

Static Electricity Electric Fields

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

A polythene rod is rubbed with a dry cloth and becomes negatively charged. Explain how. (3 marks)

Step 1 · What moves

Friction transfers electrons (negatively charged) from one material to the other.

Step 2 · Direction

Electrons move from the cloth onto the polythene rod.

Step 3 · Result

The rod gains electrons so becomes negative; the cloth loses electrons so is left with an equal positive charge.

Answer: Electrons move from the cloth to the rod

Check: Positive charges (protons) never move; only electrons are transferred.

2. Now try one with the steps

A negatively charged rod is held near a second negative rod hanging on a thread, then near a positively charged rod. Describe and explain what happens. (3 marks)

Step 1 · Near the negative rod

Step 2 · Near the positive rod

Step 3 · Type of force

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Explain how a polythene rod becomes negatively charged when rubbed with a cloth. [2]

2. State what happens when two negatively charged objects are brought close together. [1]

3. The rod in question 1 became negative. State the charge left on the cloth. [1]

4. Explain why only negative charges move when insulators are charged by friction. [1]

5. State whether the force between charged objects is a contact force or a non-contact force. [1]

6. Describe what is meant by an electric field. [1]

7. Describe the pattern of the electric field around an isolated positively charged sphere. [2]

8. State what the direction of an electric field line shows. [1]

9. Describe how the force on a small charge changes is moved further away from a charged sphere. [1]

10. Explain why you might feel a small shock when you touch a metal door handle after walking across a nylon carpet. [2]

11. Explain why the hose of a fuel tanker is earthed when refuelling an aircraft. [3]

12. Explain how a spark is produced when a large charge builds up on an object. [3]

13. Explain why a rubbed balloon sticks to a neutral wall. [3]

14. Explain why a metal rod held in your hand cannot be charged by rubbing, but a plastic rod can. [2]

4. Before you hand it in

"The cloth became positive because it gained protons."

The cloth lost electrons, so it has more protons than electrons and is positive overall.

Drawing field lines pointing into a positive sphere

Lines point away from positive and towards negative charges.

"Static electricity is electricity that does not move."

Static charge is charge that has built up on an insulator; it can still move suddenly spark.

"Earthing makes the charge disappear."

Earthing lets the charge flow to or from the ground so it does not build up.