that can be heard at all frequencies above 2000 Hz compared to working in a quiet environment • the minimum sound level that can be heard increases more as frequency increases from 2000 to 4000 Hz compared to working in a quiet environment • doesn't affect the minimum sound level that can be heard at 2000 Hz to access **level 2** the answer must include at least **one** comparison for age **and one** comparison for working in a loud environment, using supporting data/information from the graph		

Total Question 4	**12**

Answer 15 · Mark scheme

June 2024 | 8463/2H | Original Q8

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	generator (effect)	allow electromagnetic induction	1	AO1 4.7.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.2	wire cuts through the magnetic field (between the magnets) a potential difference was <u>induced</u> (across the wire) as it was part of <u>complete circuit</u> (there was a current in the circuit)		1 1 1	AO1 4.7.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.3	the needle will deflect to –0.4 mA		1	AO3 4.7.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.4	(the pressure variations in) the sound (waves) cause the diaphragm to vibrate the diaphragm causes the coil / wire to vibrate (the coil repeatedly changes direction) <u>inducing</u> an alternating current (in the circuit)	allow air particles collide with diaphragm causing it to vibrate diaphragm moves is insufficient do not accept moves the diaphragm up and down do not accept moves the coil / wire up and down if MP1 and MP2 do not score, allow sound (waves) cause the coil / wire to vibrate for **1** mark	1 1 1	AO1 4.7.3.3

4.7.1.2 Magnetic fields

Answer 15 · Mark scheme June 2024 | 8463/2H | Original Q8

Total Question 8	**8**

4.7.1.2 Magnetic fields

Answer 16 · Mark scheme

June 2025 | 8463/2H | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	B		1	AO3 4.7.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	$F = 0.30 \times 2.0 \times 0.070$		1	AO2 4.7.2.2
	$F = 0.042$ (N)	the equation $F = BIl$ must have been used to score subsequent marks	1	
	$0.042 = 0.005 \times a$	subsequent marks may be awarded if an incorrectly / not converted mass is used	1	
	$a = \frac{0.042}{0.005}$		1	
	$a = 8.4$ (m/s^2)		1	

4.7.1.2 Magnetic fields

Answer 16 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	(the interaction of) the magnetic fields produce forces on the sides of the coil (AB and CD)	do **not** accept answers describing a generator	1	AO1 4.7.2.3
	AB and CD move in opposite directions		1	
	(each half-revolution) the ends of the coil swap from one contact to the other	*allow 'split ring commutator' for ends of the coil'*	1	
	(so) current in each side of the coil is reversed, so the forces on each side of the coil are reversed		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	there is no current in the wire		1	AO1
	(so) there is no (magnetic) force acting (therefore there is no moment)	MP2 is dependent on MP1	1	AO3 4.5.1.4 4.7.2.3

Total Question 7	12

4.7.1.2 Magnetic fields

Answer 10 · Examiner comments

June 2018 | 8463/2H | Original Q10

Question 10 (Standard/high and High demand)

10.1 Many diagrams looked like the field around a bar magnet or solenoid. Shapes similar to the electric field around a point charge were also drawn.

10.2 About half of students knew the value equivalent to 4 microtesla.

10.3 Very few students gave a coherent, detailed answer to this question. Most concentrated on what made the coil move, although ideas were not always expressed with clarity. It was unusual to see an answer that considered moments. The action of the commutator was not understood well and its function was often not mentioned. Some students appreciated that current direction needed to be reversed but thought an alternating current was the solution. There were significant numbers of students unsure whether the question was about an electric motor or a generator. Many answers made reference to induced currents in the coil and the coil cutting field lines to induce a potential difference.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.7.1.2 Magnetic fields

Answer 11 · Examiner comments

June 2019 | 8463/2H | Original Q4

Question 4 (Standard and standard/high demand)

04.1 Just over 11% of the students did not attempt this question. The majority of field patterns drawn showed a lack of precision. Lines joining and crossing at the ends were common. Most patterns that scored the first mark point were a bar magnet type field pattern. Confusion of arrow direction was very common with arrows going into and out of an end. Some students did not appear to understand the term 'solenoid'.

04.2 This question was not well understood. About half of the students understood that the rods became induced magnets but often then just wrote that they repelled with no mention of the idea of same polarity/like poles. Very few answers were really clear about like poles being on adjacent ends. Incorrect ideas that were common included that the rods were charged, with phrases such as 'charged with magnetism' used, as was the idea that they were attracted to the sides of the solenoid or were repelled apart when the current was switched off. Some students stated that a current was in the rods or that closing the switch meant that current was stopped and the solenoid was no longer magnetised.

04.3 Many of the students did recognise that two variables had been changed at the same time. Only around 18% of the students scored the second mark.

04.4 About half of the students scored this mark. Those that did not score often failed to mention that the strength reached a maximum value.

04.5 Nearly three quarters of the students scored this mark, recognising that the increase in strength from 10-20 turns was higher than the increase from 20-30. Some that did not score the mark simply quoted numbers from the graph but did not use them in any comparative way to show a general trend as they were for a specific point. Others that did not score the mark usually gave a description of the shapes and/or gradients of the three graphs with no comparison of the increase in strength.

