

Name of the Student: \_\_\_\_\_

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

**Q1.**

(a) inertia 1

(b)  1

(c) increase the current 1  
*allow use a stronger magnet*

so that the (resultant) force increases 1

(d) bring the (same end of the) iron bar close to each pole / end of the permanent magnet 1  
*allow bring each end of the iron bar to the same pole of the magnet*

any repulsion shows the iron bar is a permanent magnet

**or**

if one end of the iron bar is attracted to both poles it is not a permanent magnet 1

(e) the compass (needle always) points in the same direction 1  
*allow the compass (needle always) points north*

because it aligns itself with the Earth's magnetic field 1  
*dependent on MP1*

**[8]**

**Q2.**

(a) there is a magnetic field due to the (permanent) magnets 1

and the current in the wire produces a magnetic field 1

(b) use (Fleming's) left hand rule 1  
*allow place first two fingers and thumb of left hand at right angles to each other*

place first finger in direction of the field lines **and** place second finger in direction of current

1

then thumb will show direction of the force

*allow thumb points downwards*

*allow force is downwards*

1

(c) any **one** from:

- more turns of the wire on the coil
- increase the current in the coil

*allow use a cell with a greater potential difference*

- stronger magnet

*allow move the coil closer to the magnet*

*ignore bigger magnet*

1

this will increase the force on the coil (due to the motor effect)

1

[7]

### Q3.

(a) the downward force on the balance increased

*allow when there is a current in the wire there is a magnetic field around the wire (which causes a magnetic force)*

1

therefore the wire must experience an equal and opposite force (which is upwards)

1

(b) calculate the difference between the two mass readings

*allow  $254.8 - 252.3 = 2.5$*

1

convert to kg **and** multiply by gravitational field strength

*allow  $(2.5 / 1000) \times 9.8 = 0.02375 \text{ (N)}$*

1

(c) gradient =  $\frac{(0.0210 - 0.0)}{(0.70 - 0.02)}$

1

gradient = 0.031

*allow answer correctly given to any number of significant figures*

1

$0.031 = B \times 0.125$

*allow correct substitution using correctly calculated value given to any number of significant figures*

1

$B = 0.25 \text{ T}$

*allow answer correctly given to any number of significant*

*figures*

*any rounding must be correct for subsequent marks to be awarded.*

*max **2** marks if a pair of readings from the graph are used instead of gradient calculation*

1

[8]