

MARK SCHEME

GCSE

PHYSICS

AQA - COMBINED SCIENCE

P7 - TEST 6

MAGNETISM AND ELECTROMAGNETISM

Advanced

Mark schemes

- 1.** (a) north (pole)
accept N

north (pole)
both needed for mark 1
- (b) reverses
accept changes direction 1
- (c) (i) first finger:
(direction of) (magnetic) field 1

second finger:
(direction of) (conventional) current 1
- (ii) into (plane of the) paper 1
- (iii) less current in wire
accept less current / voltage / more resistance / thinner wire 1

weaker field
allow weaker magnets / magnets further apart
*do **not** accept smaller magnets* 1

rotation of magnets (so) field is no longer perpendicular to wire 1
- (d) (i) reverse one of the magnets
*do **not** accept there are no numbers on the scale* 1
- (ii) systematic or zero error
accept all current values will be too big
accept it does not return to zero
accept it does not start at zero 1
- [10]**

2.	<p>(a) (i) (closing the switch makes) a current (through the wire)</p> <p>(the current flowing) creates a magnetic field (around the wire)</p> <p>this field interacts with the permanent magnetic field <i>accept links / crosses attracts / repels is insufficient</i></p> <p>(ii) arrow drawn showing upwards force on XY <i>judge vertical by eye the arrow must be on or close to the wire XY</i></p> <p>(iii) motor <i>accept catapult</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>
	<p>(b) (i) the wire moves up and down or the wire vibrates <i>back and forth or side to side is insufficient for vibrate</i></p> <p>(ii) the force (continually) changes direction (from upwards to downwards, on the wire) <i>accept the direction of the magnetic field (of the wire) changes</i></p>	<p>1</p> <p>1</p>
[7]		
3.	<p>(a) thumb, index finger and third finger are held mutually at right angles</p> <p>index finger shows the direction of the magnetic field from North to South, third finger shows the direction of the current from positive to negative terminal</p> <p>the thumb then shows the direction of the force acting on the copper rod</p> <p>so the copper rod will move upwards</p> <p>(b) any one from:</p> <p>use a stronger magnet</p> <p>increase the magnetic flux density</p> <p>increase the length of the copper rod in the magnetic field</p> <p>coil the copper rod</p> <p>(c) $W = 9.8 \times 4 \times 10^{-4} = 3.92 \times 10^{-3}$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

conversion of the length 7cm to 0.07m

1

$$3.92 \times 10^{-3} = B \times 1.12 \times 0.07$$

1

$$B = 3.92 \times 10^{-3} / 0.0784$$

1

$$B = 0.05 \text{ (T)}$$

1

allow 0.05 (T) without working shown for the 5 calculation marks

[10]