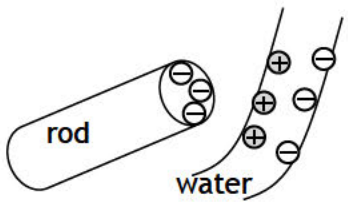
Question Number	Answer	Acceptable answers	Mark
1(a)(i)	**A** positive : equal (1)		**(1)**

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 x 120 (1) Evaluation: 9.6 (C) (1) accept 10 C	Allow full marks for correct answer with no working seen. 0.08 x 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)	An explanation linking • (Force of) attraction (1) • (plates have) opposite charge (to dust) (1)	Plates have a positive charge Ignore different charge	**(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)	An explanation linking any two of • Metal is a conductor (1) • Electrons / (negative) charge moves (through the plates/ wire) (1) • Towards the voltage supply / earth /ground (1)	Metal not an insulator Plates / charges are earthed	**(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) charge (1) positive (1) electrons (1)		**(4)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	An explanation linking any **three** from the following: • 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)	Ignore references to attracting or repelling insects. ignore droplets are positive /negative droplets spread out (produce an) even spray droplets attracted to negative/opposite charge (on plant) or spray will stick to leaves/plant better/more chance of spray landing on/hitting plant or spray (lands) evenly on plant none is wasted/Less will run off the leaves/Same amount of spray will cover a larger area(so saves money)	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	10 minutes = 600 seconds (1) substitution 0.008 x 600 (1) evaluation 4.8 (C) (1) Ignore any unit given by the candidate	 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) Power of ten error max of 2 marks eg 480 gains 2 marks Award 3 marks for correct answer, no working No power of ten error mark if answer less than 0.008 as probably dividing Award 2 marks for 0.08, no working	**(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)	An explanation linking **three** from Metals are (good) conductors (1) Electrons/(negative) charge can flow through wire (1) charge goes from/to the ground / earth (1) discharge the tank/aircraft/pipes (1)	Reject flow of positive charge for this mark plane is earthed/grounded charge does not build up/dissipates Allow no pd between plane and ground so no spark possible for 2 marks	**(3)**

(Total for Question 1 = 8 marks)

Question Number	Answer		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)	☒ **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: • 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)**