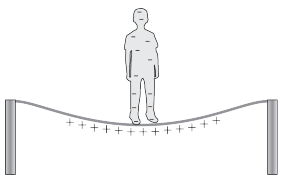


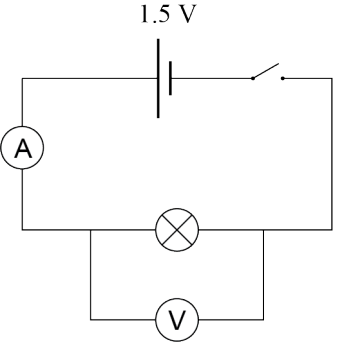
Assessment Schedule – 2019

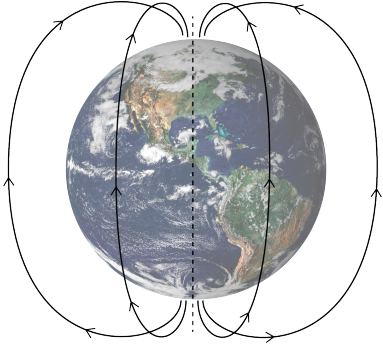
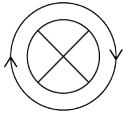
Physics: Demonstrate understanding of aspects of electricity and magnetism (90937)

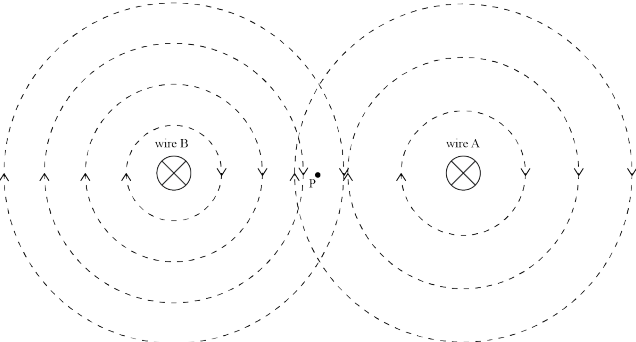
Evidence

Q	Evidence	Achievement	Merit	Excellence
ONE (a)	Static electricity is the build-up / storing of electric charge on an object.	Correct definition.		
(b)(i)	A person can become negatively charged by friction between the person and the trampoline mat. The friction causes the electrons to be stripped away from the trampoline mat and transferred to the person. The transferred charges stay on the person because they are insulated from the ground.	<ul style="list-style-type: none"> • Friction transfers electrons. 	<ul style="list-style-type: none"> • Friction transfers electrons from mat to person, and charges build up. 	
(ii)	 <p><i>Beyond recognition of the type of charge (+ / -), details of the distribution of charge within Ewan and within the trampoline are not required.</i></p>	OR Correct diagram (Ewan -ve, trampoline +ve).	AND Correct diagram (Ewan -ve, trampoline +ve).	
(c)(i)	Ewan did not get a shock when only touching the mat, as the mat is an insulator so the charge built up on his body could not flow away. The metal frame is a conductor, so when Ewan touches it, the charge that has built up can flow from him as an electric current, through the metal frame to Earth. He feels the flow of current as an electric shock.	<ul style="list-style-type: none"> • States that the mat is an insulator / person insulated from ground. OR States metal frame is a conductor / when touched he was grounded. OR Electric shock is due to current / flow of charge.	<ul style="list-style-type: none"> • Mat is an insulator so charge builds up, then quickly flows away when he touches the metal frame. 	<ul style="list-style-type: none"> • Mat is an insulator so charge builds up, then quickly flows away when he touches the metal frame.
(ii)	If the mat was also conductive any excess charge on Ewan's body would immediately flow through the trampoline to ground, so there would be no large build-up of charge on his body to be released as current when he touches the metal frame, and he would not get an electric shock.	OR No excess charge build-up if mat is conductive.	OR No excess charge build-up if mat is conductive as he is earthed.	AND No excess charge build-up if mat is conductive as he is earthed.

