

STATIC ELECTRICITY 2 MARK SCHEMES

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	each hair gains the same (type of) charge or (each) hair is negatively charged or (each) hair gains electrons similar charges repel or negative charges repel or electrons repel	do not accept hair becomes positively charged accept positive charges repel providing first marking point is in terms of positive charge	1 1
b)	0.000002 or 2×10^{-6} or $2 \mu\text{C}$	accept correct substitution and transformation for 1 mark ie 30 / 15 or .03 / 15000 or 30 / 15000 or .03 / 15 answers 2 and 0.002 gain 1 mark	2
c)	current	do not accept amp / amperes	1
Total marks			5

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	3rd box The negative charge in the water is repelled by the rod and the positive charge is attracted.		1

b)i)	friction between bottles and conveyor belt / (plastic) guides charge transfers between bottles and conveyor belt / (plastic) guides		1 1
b)ii)	an atom that has lost / gained electron(s)		1
b)iii)	charge will not (easily) flow off the conveyor belt		1
Total marks			5

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	clothing and seat rub together electrons transfer from seat to driver or electrons transfer from driver to seat	accept friction between clothing and seat accept electrons transfer on its own if first mark scores an answer in terms of rubbing, between clothing and seat and charge transfer without mention of electrons gains 1 mark an answer in terms of friction / rubbing and electron transfer without mention of clothing and seat gains 1 mark	1 1
b)i)	how wet the air is affects charge (build up) or damp air is a better conductor or damp air has a lower resistance	accept humidity affects charge do not accept fair test or as a control unless explained	1
b)ii)	No – it was only the lowest under these conditions or	accept answer in terms of changing the conditions may change the results	1

	No – there are lots of other materials that were not tested or Yes – the highest value for cotton is smaller than the lowest value for the other materials	do not accept results show that it is always less / smallest	
Total marks			4

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	Y and Z	both required, in either order	1
a)ii)	X	and no other	1
b)i)	cause a spark cause a fire / explosion	accept blow up for explosion do not accept this mark if the reason given makes no sense e.g. if fuel reacts with the pipe it causes an explosion	1 1
b)ii)	The charge will flow to earth		1
Total marks			5

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	gained electrons		1
a)ii)	see if it exerts a force on another (charged) object	accept repels another	1

	<p>or see if it will pick up (small) pieces of paper</p>	<p>negative(ly charged)object accept attracts a positive(ly charged) object accept attracts or repels a charged object</p> <p>accept any correct way of showing an electrostatic effect i.e. bend a (slow moving)</p> <p>stream of water (from a tap)</p> <p>do not accept see if you get an electric shock on its own</p>	
b)i)	<p>plastic is an insulator</p> <p>stop them discharging or stop them being earthed</p>	<p>accept plastic is a poor conductor any mention of heat negates this mark accept keeps the charge on the person accept stop them being grounded accept electricity cannot go to earth do not accept so don't get an electric shock</p>	<p>1</p> <p>1</p>
b)ii)	<p>type of clothing could affect (build up of) charge/data</p>	<p>accept it is a variable/ factor (that needs to be controlled) do not accept fair test on its own</p>	<p>1</p>
b)iii)	<p>there is a clear pattern or enough precision to tell difference (between the materials) or accept none of the results are within 0.1kV of the shock line or each other</p>	<p>accept there is a wide range of results</p>	<p>1</p>

b)iv)	<p>any two from:</p> <ul style="list-style-type: none"> ☒ the material normally used has a value above the p.d likely to cause a shock ☒ use a material that reduces pd (below 3.6 kV) ☒ so people are less likely to be shocked ☒ can put 'non-shock' seating in adverts ☒ may sell more seats/ cars 	<p>accept use a material that reduces charge (on the person)</p> <p>accept so people will not feel a shock</p> <p>owtte</p>	2
Total marks			8