

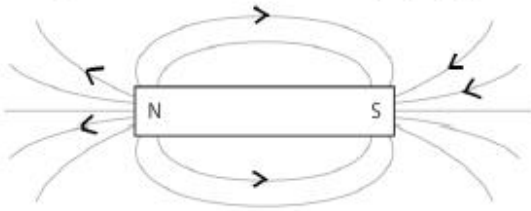
Name of the Student: _____

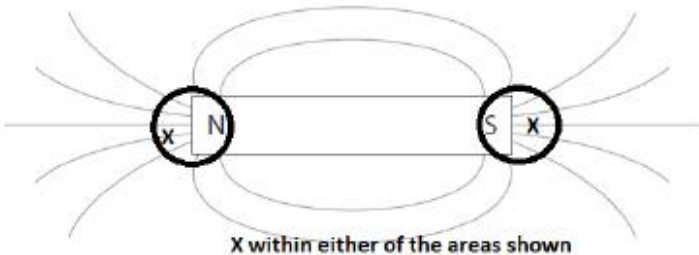
Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

Question number	Answer	Additional guidance	Mark
(i)	consistent arrows showing magnetic field direction(s) (1) 	arrows showing direction out of N, towards and into S minimum of two arrows all arrows shown must be in the correct direction	(1) AO1.2

Question number	Answer	Additional guidance	Mark
(ii)	'X' placed just/immediately to the left of the N pole or just/immediately to the right of S pole (1) 	allow on the letters N or S do not allow further inside the magnet	(1) AO1.1

Question number	Answer	Additional guidance	Mark
(iii)	A description to include any two from: (in comparison with bar magnet's field shown the uniform field has:) 1. only one direction (1) 2. straight lines (1) 3. parallel lines (1) 4. equidistant lines (1) 5. same strength of field everywhere (1)	(in comparison with uniform field the bar magnet's field lines:) vary in direction curved lines converge / diverge vary in distance(s) apart / gap vary in strength of field if no other mark is awarded, credit any diagram showing a uniform magnetic field for 1 mark	(2) AO3.2

Q2.

Question Number:	Answer	Additional Guidance	Mark
(i)	a description to include 4 of the following: • note position of pointer before current is switched on (1) • measure position of pointer when current in coil (1) • (use an ammeter to) measure current (1) • calculate the extension / stretch of the spring (1) • use force (of attraction) is proportional to extension / stretch (of spring) (1) • repeat with different currents (1)	measure length of spring before current is switched on how far nail moves calculate force from spring constant and extension calibrate spring increase the current calculate the extension of the spring using new position of pointer minus starting position of pointer is worth 3 marks	(4) AO 2 2

Question Number:	Answer	Additional Guidance	Mark
(ii)	select and substitute (1) $(E =) \frac{1}{2} \times 24 \times 0.12^2$ evaluation (1) $(E =) 0.17 \text{ (J)}$	$\frac{1}{2} \times 24 \times 12^2$ max 1 mark accept answers that round down to 0.17 e.g. 0.1728 POT error (e.g. 1728) max 1 mark award full marks for correct answer without working	(2) AO 2 1

Q3.

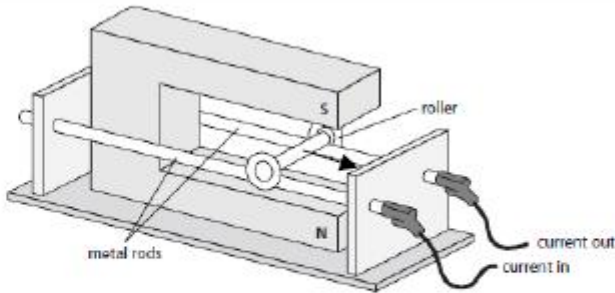
Question number	Answer	Additional guidance	Mark
(i)	substitution of values (1) $1.2 = \frac{K}{4(.0)^2}$ rearrangement and evaluation (1) $(K =) 19$ unit (1) N cm^2	allow rearrangement before substitution $(K =) 1.2 \times 4(.0)^2$ 19.2 0.00192 award full marks for the correct answer without working independent mark N m^2	(3) AO2

Question number	Answer	Additional guidance	Mark
(ii)	same magnitude and opposite direction (1)	allow (now) attraction for opposite direction	(1) AO1

Q4.

Question number	Answer	Additional guidance	Mark
(i)	substitution (1) ($F = $) $1.2 \times 2.5 \times 0.06$ evaluation (1) 0.18 (N)	 award full marks for the correct answer without working	(2)

Question number	Answer	Additional guidance	Mark
(ii)	a description to include first finger, second finger and thumb (of left-hand) held mutually perpendicular (1) first finger (is in the direction of) magnetic field OR second finger (is in the direction of) current (1) thumb (is in the direction of) force / motion (1)	 award 1 mark for attempt at mutually perpendicular shown in a diagram diagram relating thumb and fingers to correct quantities at right angle gains 3 marks	(3)

Question number	Answer	Additional guidance	Mark
(iii)	 arrow from roller towards contacts (1)		(1)