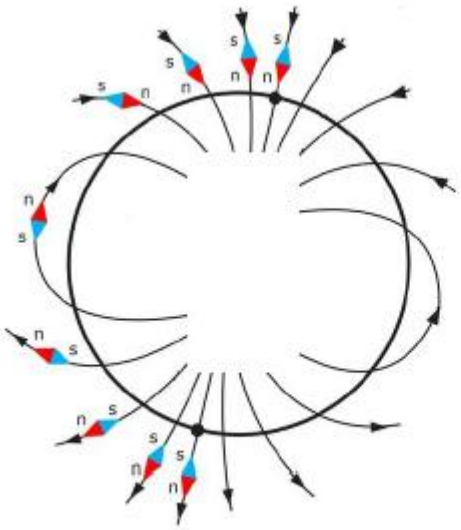
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

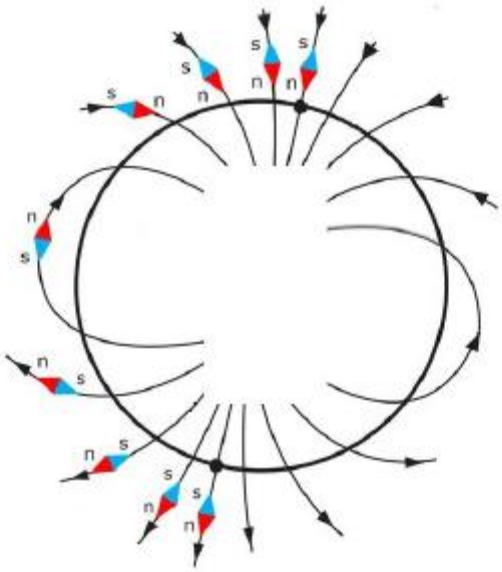
Mark Schemes

Q1.

Question number	Answer	Additional guidance	Mark
(i)	Sketch including any **two** from at least two field lines outside the Earth approximately aligning with compasses (1) at least two field lines continue inside the Earth towards imaginary poles (1) all arrows on lines drawn in the correct direction(s) outside the Earth (1) 	field lines need to have a gap inside the Earth ignore arrows on field lines inside the Earth	**2** **AO3.1**

Question number	Answer	Additional guidance	Mark
(ii)	(magnetic outer) **core** (1)	moving charges/ions	**(1)** **AO1.1**

Q2.

Question number	Answer	Additional guidance	Mark
(i)	Sketch including any **two** from at least two field lines outside the Earth approximately aligning with compasses (1) at least two field lines continue inside the Earth towards imaginary poles (1) all arrows on lines drawn in the correct direction(s) outside the Earth (1) 	field lines need to have a gap inside the Earth ignore arrows on field lines inside the Earth	**(2)** **AO3.1**

Question number	Answer	Additional guidance	Mark
(ii)	(magnetic outer) **core** (1)	moving charges/ions	**(1)** **AO1.1**

Q3.

Question number	Answer	Additional guidance	Mark
i	arrow pointing vertically up (1)	seen anywhere judge direction by eye	(1) AO2.1

Question number	Answer	Additional guidance	Mark
ii	statement (1) accept any clear **action** that will reverse the current **OR** accept any clear **action** that will reverse the poles	 swap the battery connections around turn the magnet around	(1) AO2.2

Question number	Answer	Additional guidance	Mark
iii	rearrangement and substitution (1) (B =) $\frac{0.078}{3.2 \times 0.042}$ evaluation (1) 0.58 (T)	 (B =) $\frac{0.078}{0.1344}$ any number rounding to 0.6 (T) award full marks for the correct answer without working	(2) AO2.1

Q4.

Question number	Answer	Additional guidance	Mark
i	arrow pointing vertically up (1)	seen anywhere judge direction by eye	(1) AO2.1

Question number	Answer	Additional guidance	Mark
ii	statement (1) accept any clear **action** that will reverse the current **OR** accept any clear **action** that will reverse the poles	 swap the battery connections around turn the magnet around	(1) AO2.2

Question number	Answer	Additional guidance	Mark
iii	rearrangement and substitution (1) (B =) $\frac{0.078}{3.2 \times 0.042}$ evaluation (1) 0.58 (T)	 (B =) $\frac{0.078}{0.1344}$ any number rounding to 0.6 (T) award full marks for the correct answer without working	(2) AO2.1

Q5.

Question number	Answer	Additional guidance	Mark
	(inside) a solenoid / long coil (with a current / power supply) (1)	give credit for diagrams accept: horseshoe magnet (between / using) pair of Magnadur / flat magnets (between / using) Helmholtz coils (between / using) two bar magnets, with unlike poles facing each other	**(1)** **AO1.2**

Q6.

Question number	Answer	Additional guidance	Mark
	(inside) a solenoid / long coil (with a current / power supply) (1)	give credit for diagrams accept: horseshoe magnet (between / using) pair of Magnadur / flat magnets (between / using) Helmholtz coils (between / using) two bar magnets, with unlike poles facing each other	**(1)** **AO1.2**

Q7.

Question number	Answer	Additional guidance	Mark
(i)	1 up(wards) (1) 2 down(wards) (1)	independent marks accept out(wards from the magnet) accept in(wards) / into (magnet) allow 1 mark for 1 down / in(wards) AND 2 up / out(wards)	**(2)** **AO1**

Question number	Answer	Additional guidance	Mark
(ii)	substitution (1) 0.15 = 0.5(0) x 2.7 x L(ength) rearrangement and evaluation (1) (length =) 0.11 (m)	alternative method re-arrangement (1) (length =) $\frac{F}{B \times I}$ Or (length =) $\frac{0.15}{0.5(0) \times 2.7}$ (substitution and) evaluation (1) (length =) 0.11 (m) allow any values that round to 0.11 e.g 0.111 accept 0.1 or 0.i̇ (m) allow 1 mark for answer of 9 (with or without working) award full marks for correct answer without working.	**(2)** **AO2**