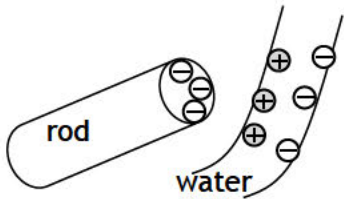


Question Number	Answer	Acceptable answers	Mark
1(a)(i)	A positive : equal (1)		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	An explanation linking negative charge(s)/electrons (1) (move/ transfer) {to (plastic) rod / to it / from cloth} (1)	Any reference to positive charges, positive electrons or protons moving scores zero marks for question ignore contradictions to Q i.e. cloth is negatively charged attract is insufficient for transfer e.g. {rod /it} gains/gets electrons (from cloth) for 2 marks the cloth loses electrons (to the rod) for 2 marks	(2)

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	B 		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(iv)	a suggestion including: plastic rod has {become neutral/ discharged/no longer charged/not negatively charged (anymore)} OR {charge/electrons} {transferred/ taken} from rod (to/by the water) (1)	Any reference to positive charges, positive electrons or protons moving scores zero marks for question accept the rod loses its charge/ electrons OR rod is 'earthed'/ 'grounded' ignore has same charge as water the water removes/washes away the electrons/charge	(1)

Question Number	Answer	Acceptable answers	Mark
1(b)	Conversion to correct units: 120 seen anywhere (1) Substitution: 0.08×120 (1) Evaluation: 9.6 (C) (1) accept 10 C	Allow full marks for correct answer with no working seen. 0.08×2 gains 1 mark for sub of their time into correct eq'n 0.16 (C) gains 2 marks (only mistake is not converting time to seconds) accept any power of 10 error for 2 marks e.g. 960 (C)	(3)

Total for Question 2 = 8 marks

Question Number	Answer	Acceptable answers	Mark
2(a)	C (gain electrons)		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)	<p>An explanation linking</p> <ul style="list-style-type: none"> • (Force of) attraction (1) • (plates have) opposite charge (to dust) (1) 	<p>Plates have a positive charge</p> <p>Ignore different charge</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	transferred to plate / lost (1)	neutral / become discharged	(1)

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	<p>An explanation linking any two of</p> <ul style="list-style-type: none"> • Metal is a conductor (1) • Electrons / (negative) charge moves (through the plates/ wire) (1) • Towards the voltage supply / earth /ground (1) 	<p>Metal not an insulator</p> <p>Plates / charges are earthed</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(d)	Substitution: $Q = 1.2 \times 10^{-3} \times 40$ (1) Evaluation: 0.048 or 4.8×10^{-2} (1) C / coulombs (1)	Give 2 marks for correct answer with no working shown Unit mark is independent Allow for 1 mark 48 (with incorrect or no units) Allow for 2 marks 48 C Allow for all 3 marks 48 mC	(3)

Total for Question 2 = 9 marks

Question Number	Answer	Acceptable answers	Mark
3(a)	repel (1)		(4)
	charge (1)		
	positive (1)		
	electrons (1)		

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	<p>An explanation linking any three from the following:</p> <ul style="list-style-type: none"> • Droplets have same charge (1) • (droplets) repel (one another) (1) • (This produces) a fine spray/mist (1) • attraction between droplets and plant (1) • This improves coverage OR Spray covers whole [leaf /plant] top and underside of leaf/ gives a fine coating/ even coat (1) • Less spray used/wasted/ falls onto soil (so saves money) (1) 	<p>Ignore references to attracting or repelling insects.</p> <p>ignore droplets are positive /negative</p> <p>droplets spread out</p> <p>(produce an) even spray</p> <p>droplets attracted to negative/opposite charge (on plant)</p> <p>or</p> <p>spray will stick to leaves/plant</p> <p>better/more chance of spray landing on/hitting plant</p> <p>or</p> <p>spray (lands) evenly on plant</p> <p>none is wasted/Less will run off the leaves/Same amount of spray will cover a larger area(so saves money)</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	<p>10 minutes = 600 seconds (1)</p> <p>substitution 0.008×600 (1)</p> <p>evaluation 4.8 (C) (1)</p> <p>Ignore any unit given by the candidate</p>	<p>ECF from their time eg 2 marks for 0.08 if their time is 10 0.8/8/8.0/80 gains 1 mark (bod POT error)</p> <p>Power of ten error max of 2 marks eg 480 gains 2 marks Award 3 marks for correct answer, no working</p> <p>No power of ten error mark if answer less than 0.008 as probably dividing</p> <p>Award 2 marks for 0.08, no working</p>	(3)

(Total for Question 3 =10 marks)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	A - negative charge has moved from the cloth to the rod		(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	An explanation linking they repelled (1) (strips had) like charge (1)	push away same (type of) charge	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	An explanation linking any two from charges are separated (1) possibility of a spark (1) ignite the fuel (1)	ignore ref to electric shock pd between plane and ground cause fire / explosion	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	<p>An explanation linking three from</p> <p>Metals are (good) conductors (1)</p> <p>Electrons/(negative) charge can flow through wire (1)</p> <p>charge goes from/to the ground / earth (1)</p> <p>discharge the tank/aircraft/pipes (1)</p>	<p>Reject flow of positive charge for this mark</p> <p>plane is earthed/grounded</p> <p>charge does not build up/dissipates</p> <p>Allow no pd between plane and ground so no spark possible for 2 marks</p>	(3)

(Total for Question 1 = 8 marks)

Question Number	Answer	Acceptable answers	Mark
5 (a)	an explanation linking: balloons repel (1) (because) they have like charges (1)	balloons repulse / push away (from each other/to the side) same charge / both positive / both negative accept like charges repel for 2 marks	(2)

Question Number	Answer	Acceptable answers	Mark
5 (b)(i)	<input checked="" type="checkbox"/> D an equal positive charge		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	an explanation linking any two of friction (between cloth and balloon) (1) transfer of electrons (1) (electrons/negative charges move) from cloth to balloon (1)	charge/electrons move accept balloon gains electrons from the cloth for 2 marks	(2)

Question Number	Answer	Acceptable answers	Mark
5(b)(iii)	a description including two from the following: <ul style="list-style-type: none"> • balloon becomes discharged (1) • metal /cabinet is a conductor (1) • electrons {move through / on to} metal / cabinet (1) 	earthed / neutral (negative) charge for electrons accept electrons move to earth for 2 marks	(2)

Question Number	Answer	Acceptable answers	Mark
5(b)(iv)	(surface of) wall (becomes) positively charged /charged by induction (1)	charges on the wall separate charge closest to the surface of the wall is opposite to the charge on the balloon	(1)