Eduqas Physics GCSE
Topic 7.3: Static electricity -forces and electric fields
Mark Schemes for Questions by topic

1.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	negatively charged electrons are transferred from the (neutral) object		1 1 1	AO1/1 4.2.5.1
06.2	minimum of four lines drawn perpendicular to surface of sphere minimum of one arrow shown pointing away from sphere	judge by eye do **not** accept any arrow pointing inwards.	1 1	AO1/1 4.2.5.2
06.3	Q		1	AO3/1a 4.2.5.2
Total			**6**	

2.

(a) each hair gains the same (type of) charge**or**(each) hair is negatively charged

*do **not** accept hair becomes positively charged*

or(each) hair gains electrons

1

similar charges repel

accept positive charges repel

providing first marking point is in terms of positive charge

ornegative charges repel**or**electrons repel

1

(b) 0.000002

*accept correct substitution and transformation for **1** mark*

or 2×10^{-6}

ie 30 / 15 or .03 / 15000 or 30 / 15000 or .03 / 15

or 2 μ C

*answers 2 and 0.002 gain **1** mark*

2

(c) current

*do **not** accept amp / amperes*

1

[5]

3.

.(a) (i) electrons

1

a positive

1

(ii) (forces are) equal

accept (forces are)the same

forces are balanced is insufficient

1

(forces act in) opposite directions

accept (forces) repel

both sides have the same charge is insufficient

1

(b) aluminium

1

[5]

4.

(a) repel

1

opposite

1

attract

1

correct order only

(b) refuelling an aircraft

reason cannot score if refuelling aircraft is not chosen

1

a spark may cause an explosion / fire / ignite the fuel

accept the static for a spark

accept named fuel

there must be a consequence of having a spark

*do **not** accept answers in terms of people getting a shock or electrocuted*

1

[5]

(ii) lower than

1

(iii) accept any sensible suggestion,eg:

- too many variables (to control)
- lightning strikes / storms are random / unpredictable
- do not know which building will be struck
- do not know when a building will be struck
- do not know when lightning will happen
- (very) difficult to create same conditions in a laboratory
- lightning storms are not the same

it is not safe is insufficient

*do **not** accept lightning does not strike the same place twice*

1

[8]

5.

(a) fleece rubs against shirt

it refers to the fleece

1

or

friction (between fleece and shirt)

(causing) <u>electrons</u> to transfer from one to the other

accept a specific direction of transfer

*do **not** accept charge for electrons*

positive electrons negates this mark

movement of protons negates this mark

1

(b) Electrical charges move easily through metals.

1

An electric current is a flow of electrical charge.

1

(c) (i) copper

reason only scores if copper chosen

1

(good electrical) conductor

accept it is a metal

any mention of heat conduction negates this mark

1

6.

(a) electrons transfer / removed

*do **not** accept negatively charged atoms for electrons*
this only scores if first mark given

1

to the rod / from the cloth

this does not score if there is reference to any original charge on cloth or rod
'it' refers to the rod
*accept negative charge transfer to rod / removed from cloth for **1** mark*
transfer of positive charge / positive electrons scores zero

1

(b) (i) rods / charges repel

1

creating downward / extra force (on the balance)

accept pushing (bottom) rod downwards
do not accept increasing the weight / mass
charges attracting scores zero

1

(ii) the (repulsion) force increases as the distance between the charges decreases

*accept there is a negative correlation between (repulsion) force and distance between charges **or** (repulsion) force and distance between charges are inversely proportional*
for both marks
*examples of **1** mark answers*
force increases as distance decreases
force and distance are inversely proportional
negative correlation between force and distance
repels more as distance decreases
if given in terms of attracting or attraction force this mark does not score

2

7.

.(a) 3rd box

The negative charge in the water is repelled by the rod and the positive charge is attracted to the rod.

1

(b) (i) friction between bottles and conveyor belt / (plastic) guides

accept bottles rub against conveyor belt / (plastic) guides

1

charge transfers between bottles and conveyor belt / (plastic) guides

accept specific reference eg electrons move onto / off the bottles

reference to positive electrons / protons negates this mark

1

(ii) (the atom) loses or gains one (or more) electrons

1

(iii) charge will not (easily) flow off the conveyor belt / bottles

accept the conveyor belt / bottles is an insulator / not a conductor accept conveyor belt is rubber

1

[5]