

GCSE Physics

Worksheet: Electric fields

TIME 30 min	TOTAL 28 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Electric fields

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

01

01.1

An isolated charged sphere has an electric field around it.
What happens to the electric field strength as you move further from the sphere?
Tick (✓) **one** box.

It increases.

It decreases.

It stays the same.

☐

☐

☐

[1 mark]

01.2

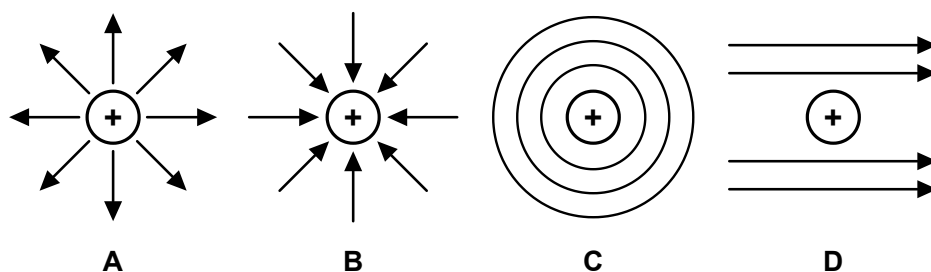
What is used to represent an electric field in a diagram?

[1 mark]

0 2

Figure 1 shows four diagrams, A, B, C and D, drawn by students to show the electric field around an isolated positively charged sphere.

Figure 1



0 2 . 1

Which diagram correctly shows the electric field around the positively charged sphere?

Tick (✓) **one** box.

A

☐

B

☐

C

☐

D

☐

[1 mark]

0 2 . 2

Where is the electric field strongest?

Tick (✓) **one** box.

close to the sphere

☐

far from the sphere

☐

it is the same strength everywhere

☐

[1 mark]

0 2 . 3

A small positively charged object is moved further away from the sphere.

What happens to the force on the object?

Tick (✓) **one** box.

It decreases.

☐

It increases.

☐

It stays the same.

☐

[1 mark]

0 2 . 4

Complete the sentence.

An electric field is a region in which a charged object experiences a ...

.....

.....

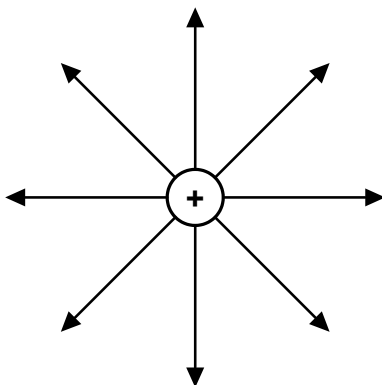
.....

[1 mark]

0 3

Figure 2 shows the electric field around an isolated, positively charged sphere, represented by field lines.

Figure 2



0 3 . 1

Use Figure 2 to state where the electric field around the sphere is strongest.

.....

.....

[1 mark]

0 3 . 2

Explain how the spacing of the field lines in Figure 2 shows this.

.....

.....

.....

.....

[2 marks]

0 4

A small metal sphere is given a negative charge. It is isolated from other objects. Figure 3 shows the sphere.

Figure 3



0 4 . 1

Draw the electric field pattern around the sphere on Figure 3.

[3 marks]

0 4 . 2

Explain what is meant by an electric field.

.....

.....

[1 mark]

0 4 . 3

A positively charged dust particle is near the sphere.

Describe the force on the dust particle and how it changes as the particle moves closer to the sphere.

.....

.....

.....

.....

[2 marks]

0 5

A small metal sphere is given a positive charge. It is isolated from other objects. Figure 4 shows the sphere.

Figure 4



0 5 . 1

Draw the electric field pattern around the sphere on Figure 4.

[3 marks]

0 5 . 2

A second sphere, identical in size but with a smaller positive charge, is now considered instead.

State how its field pattern would differ from the one you have drawn.

[2 marks]

0 6

A small, negatively charged plastic sphere hangs from an insulating thread. A positively charged rod is brought near to the sphere but does not touch it.

0 6 . 1

Describe what happens to the sphere.

