

# MARK SCHEME

# GCSE

## PHYSICS

## AQA - TRIPLE SCIENCE

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P7 - TEST 1  
MAGNETISM  
Beginner

## Mark schemes

- 1.** (a) induced 1
- (b) bar 2 1
- (the same end) of bar 1 attracts both ends of bar 2
- or**
- only two magnets can repel so cannot be bar 1 or bar 3 1
- (c) so the results for each magnet can be compared
- or**
- so there is only one independent variable
- fair test is insufficient*
- allow different thickness of paper would affect number of sheets each magnet could hold*
- accept it is a control variable* 1
- (d) because the magnet with the biggest area was not the strongest
- accept any correct reason that confirms the hypothesis is wrong eg smallest magnet holds more sheets than the largest* 1
- [5]**
- 2.** (a) field
- correct order only* 1
- current 1
- force
- accept motion*
- accept thrust* 1

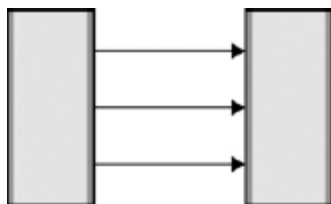
- (b) (i) arrow pointing vertically downwards 1
- (ii) increase current / p.d. 1  
*accept voltage for p.d.*
- increase strength of magnetic field 1  
*accept move poles closer together*
- (iii) reverse (poles of) magnets 1
- reverse battery / current 1
- (c) (i) 1.5 or 150% 2  
 $efficiency = 120 / 80 (\times 100)$   
*gains 1 mark*  
*an answer of 1.5 % or 150*  
*gains 1 mark*
- (ii) efficiency greater than 100% 1  
**or**  
 output is greater than input  
**or**  
 output should be 40 (W)
- (iii) recorded time much shorter than actual time 1  
*accept timer started too late*  
*accept timer stopped too soon*

[12]

3.

- (a) (i) field pattern shows:  
 some straight lines in the gap 1

direction N to S



- (ii) north poles repel 1

	(so) box will not close	1
(b)	(i) as paper increases (rapid) decrease in force needed	1
	force levels off (after 50 sheets)	1
	(ii) the newtonmeter will show the weight of the top magnet	1
	(iii) (top) magnet and newtonmeter separate before magnets separate <i>accept reverse argument</i>	1
	(because) force between magnets is greater than force between magnet and hook of newtonmeter	1
(iv)	any <b>three</b> from:	
	<ul style="list-style-type: none"> <li>• means of reading value of force at instant the magnets are pulled apart</li> <li>• increase the pulling force gently</li> </ul> <p style="text-align: center;"><b>or</b></p> <ul style="list-style-type: none"> <li>• use a mechanical device to apply the pulling force</li> <li>• clamp the bottom magnet</li> <li>• use smaller sheets of paper</li> <li>• fewer sheets of papers between readings (smaller intervals)</li> <li>• ensure magnets remain vertical</li> <li>• ensure ends of magnet completely overlap</li> <li>• repeat the procedure several times for each number of sheets and take a mean</li> <li>• make sure all sheets of paper are the same thickness</li> </ul>	3
(v)	3 (mm)	
	<i>30 × 0.1 ecf gains 2 marks</i>	
	<i>2.1 N corresponds to 30 sheets gains 1 mark</i>	3
		<b>[15]</b>
<b>4.</b>	(a) iron	
	<i>correct positions only</i>	1
	primary	1
	secondary	1

- (b) (it) decreases the p.d.  
*accept it would increase current*  
*accept voltage for p.d.*  
*the voltage goes from 230(V) to 20(V) is insufficient*  
*do **not** accept decreases current / energy / power*  
*do **not** accept decreases p.d. / voltage and current*

1

- (c) an environmental

1

[5]

5.

- (a) a force

1

- (b) any **two** from:

- more powerful magnet  
*do **not** allow 'bigger magnet'*
- reduce the gap (between magnet and coil)
- increase the area of the coil
- more powerful cell  
*do **not** allow 'bigger cell'*  
*accept battery for cell*  
*accept add a cell*  
*accept increase current / potential difference*
- more turns (on the coil)  
*allow 'more coils on the coil'*  
*do **not** allow 'bigger coil'*

2

- (c) reverse the (polarity) of the cell  
*allow 'turn the cell the other way round'*  
*accept battery for cell*

1

- reverse the (polarity) of the magnet  
*allow 'turn the magnet the other way up'*

1

[5]

6.

- (a) *there is a magnetic field (around the magnet)*

1

- (this magnetic field) changes / moves*

1

and cuts through coil  
accept links with coil

1

so a p.d. induced across coil

1

the coil forms a complete circuit

1

so a current (*is* induced)

1

(b) ammeter reading does not change

*must be in this order*

*accept ammeter has a small reading / shows a current*

1

zero

1

greater than before

*accept a large(r) reading*

1

same as originally but in the opposite direction

*accept a small reading in the opposite direction*

1

(c) 0.30

*allow 1 mark for correct substitution, ie  $0.05 = Q / 6$*

2

*C / coulomb*

*allow A s*

1

**[13]**

**7.**

(a) (i) Iron

1

(ii) 50

*ignore references to current*

*reason only scores if 50 chosen*

1

there are more turns on the secondary coil (than the primary coil)

*accept it is a step-up transformer*

*not more coils*

1

(b) (i) 200

1

(ii) any **one** from:

- Lighter
- smaller
- use very little power / current (when switched on with no load / phone attached).

*accept more efficient*

*do not accept uses no power / current*

*a disadvantage of a traditional transformer is insufficient on its own*

1

**[5]**