

The Motor Effect

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.7 Magnetism and Electromagnetism
Sub-Topic	The Motor Effect
Difficulty Level	Silver Level
Booklet	Mark Scheme

Time Allowed: 32 minutes

Score: /32

Percentage: /100

Grade Boundaries:

- M1.** (a) (i) an electric motor 1
- (ii) 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

M2.	(a) (i) an electrical conductor	1
	(ii) increase current <i>accept increase p.d. / voltage</i> or use stronger magnets <i>accept move magnets closer</i> <i>do not accept use larger magnets</i>	1
	(iii) reverse the poles / ends (of the magnet) <i>either order</i>	1
	reverse the connections (to the power supply)	1
	(b) (i) environmental	1
	(ii) ethical <i>allow political (instability)</i> <i>allow economic (migration)</i>	1
		[6]

M3.	(a) electric drill, electric fan, electric food mixer and electric screwdriver <i>all four ticked and no others (2)</i> either all four of these ticked and only one other (1) or any three of these ticked and none/one/two of the others
------------	---

(1)

2

- (b) (i) reverse (the direction of the) current (1)
or reverse the connections (to the battery)

reverse (the direction of the) magnetic field (1)
or reverse the (magnetic) poles /ends
do not credit 'swap the magnets (around)'

2

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

- increase the strength of the magnet(s)/(magnetic) field
do not credit 'use a bigger magnet'
- increase the current
allow 'increase the voltage/p.d.'
allow add cells/batteries
allow increase the (electrical) energy
allow increase the power supply
allow 'decrease the resistance'
allow 'increase charge'
allow 'increase the electricity'
do not credit 'use a bigger battery'
- reduce the gap (between coil/armature and poles/magnets)
allow increase the (number of) coils
- increase the turns (on the coil/armature)
do not credit 'use a bigger coil'

2

[6]

- M4.** (a) increase the current (1)
credit increase the p.d./voltage
credit reduce the resistance
credit have thicker wiring

credit add extra / more cells

1

increase the magnetic field (strength) (1)

credit 'have stronger magnet(s)

*do **not** credit 'bigger magnets' either order*

1

(b) **either** reverse polarity

or connect the battery the other way round

1

either reverse direction of the magnetic field

or put the magnet the other way round / reverse the magnet

*do **not** give any credit to a response in which both are done at the same time*

either order

1

(c) **either**

conductor parallel to the magnetic field

or lines of magnetic force and path of electricity do not cross

1

[5]

M5. (a) (i) it moves or experiences a force horizontally to the right
for 1 mark

1

(ii) A – moves in opposite direction or force reversed e.c.f.
B – faster movement or larger force
(**not** move further)

for 1 mark each

2

- (b) turns clockwise
oscillates/reverses
comes to rest facing field/at 90° to field/vertically
for 1 mark each

3

- (c) number of turns or linear number density of turns current core
for 1 mark each

3

[9]