



# **GCSE Physics**

## **Static**

### **Mark Scheme**

**Time available: 50 minutes**

**Marks available: 40 marks**

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## Mark schemes

<b>1.</b>	(a) repel	1
	opposite	1
	attract	1
	<i>correct order only</i>	
	(b) refuelling an aircraft	
	<i>reason cannot score if refuelling aircraft is not chosen</i>	1
	a spark may cause an explosion / fire / ignite the fuel	
	<i>accept the static for a spark</i>	
	<i>accept named fuel</i>	
	<i>there must be a consequence of having a spark</i>	
	<i>do <b>not</b> accept answers in terms of people getting a shock or electrocuted</i>	1
		[5]
<b>2.</b>	(a) fleece rubs against shirt	
	<i>it refers to the fleece</i>	1
	<b>or</b>	
	friction (between fleece and shirt)	
	(causing) <u>electrons</u> to transfer from one to the other	
	<i>accept a specific direction of transfer</i>	
	<i>do <b>not</b> accept charge for electrons</i>	
	<i>positive electrons negates this mark</i>	
	<i>movement of protons negates this mark</i>	1
	(b) Electrical charges move easily through metals.	1
	An electric current is a flow of electrical charge.	1
	(c) (i) copper	
	<i>reason only scores if copper chosen</i>	1
	(good electrical) conductor	
	<i>accept it is a metal</i>	
	<i>any mention of heat conduction negates this mark</i>	1

1

(ii) lower than

(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]

3.

(a) transfer of electrons

*mention of positive charge moving negates both marks*

1

from the carpet to the student

1

(b) three arrows perpendicular to sphere's surface with all arrows directed inwards and distributed evenly around sphere

1

(c) there is a potential difference between the student and the tap

*do **not** accept the tap / sink is charged*

1

which causes electrons / charges to transfer from the student

**or**

which causes electrons / charges to transfer to the tap

1

which earths the charge

*allow the tap is earthed*

1

- (d) carpet / copper has a low resistance  
*allow carpet is a conductor*  
**or**  
*copper is a conductor*

1

lower / no build-up of charge (on the student)

**or**

(so there is a) smaller / no potential difference between student and tap / earth

1

[8]

4.

- (a) electrons

1

- (b) a positive

1

- (c) the forces are repulsive

*allow the forces act in opposite directions*

1

the forces are equal in size

*allow the forces are the same (size)*

1

- (d) reproducible

1

[5]

5.

- (a) **Level 2 (3–4 marks):**

A detailed and coherent explanation is provided. The student makes logical links between clearly identified, relevant points.

**Level 1 (1–2 marks):**

Simple statements are made, but not precisely. The logic is unclear.

**0 marks:**

No relevant content

**Indicative content**

- friction (between cloth and rod) causes
- electrons (to) move
- from the acetate rod **or** to the cloth
- (net) charge on cloth is now negative
- (net) charge on rod is now positive

4

- (b) there is a force of attraction between the acetate rod and the cloth

(reason)

1

unlike charges attract

or

negative charges attract positive charges

1

(c) increase

1

(d)  $0.000025 \times 60\,000$

1

1.5 (J)

1

*accept 1.5 (J) with no working shown for 2 marks*

[9]

6.

(a) 3<sup>rd</sup> 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

*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) an atom that has lost / gained electron(s)

*do **not** accept a charged particle*

1

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

*accept the conveyor belt / bottle is an insulator / not a conductor*

*accept conveyor belt is rubber*

1

[5]