Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

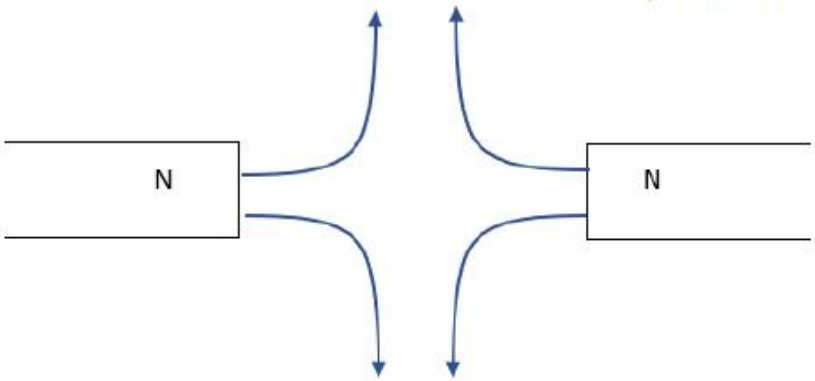
Q1.

Question number	Answer	Additional guidance	Mark
	rearrangement and substitution (1) $(B = \frac{F}{I \times l})$ $= \frac{1.11 \times 10^{-5}}{93(.1 \times 10^{-3}) \times 0.6(000)}$ evaluation (1) 2.0×10^{-4} (T)	0.0002 (T) accept any number that rounds to 2.0×10^{-4} (T) e.g. 1.989×10^{-4} (T) any number that rounds to 2.0×10^{-7} (T) e.g. 1.987×10^{-7} (T) is awarded 1 mark only award full marks for the correct answer without working	**(2)** **AO2.1**

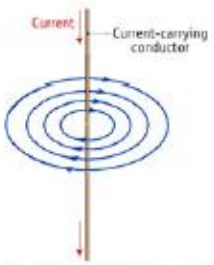
Q2.

Question number	Answer	Additional guidance	Mark
	any **three** from	marks can be awarded from a correctly labelled diagram	**(3)** **AO1**
	magnetic **fields** interact (1)	magnets are in each other's magnetic **field**	
	(force due to) repulsion (between magnets) (1)	repel / push away	
	(repulsion) force upwards (on upper magnet) (1)		
	weight / gravitational force (downwards on upper magnet) (1)	accept gravity (acts downwards)	
	forces equal size / in equilibrium (1)	forces are balanced	
		ignore references to charge	

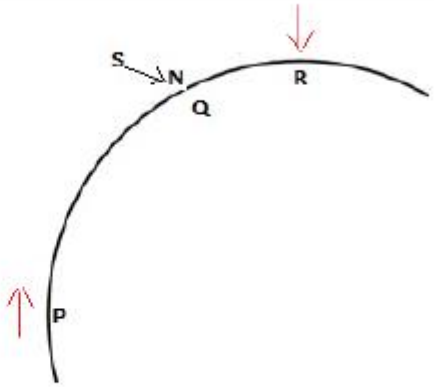
Q3.

Question number	Answer	Additional guidance	Mark
	at least four lines as shown (1) at least two arrows directed away from N poles (1)  	lines must not intersect (cross over) ignore continuation of lines to S of a magnet independent mark do not award if one or more arrows shown pointing towards N pole	**(2)** **AO1**

Q4.

Question number	Answer	Additional guidance	Mark
	 at least two concentric circles (1) arrows correct (1)	separation of the circles is increasing	**(2)**

Q5.

Question number	Answer	Additional guidance	Mark
i	arrow pointing up the page at P (1) arrow pointing down the page at R (1)	 judge directions by eye – within 10° acceptable as a guide allow arrows inside or outside the circle	(2) AO3.1

Question number	Answer	Additional guidance	Mark
ii	an explanation linking any **three** from: Earth has a magnetic field (1) (magnetic compass) needle/arrow points in the direction of the field (1) (Earth's magnetic) field goes into Earth at Q and/or R / comes out of Earth at T (1) (Earth's magnetic) field runs parallel to Earth's surface at P (1) Q and/or R are at (magnetic) south pole / T is at (magnetic) north pole (1)	credit answers shown in Figure 13 the core is magnetic / (it is as if there were a) magnet inside the Earth (north pole of compass) needle/arrow points to south pole of magnet magnetic field lines go from north to south poles **of magnet** magnetic south pole of Earth is at (geographic) north pole or RA	(3) AO3.1

Q6.

Question Number	Answer	Additional guidance	Mark
(i)	**The only correct answer is B:** up **A is incorrect** because it does not follow the "Left Hand Rule" **C is incorrect** because it is not perpendicular to the direction of the magnetic field. **D is incorrect** because it is not perpendicular to the direction of the magnetic field.		**(1)**

Question Number	Answer	Additional guidance	Mark
(ii)	A description that includes: (forces are) equal (in size) **and** opposite (in direction)	 accept (in this context) forces balance	**(1)**

Question Number	Answer	Additional guidance	Mark
(iii)	substitution into $F = B \times I \times l$ (1) $0.045 = 0.72 \times I \times 30\ (\times 10^{-3})$ rearrangement (1) $(I =) \frac{F}{B \times l}$ OR $\frac{0.045}{0.72 \times 30\ (\times 10^{-3})}$ evaluation (1) 2.1 (A)	rearrangement and substitution can be in either order $(I =) \frac{45}{21.6}$ accept answers that round to 2.1 (A) accept final value rounded down to 2 leave POT until final evaluation award full marks for the correct answer without working	**(3)**