

Static Electricity Past Paper Answers IGCSE Edexcel

1.

Question number	Answer	Notes	Marks
1	friction; negatively; repel; electrons;		4

2.

Question number	Answer	Notes	Marks										
(a)	one mark for each correct tick;; if three ticks, 1 mark maximum if four ticks, zero marks <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Statement</th> <th>Tick</th> </tr> </thead> <tbody> <tr> <td>negatively charged particles move from the cloth onto the balloon</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>positively charged particles are rubbed off the balloon</td> <td></td> </tr> <tr> <td>negatively charged particles on the balloon are protons</td> <td></td> </tr> <tr> <td>the cloth becomes positively charged</td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>	Statement	Tick	negatively charged particles move from the cloth onto the balloon	✓	positively charged particles are rubbed off the balloon		negatively charged particles on the balloon are protons		the cloth becomes positively charged	✓		2
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negatively charged particles on the balloon are protons													
the cloth becomes positively charged	✓												
(b) (i)	any 1 of: (possibility of a) spark; (possibility of an) explosion / fire / eq;	ignore references to shock allow 'ignite the petrol'	1										
(ii)	earthing / grounding the {tank / pipe};	allow hose for pipe allow can for tank allow description of earthing e.g. 'connecting tank/pipe to ground (with a wire)'	1										
(c)	(granules) repel; (because) charge on the granules is all the same / eq;	ignore references to attraction to container	2										

3.

Question number	Answer	Notes	Marks
(a)	gravitational (potential energy);	allow GPE ignore gravity ignore thermal/heat potential energy	1
(b) (i)	friction; electrons; positive;	must be in this order	3
(ii)	all the hairs have the same (negative) charge; (same charges) repel;	condone positive charge allow 'like' for 'same'	2
(c)	any 3 of: MP1. metal /post conducts/eq; MP2. charge is earthed /charge flows to ground ; MP3. discharging hair/ eq; MP4. hair falls down due to its weight;	allow electrons for charge allow metal provides low resistance path allow (all) charge leaves hair /girl hair/ girl becomes neutral condone 'pulled down by (effect of) gravity'	3

4.

Question number	Answer	Notes	Marks
(a)	any 3 of: MP1. idea of {rubbing / tearing} of {materials / surfaces}; MP2. idea of movement / transfer of electrons; MP3. electrons have negative charge; MP4. (object becomes) negatively charged by gaining electrons OR positively charged by losing electrons; MP5. need for insulating material(s);	movement of positive {charge / electrons} can only score MP1 and MP5 ignore 'friction'	3
(b)	any 2 of: MP1. idea of opposite charges OR positive and negative charges; MP2. idea of attraction; MP3. idea of an (attractive) force larger than the weight of the loose end of tape;	reject if mentions positive electrons ignore 'different' condone 'unlike'	2

5.

Question number	Answer	Notes	Marks
(a)	MP1 Due to friction; MP2 Idea of <u>electron</u> transfer;	Allow idea of materials rubbing Ignore "charge" "static" Reject (for MP2 mark) idea of protons moving	2
(b) (i)	Idea of spark / ignition / fire / explosion	Ignore reference to shock and petrol fumes	1
(ii)	Idea of current (in the wire); OR Idea of charge moving (in the wire); Idea that this discharges tanker; OR No voltage/ p.d. remains;	ignore references to positive charges Allow: No charge is left No overall charge Charge is removed Tanker becomes neutral Ignore: "Electricity" further discussion of danger	2

6.

number	ANSWER	NOTES	MARKS
(a)	Any ONE simple effect, e.g. attract scraps of paper / deflect water stream / deflect (gold leaf) electroscope/use a coulomb-meter	Ignore theoretical approaches e.g. use a charged "object" Allow any practical suggestion e.g. attracts hair/balloon	
(b)	(charges) are transferred / lost; <u>electrons</u> ;	Allow move or jump Allow <ul style="list-style-type: none"> "negative electrons" e- reject for 1 mark "positive electrons"	
(c)	MP1. Charge rods (of different plastics); MP2. Method to allow to swing freely (suspend / watch glasses); MP3. Observation of attraction <u>and</u> repulsion;	Points may be shown on a labelled diagram Methods that would not distinguish charge (picking up paper scraps, bending a water stream) can score ONLY MP1 Allow rubbing with the cloth as charging by friction Accept alternative method e.g. induction Allow method describing deflections of a charged gold leaf electroscope (GLE) for up to 3 marks MP1 (GLE) Charge rods; MP2 (GLE) Use of (charged) GLE; MP3 (GLE) Looking for rise <u>and</u> fall of leaves	
(Total for Question 6)			

7.

number	ANSWER	NOTES	MARKS
(a)	electrons move; from balloon to cloth;	Allow negative charges for electrons Ignore all references to <ul style="list-style-type: none"> positive electrons explanations in terms of movement of positive charge 	2
(b)	Idea that movement is due to attraction; between negative charges in the hair and (positive) balloon (however expressed);	Allow unlike charges attract	2
(c)	The balloon is an insulator;	Allow poor conductor	1
(d)	A sensible suggestion including movement of electrons; e.g. electrons move from air/water/hair onto balloon charges move from the hair into the air water is a conductor so electrons move (into air/from balloon)	Allow <ul style="list-style-type: none"> 'charge(s)' for electrons the charge on the balloon is neutralised Ignore all references to 'positive charge'	1

8.

Question number	Answer	Notes
(a)	C Silver	
(b)	<p>Must be in the correct context</p> <p>Any two from:</p> <ul style="list-style-type: none"> negative charge moves or electrons move; (charge moves through wire) from plate B / to lifting sheet A; therefore produces unbalanced /net charge on A/B; 	<p>Do not award marks for repeat of stem</p> <p>Accept: lifting sheet for A, metal plate for B</p> <p>charge is not enough for first MP</p> <p>A has gained electrons /B has lost electrons for 2 marks</p> <p>Ignore references to 'poles' 'current'</p> <p>Reject ideas about positive charge moving</p>

number	Answer	Notes	
(c)	<p>Must be in the correct context</p> <p>Any two from</p> <ul style="list-style-type: none"> (top of) dust becomes positive; negative charge on lifting sheet A attracts dust; force of attraction > weight of dust; 	<p>Ignore unqualified 'opposite charges attract'</p> <p>allow an answer in terms of charge separation e.g. induced charge on dust ('top' positive 'bottom' negative)</p>	2
(d)	<p>Answers must be in the context of the stream of water and charged rod</p> <ul style="list-style-type: none"> the water (molecules) have a charge; opposite charges attract / like charges repel; 	<p>do not credit repeat of stem</p> <p>allow (negatively) charged rod attracts (positively) charged water</p>	2
		Total	7

9.

number	ANSWER	NOTES
(a)	electrons; negative;	
(b) (i)	(droplets) repel each other / repulsive force / like charges repel; (droplets) spread out / finer spray;	Ignore: attraction of paint to object Ignore: references to paint sticking
(b) (ii)	Any two from (object) attracts droplets /paint OR opposite charges attract; paint reaches back of object / obscured places (at same time); less paint wasted;	Ignore: references to paint sticking
(c)	risk of spark / shock /damage; related risk reduction; e.g. earth connection, appropriate use of insulation	Accept: lightning, fire, explosion, Reject: risks from current electricity risk reduction method needs to apply to sta risk Accept: earthed, earthing, grounding, rubb gloves Reject: "rubber earth strip (under cars)"