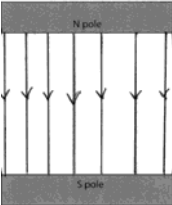
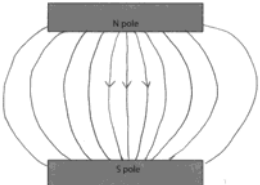


Question number	Answer	Notes	Marks
1 (a) (i)	arrows on two or more {lines from N to S and/or clockwise on loops around wire};	accept arrows beside lines showing correct directions reject contradicting arrows (i.e. one correct and one incorrect)	1
(b)	EITHER: Uniform field drawn MP1. single straight line drawn perpendicular to and between poles; MP2. additional straight lines drawn either side that are parallel and evenly spaced (by eye); OR Non-uniform field drawn MP1. central straight line(s) drawn perpendicular to and between poles; MP2. correctly curved lines drawn either side of the centre and drawn symmetrically (by eye);	Lines can start/end at faces or edges of poles   ignore all arrows on lines	2

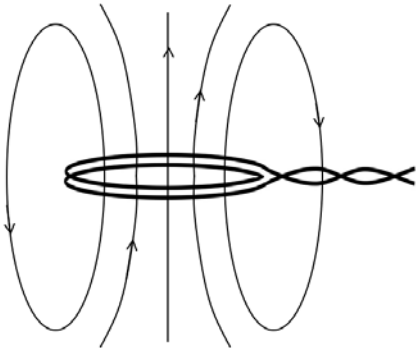


(c)	MP1. place compass around magnet and note / mark its direction; MP2. place compass in new position and note / mark its direction again; MP3. directions linked together to find a field line / pattern;	ignore references to iron filings award marks if clear in diagram if contradiction between words and diagram, go by the diagram allow use of additional compass(es)	3
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Total 8 marks



Question number		Answer	Notes	Marks
2	a	one of: iron is (soft) magnetic; iron loses its magnetism easily;	allow RA for steel	1
	b	these can be shown on a labelled diagram MP1. current carrying (insulated) wire; MP2. wrapped into coil; MP3. wrapped on iron core;	allow wire shown connected to a battery solenoid = MP2 only	3
	c	Any two ideas from: MP1. current/ voltage reduces OR eq; MP2. magnetic field of em reduces; MP3. (magnetic) force holding the iron plate to the magnet no longer present;	do not give marks for • 'the door closes'/eq • electricity • power allow current stops circuit broken • iron plate no longer magnetised	2
			total = 6 marks	

Question number	Answer	Notes	Marks
3 (a)	<p>MP1. at least one straight, vertical central field line;</p> <p>MP2. any field line drawn circling the wire / at least one peripheral field loop;</p> <p>MP3. field directions correct and consistent throughout and shown on at least two lines;</p> 	<p>ignore breaking of field lines as they pass through the centre of the coil by eye</p> <p>condone spiral drawn round wire</p>	3
(b)	<p>any 3 from:</p> <p>MP1. idea of magnetic fields interacting;</p> <p>MP2. idea of (magnetic) attraction or repulsion;</p> <p>MP3. reversing current reverses direction of magnetic field / force;</p> <p>MP4. some comparison with magnets, e.g. like poles repel, unlike poles attract;</p>	<p>allow field lines crossing</p> <p>ignore 'cutting'</p> <p>reject mention of electrostatic force or charge</p> <p>mention of having 'poles'</p>	3

Total 6 marks

Question number	Answer	Notes	Marks
4 (a)	Rods magnetised; And repel;	Reject ideas of charge for one mark only	2
(b)	MP1. A named magnetic material e.g.(soft) iron; MP2. because the material is capable of being magnetised; MP3. DOP (iron only) but does not retain its magnetism;	ACCEPT steel, mu-metal, nickel, cobalt accept RA steel would stay magnetised/apart	3
(c)	any two from- MP1. field (in coil) switches polarity; MP2. field (in rods) weaker; MP3. (since) field alternates with current or at 50 Hz; MP4. rods may not have time to become fully magnetised;	allow • 100 times a second or mains frequency • hysteresis ideas • domain theory • reluctance ideas	2

Total 7 marks