(d)	$P = \frac{E}{t} = \frac{1.25 \times 10^{-5} \text{ J}}{2.5 \times 10^{-4} \text{ s}} = 0.05 \text{ W}$ $I = \frac{P}{V} = \frac{0.05 \text{ W}}{3500 \text{ V}} = 1.4 \times 10^{-5} \text{ A}$	<ul style="list-style-type: none">• Correct power. OR <ul style="list-style-type: none">• Calculates current with incorrect power.	<ul style="list-style-type: none">• Correct current.	
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Q	Evidence	Achievement	Merit	Excellence
TWO (a)	Removing one light bulb breaks the series circuit / there is no complete path so no current can flow and all the light bulbs go out.	<ul style="list-style-type: none"> The circuit is broken / open / no complete circuit. OR No current can flow. OR Series has a single pathway.		
(b)		<ul style="list-style-type: none"> Circuit diagram with one minor error, e.g. missing one component, ammeter or voltmeter in wrong position. 	<ul style="list-style-type: none"> Correctly drawn circuit with meters connected correctly. 	
(c)	$R_{\text{TOT}} = 20 \times 0.40 = 8.0 \Omega$ $I = \frac{V}{R} = \frac{9.0}{8.0} = 1.125 \text{ A } (= 1.1 \text{ A } 2 \text{ s.f.})$	<ul style="list-style-type: none"> Correct R_{TOT}. OR Correct working For I with incorrect R_{TOT} .	<ul style="list-style-type: none"> Correct answer. (Including use of formula and substitute) 	
(d)	If the new light bulb has a lower resistance, the total resistance of the circuit will be lower. Since the supply voltage will stay the same, this will mean that the total current will increase. If the total current increases, power will increase. With more power used, the battery life will be shorter.	<ul style="list-style-type: none"> Total resistance lower. OR Increased current. OR Increased power. OR Shorter battery life.	<ul style="list-style-type: none"> Lower Total resistance linked to higher current. OR Higher current linked to higher power. OR Higher power linked to shorter battery life.	<ul style="list-style-type: none"> Complete answer linking lower total resistance to higher current to higher power to shorter battery life.

Q	Evidence	Achievement	Merit	Excellence
THREE (a)		<ul style="list-style-type: none"> • Correct magnetic field shape with arrow/s pointing from Geographic South to Geographic North. 		
(b)	<ul style="list-style-type: none"> • Magnetic field is stronger near the North pole than at the Equator. • Magnetic field is vertical near the North pole and horizontal near the Equator. 	<ul style="list-style-type: none"> • Either difference (strength or direction). 	<ul style="list-style-type: none"> • Both differences (strength and direction). 	
(c)(i)	<p>Magnetic field line/s drawn in a clockwise direction as shown.</p> 	<ul style="list-style-type: none"> • Circular field around wire with arrow pointing in clockwise direction. <p>OR</p>	<ul style="list-style-type: none"> • Circular field around wire with arrow pointing in clockwise direction. <p>AND</p>	
(ii)	$d = \frac{kI}{B} = \frac{2 \times 10^{-7} \times 0.20}{8.0 \times 10^{-7}} = 0.05 \text{ m}$	$d = 0.050 \text{ m}$	$d = 0.050 \text{ m}$	

<p>(d)</p>	<p>At point P, the magnetic field from wire A is upwards, but the magnetic field from wire B is downwards. This means the fields oppose, making the combined field weaker. As the field from wire B is stronger, the direction of the combined field will be downwards.</p>  <p>Combined magnetic field strength:</p> $B_{\text{TOT}} = 6.5 \times 10^{-6} - 8.0 \times 10^{-7}$ $= 5.7 \times 10^{-6} \text{ T}$	<ul style="list-style-type: none"> • Opposing fields at point P (stated or in diagram). OR Weaker combined field. OR Combined field downwards. 	<ul style="list-style-type: none"> • EITHER: Both fields in same direction (either up or down) AND combine to form stronger field AND direction stated consistent with stated field directions AND $B_{\text{TOT}} = 7.3 \times 10^{-6} \text{ T}$. OR: • Correct except both fields anticlockwise giving combined field upwards. OR • $B_{\text{TOT}} = 5.7 \times 10^{-6} \text{ T}$. 	<ul style="list-style-type: none"> • Both fields clockwise so opposing fields at point P (stated or in diagram). AND Combined field downwards. AND $B_{\text{TOT}} = 5.7 \times 10^{-6} \text{ T}$. (weaker)
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Judgement Statement

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No relevant evidence.	Very little evidence at the Achievement level. Most evidence is at the Not Achieved level.	Some evidence at the Achievement level; partial explanations.	Most evidence provided is at the Achievement level, while some is at the Not Achieved level.	Nearly all evidence provided is at the Achievement level.	Some evidence is at the Merit level, with some at the Achievement level.	Most evidence is at the Merit level, with some at the Achievement level.	Evidence is provided for most tasks, with evidence at the Excellence level weak or with minor errors / omissions.	Evidence provided for all tasks. Evidence at the Excellence level accurate and full.
No evidence	1 × A	2 × A OR 1 × M OR 1 × E	3 × A OR 1 × A + 1 × M	4 × A OR 2 × A + 1 × M OR 2 × M OR 1 × A (or more) + 1 × E	1 × A + 2 × M OR 1 × M + 1 × E	2 × A + 2 × M OR 3 × M	1 × A + 1 × M + 1 × E	2 × M + 1 × E

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 6	7 – 12	13 – 18	19 – 24