AQA GCSE Physics | 8463

SPECIFICATION POINT 4.7.2.2

Fleming's left-hand rule (HT only)

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**3**
Available paper years	**2011–2025**

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.

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 01 · Mark scheme

November 2011 | PHY1AP | Original Q9 | Legacy

Nine	**3**	**3**	**3**	**2**

The AQA UMS Conversion Calculator can be found at the following web address:

http://www.aqa.org.uk/umsconversion

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 02 · 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	

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 02 · Mark scheme

November 2021 | 8463/2H | Original Q9

09.3	F = 0.30 × 1.7 × 0.050 F = 0.0255 (N) m = 0.004(0 kg) 0.0255 = 0.0040 × a a = 0.0255 / 0.0040 **or** a = 6.375 Δv = 6.375 × 0.15 = 0.95625 (m/s) <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) 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)	1 1 1 1 1 1	AO2 4.5.6.2.2 4.5.6.1.5 4.7.2.2
Total			**13**	

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 03 · 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	

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 03 · 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

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 02 · 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.

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 02 · 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.

4.7.2.2 Fleming's left-hand rule (HT only)

Answer 03 · 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.