[1 mark]

0 6 . 2

Explain, using the idea of an electric field, why the sphere moves even though the rod does not touch it.

.....

.....

.....

.....

[2 marks]

0 6 . 3

The rod is moved closer to the sphere.
Describe and explain how the angle between the thread and the vertical changes.

.....

.....

.....

.....

[2 marks]

0 6 . 4

The positively charged rod is replaced by a negatively charged rod.
Describe what happens to the sphere.

.....

.....

[1 mark]

.....

0 7

Two students discuss electric field diagrams. Student X says: 'Field lines just show the shape of the field, not how strong it is.' Student Y disagrees.

0 7 . 1

Who is correct, and why?

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Physics · Worksheet: Electric fields · 28 marks

Question 1 (2 marks)

01.1 [1 mark]

Correct: It decreases.

01.2 [1 mark]

Answer: Field lines

- field lines (1)
-

Question 2 (4 marks)

02.1 [1 mark]

Correct: A

02.2 [1 mark]

Correct: close to the sphere

02.3 [1 mark]

Correct: It decreases.

02.4 [1 mark]

Answer: force

- force (1)
-

Question 3 (3 marks)

03.1 [1 mark]

Answer: Close to the sphere.

- close to the sphere (where the field lines are closest together) (1)
-

03.2 [2 marks]

Answer: The field lines are closer together near the sphere and more spread out further away; the closer together the field lines are, the stronger the field they represent.

- the field lines are closer together near the sphere and further apart at greater distances (1)
 - the closer together the field lines are, the stronger the electric field (that they represent) (1)
-

Question 4 (6 marks)

04.1 [3 marks]

Answer: At least four evenly spaced straight radial lines meeting the surface of the sphere, with arrows pointing towards the sphere.

- at least 4 straight lines that are radial (they would pass through the centre if extended) (1)
- lines touching / starting at the surface of the sphere and evenly spaced (1)
- arrows on the lines pointing towards the sphere (1)

04.2 [1 mark]

Answer: The region around a charged object where another charged object experiences a (non-contact) force.

- a region (around a charged object) where a (second) charged object experiences a force (1)

04.3 [2 marks]

Answer: An attractive force towards the sphere, which gets stronger as the particle gets closer (the field is stronger closer to the sphere).

- (an attractive force) towards the sphere (1)
- the force increases as the distance decreases / the field is stronger closer to the sphere (1)

Question 5 (5 marks)

05.1 [3 marks]

Answer: At least four evenly spaced straight radial lines meeting the surface of the sphere, with arrows pointing away from the sphere.

- at least 4 straight lines that are radial (they would pass through the centre if extended) (1)
- lines touching / starting at the surface of the sphere and evenly spaced (1)
- arrows on the lines pointing away from (out of) the sphere (1)

05.2 [2 marks]

Answer: The field pattern would still be radial, pointing outward, but the field would be weaker at every distance from the sphere.

- the field pattern would still be radial, pointing outward (1)
 - but the field would be weaker at every point (for the same distance from the sphere) (1)
-

Question 6 (6 marks)

06.1 [1 mark]

Answer: It moves towards the rod (the thread swings towards the rod).

- it moves / swings towards the rod (1)

06.2 [2 marks]

Answer: The charged rod creates an electric field around itself; the charged sphere is in this field, so it experiences a (non-contact) force.

- the (charged) rod creates an electric field around it (1)
- the (charged) sphere is in the field so it experiences a force (1)

06.3 [2 marks]

Answer: The angle increases, because the electric field is stronger closer to the rod, so the force on the sphere is greater.

- the angle increases (1)
- the field is stronger closer to the rod so the force (of attraction) on the sphere is greater (1)

06.4 [1 mark]

Answer: It moves away from the rod (it is repelled).

- it moves / swings away from the rod / is repelled (1)

Question 7 (2 marks)

07.1 [2 marks]

Answer: Student Y is correct — the spacing (density) of the field lines shows the strength of the field as well as its direction; closer lines mean a stronger field, not just its shape.

- student Y (is correct) (1)
 - the spacing / density of the field lines shows the strength of the field as well as its direction — closer lines mean a stronger field, not just the shape (1)
-