

Physics - Key Stage 4 - Electricity

Static Electricity

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Q1.

Answers as discussed in this slide have not been seen or verified by OCR.

Patrick walks on a nylon carpet.

He becomes negatively charged.

Describe how Patrick has become **negatively** charged.

[2]



Answers



Q1. Answers

1. For this question a deeper explanation gains more marks, if you wrote:

he **gains** negative charge (from the carpet) (1)

But if you wrote

he **gains electrons** (from the carpet) (2)



In lesson questions



Independent Task:

Label the particles inside the atom. Give their relative charge.

Atom, GFDL, Wikimedia



Electrical Conductors and Insulators

1. Write a definition for an electrical conductor.
2. Give an example of an electrical conductor
3. Write a definition of an electrical insulator
4. Give an example of an electrical insulator



Independent Task: Charging by friction

Describe how insulators can be charged by friction.

When two insulators are rubbed together they ...

The friction force ...

The _____ move because they are ...

The insulator with fewer electrons than protons becomes ...

The insulator with more electrons than ...

The total number of ...



Independent Task: Forces on Charged Objects

	Negatively Charged	Positively charged
Positively charged		
Negatively charged		



Independent Task: Charging by induction

Describe how insulators can be charged by induction.

When a negative object is moved towards a neutral object, the electrons in the neutral object

This leaves the closest surface

This leaves the furthest...

If a positive object is ...



Worked Example:

This question is about static electricity.

Bruno rubs a balloon on a piece of material.

He puts the balloon next to a water tap.

The stream of water bends towards the balloon.

Use ideas about static electricity to explain why. [3]

Answers as discussed in the next slide have not been seen or verified by OCR.

OCR, Gateway Physics A, Paper B752/01, June 2016



Answers



Review - Independent Task:

Label the particles inside the atom. Give their relative charge.

Red sphere - proton, relative charge +1

Green sphere - neutron, relative charge 0

Yellow sphere - electron, relative charge -1



Review: Electrical conductors and insulators

Electrical conductors are materials where the electrons can flow. We call these electrons **delocalised**.

An example of an electrical conductor is a metal for example, copper.

Electrical insulators are materials where the electrons are fixed in place, they cannot flow.

An example of an electrical insulator is plastic.



Review Task - Independent Task: Charging by friction

Describe how insulators can be charged by friction.

*When two insulators are rubbed together they **become charged**.*

*The friction force causes **the electrons to be transferred between insulators**.*

*The **electrons** move because they are **light and outside the nucleus**.*

*The insulator with fewer electrons than protons becomes **positively charged**.*

*The insulator with more electrons than **protons becomes negatively charged**.*

*The total number of **electrons and protons on the two insulators is constant**.*



Review - Independent Task: Forces on Charged Objects

	Negatively Charged	Positively charged
Positively charged	Attract	Repel
Negatively charged	Repel	Attract



Review - Independent Task: Charging by induction

Describe how insulators can be charged by induction.

*When a negative object is moved towards a neutral object the electrons in the neutral object are **repelled**.*

*This leaves the closest surface **positively charged**.*

*This leaves the furthest surface **negatively charged**.*

*If a positive object is moved towards a neutral object, the **electrons** in the neutral object are **attracted**. This leaves the closest surface **negatively charged** and the furthest surface **positively charged**.*

