Name of the Student:_____

Max. Marks : 20 Marks **Time : 20 Minutes**

Mark Schemes

Q1.

Question number	Answer	Additional guidance	Mark
	An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (3 marks): • the transmission wire carries an alternating current (1) • the force is caused by this current which varies in size and direction (1) • the direction of this force depends on the direction of the current so the direction of the force also changes (1) • the magnitude of this force depends on the magnitude of the current so the magnitude of the force also changes (1)	allow responses that link the changes in the force to the interaction of the changing field around the wire with the constant field of the Earth	**(4)**

Downloaded from www.merit-minds.com

Q2.

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)**

Downloaded from www.merit-minds.com

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)

Downloaded from www.merit-minds.com

Q3.

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)**

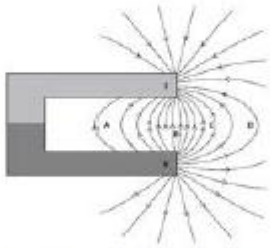
Question Number	Answer	Additional guidance	Mark
(ii)	A description that includes: (forces are) equal (in size) **and** opposite (in direction)	 accept (in this context) forces balance	**(1)**

Downloaded from www.merit-minds.com

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)**

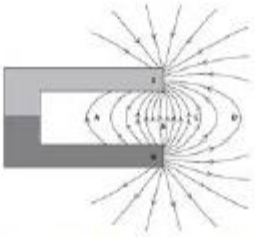
Downloaded from www.merit-minds.com

Q4.

Question number	Answer	Mark
	B  A,C and D are in the areas where the field lines are further apart and the field is weaker	**(1)**

Downloaded from www.merit-minds.com

Q5.

Question number	Answer	Mark
	B  A,C and D are in the areas where the field lines are further apart and the field is weaker	**(1)**

Downloaded from www.merit-minds.com

Q6.

Question Number	Answer	Mark
(i)	**The only correct answer is A**  **B is incorrect** because it is not tangential to the (circular) magnetic field lines produced by the current **C is incorrect** because it is not tangential to the (circular) magnetic field lines produced by the current **D is incorrect** because it is not tangential to the (circular) magnetic field lines produced by the current	**(1)**

Downloaded from www.merit-minds.com

Question Number	Answer	Additional guidance	Mark
(ii)	A description of the method that includes: **EITHER** (using single compass) record field at one location (1) find how field continues (1) connect the dots (to reveal overall shape of field / line) (1) **OR** arrange multiple compasses (1) over all of the card (1) direction of (all of) the compass needles indicates shape of field (1) **OR** sprinkle iron filings on card (before current is switched on) (1) switch on current/ tap card (1) pattern produced indicates shape of field (1)	Marking points may be awarded from a diagram. mark where compass points **or** put dots at each end of needle / arrow move compass to new position / until needle over previous dot start from different position and repeat (idea of obtaining concentric circles) all the way round the wire allow iron filings to arrange themselves	**(3)**

Downloaded from www.merit-minds.com