Answer 12 · Examiner comments

November 2021 | 8463/2H | Original Q9

Question 9

Whilst many of the students could quote Fleming's Left Hand rule, few were able to apply it in order to explain how to predict the direction of the copper rod given in Figure 16. In part **09.2** an answer 'bigger magnet' is not necessarily the same as a 'stronger magnet' and neither is 'changing the current' necessarily the same as 'increasing the current'. In part **09.3** whilst there were few answers scoring all six marks many of the students gained partial credit by showing their working out clearly. A very common error was not to convert 4 g to kg.

Concluding Remarks

The paper presented to the students was broadly similar to that seen in previous series. Many of the errors made by the students were similar to those seen in previous series.

The failure to be able to accurately present information requiring recall from the specification (AO1), for example understanding the term 'elastically deformed' or describing the difference between a transverse wave and a longitudinal wave was commonly seen. Incorrect recall of equations stopped many students from scoring marks in calculations. Students often seemed to be unsure what the command word in a question meant. For example being asked to 'Explain' an application of Fleming's Left Hand rule is not the same as 'Describe'.

Areas of the specification that were particularly poorly answered were sections 4.7 (Magnetism and Electromagnetism), 4.8 (Space physics) and 4.6.2.5 (Lenses). Vector diagrams did not appear to be well understood.

Many of the students now understand the importance of showing clear working out when completing a calculation. This is crucial in the more complex calculations.

Similar to previous series a significant number of the students were unable to read values from graphs accurately and failed to realise when numerical values were not given in standard SI units.

4.7.1.2 Magnetic fields

Answer 12 · Examiner comments

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.7.1.2 Magnetic fields

Answer 14 · Examiner comments — June 2023 | 8463/2H | Original Q4

04.1

31% of students gained this mark. Many students responded with a selection of random Physics terms.

04.2

74% of students recognised the direction of the magnetic field.

Answer 14 · Examiner comments — June 2023 | 8463/2H | Original Q4

04.3

51% of students knew what an induced magnet is. Responses sometimes confused magnets and magnetic materials. Most correct answers were to do with placing a material into a field to become a magnet, compared with removing the material from the field.

04.4

88% of students knew that it is the motor effect that causes the coil to move..

04.5

46% of students scored all 4 marks for this calculation. There were a wide variety of incorrect conversions of mA, which gained 3 out of the 4 marks.

04.6

Most students were able to make generic statements about how age and environment affect hearing. 35% of students were able to use the data in the graph to support their statements. Some responses just gave information about person A, B and C, without any comparisons. Students did not use the patterns in the graph to back up conclusions. There was some confusion over sensitivity, and a number tried to explain the variables to the extent that the response became incorrect. Examples of this included saying that a higher minimum sound level shows better hearing.
A proportion of the responses mentioned ideas about being "used to a loud sound" so "could hear loud sounds better" and younger people not having had the experience of a full range of frequencies due to their age. Alternatively, the idea that being in a quiet environment means you can only hear quiet sounds was another misunderstanding which was often seen.

4.7.1.2 Magnetic fields

Answer 15 · Examiner comments June 2024 | 8463/2H | Original Q8

08.1
Just under 50% of students were able to identify this as the generator effect. Common errors were ‘motor effect’ or ‘motor and generator effect’.

08.2
Well answered for a normally difficult topic about the generator effect. 8% of students scored all 3 marks and 37% gained at least 1 mark. Many failed to explain that the wire was cutting the magnetic field lines or thought there was already a current in the wire.

08.3
80% of students were able to work out which way the ammeter needle would deflect.

08.4
The students' understanding of the operation of a microphone was often good, although some did describe the operation of a speaker. Knowledge of the term 'inducing' was widespread although many students failed to appreciate that an alternating current was induced in the circuit. Some students did not appreciate the longitudinal nature of sound waves and described oscillations in the wrong direction as a result. Most students attempted this item, although a thorough knowledge and understanding of the principles was not always evident in their answers. Only 4% achieved full marks, but 49% scored at least one mark.

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4.7.1.2 Magnetic fields

Answer 15 · Examiner comments

Mark Ranges and Award of Grades

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4.7.1.2 Magnetic fields

Answer 16 · Examiner comments June 2025 | 8463/2H | Original Q7

7.1

Just over 60% of the students were able to use Flemings Left Hand rule to work out which direction the copper rod would accelerate.

7.2

Just over half of the students scored all the marks on this multi-step calculation of acceleration. Those students not scoring full marks often failed to convert the mass correctly or did not rearrange the equation F=ma correctly.

7.3

This motor question was targeted at the most able students and proved very challenging. Only about one third of the students scored any marks at all. Only a very few of the students scored four marks. Most of the students who scored any marks were most likely to gain the 2nd and/or 3rd mark points. A significant number of the students confused motors with generators.

7.4

Another poorly answered high demand question. Many answers were to do with the coil being parallel to the field and there being no force. The majority of the students had missed that there would be no current flowing at that point due to the position of the coil. If this marking point was scored, responses usually continued to the idea of there being no forces acting. The 2nd mark point was dependent on the students scoring the 1st mark point.