

Charge, fields and sparks

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test covers charging by friction, field lines, sparks and $Q = I \times t$. Show your working, give units and use $e = 1.6 \times 10^{-19} \text{ C}$. The paper is worth 20 marks.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** GCSE P2, HS-PS2-4

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Forces between charges (2 marks)

- State the rule for the force between two charged objects. (1 mark)
- A cloth is rubbed on a rod and the rod becomes negative. State which particles moved and the charge on the cloth. (1 mark)

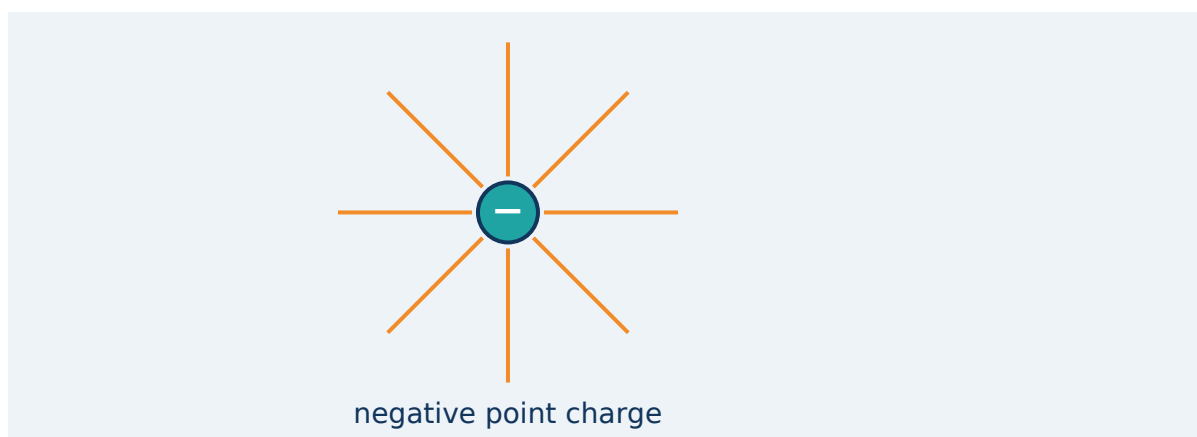
Question 2 Charge in a circuit (3 marks)

- A current of 0.20 A flows for 3.0 minutes. Calculate the charge that flows. (2 marks)
- Calculate how many electrons this is. The charge of an electron is $1.6 \times 10^{-19} \text{ C}$. (1 mark)

Question 3 Field lines (3 marks)

The diagram shows a negatively charged sphere.

- Draw four arrowheads to show the direction of the field. (1 mark)
- State what the spacing of field lines shows. (1 mark)
- Describe what happens to a small positive charge placed near the sphere. (1 mark)



Field lines around a negative charge. The arrowheads are missing.

Question 4 Car door shock (3 marks)

Wanjiru slides across the car seat, gets out and gets a small shock from the metal door. Explain why this happens. (3 marks)

Question 5 Spark current (3 marks)

A spark carries $6.0 \times 10^{-8} \text{ C}$ in $2.0 \times 10^{-6} \text{ s}$. Calculate the average current. (3 marks)

Question 6 Earthing aircraft (2 marks)

Explain why an aircraft is earthed before fuel is pumped into it. (2 marks)

Question 7 Using static charge (2 marks)

Describe one use of electrostatics and explain why charge is useful in it. (2 marks)

Question 8 Number of electrons (2 marks)

A balloon holds a charge of $4.8 \times 10^{-9} \text{ C}$. Calculate the number of extra electrons on it. (2 marks)