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Magnetism and Electromagnets

Mark Scheme

GCSE

SINGLE SCIENCE PHYSICS

END OF TOPIC TEST

AQA Physics

Q1a	Iron	1
	Cobalt	1
	Nickel	1
	Steel	1
	All 4 correct – 3 marks 3 correct – 2 marks 2 correct – 1 mark	
Q1b	non-contact force.	1
Q1d	Iron filings	1
	Plotting compass	1
Q1e	Correctly draw magnetic field	1
	Arrows show direction N to S	1
	Stronger field closer to magnet (lines closer)	1
Q1f	Magnet wrong way	1
	South should point towards magnetic North Pole	1
Q2a	Permanent – produce own magnetic fields and always have N and S poles.	1
	Induced – Becomes magnetic when placed in a magnetic field.	1
Q2b	Correctly drawn circular magnetic field around wire	1
	Direction shown - clockwise	1
Q2c	Reverse the direction of the magnetic field	1
Q2d	Any of the following for one mark. Maximum of two marks.	

- Larger current 1
- Coils closer together 1
- Use an iron core in the middle. 1

Q2e As the number coils increases the number of paper clips increase 1
Include supporting data from table to back up conclusion. 1

Q2f Check for anomalies 1
Confirm pattern/trend 1
As long as have same variables 1

Q3a Lines drawn between magnets to show flux 1
Direction correct N to S 1
Lines closer for set 1 1
Lines further apart for set 2 1

Q3b Tesla 1

Q3c F = BIl 1
Force = magnetic flux density x current x length

Q3d L = 0.15m 1
0.3 x 3.0 x 0.15 1
= 0.135 1
N 1

Q4a Caused by the interaction of two magnetic fields 1
One from the permanent magnets and one from the current passing through the wire 1

Q4b Any of the following for one mark.
Maximum of two marks

- Increase the magnetic flux density 1
- Increase the current 1
- Increase the length of the foil (between the magnets) 1

Q4c Flemings left hand rule – diagram to show position of hand/fingers 1
Thumb – point in the direction of the motion 1
First finger – held in direction of field 1
Second finger – held in direction of current 1

Q5 Any of the following for one mark.
Maximum of six marks.

- Uses Direct current (DC) 1
- Current flows and causes a force to be experienced 1
- On one side the force is upwards 1
- On other side the force is downwards 1
- Caused by the Split-ring commutator 1
- Rotates with coil 1

- Causes the direction of the current to be reversed 1
- Diagrams to show forces/motions 1

Q6 Any of the following for one mark each.
Maximum of 5 marks awarded.

Main sequence star run out of hydrogen 1
It expands and forms a red super giant 1
Eventually becoming unstable 1
It explodes in a supernova 1
Leaving behind a black hole 1
Or a neutron star 1