FREE REVISION PACK

Uniform Electric Fields

AQA A-level Physics · 7408 · Specification 3.7.3.2

Easy | Medium | Multiple choice · past-paper questions

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Field strength between parallel plates	AQA June 2017 · A-level Paper 2 · Q15	1 mark
2	Easy	pd needed to hold a charge still	AQA June 2019 · A-level Paper 2 · Q14	1 mark
3	Easy	Field direction from an electron's path	AQA June 2023 · A-level Paper 2 · Q16	1 mark
4	Medium	Force on an electron in a field	AQA June 2019 · A-level Paper 2 · Q16	1 mark
5	Medium	Field that holds a negative ion still	AQA June 2024 · A-level Paper 2 · Q27	1 mark
6	Medium	Final velocity after acceleration through a pd	AQA June 2022 · A-level Paper 2 · Q15	1 mark

Key ideas to have ready

- Between parallel plates the field is uniform: $E = V / d$, the same at every point.
- The force on a charge is $F = QE$, in the direction of the field for a positive charge and opposite to it for a negative charge (e.g. an electron).
- A charge held still between horizontal plates: $QE = mg$, so $QV / d = mg$.
- A charge accelerated from rest through a pd V gains kinetic energy QV: $\frac{1}{2}mv^2 = QV$.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

Questions are reproduced from AQA past papers; AQA material is © AQA. Question numbers have been changed to suit this pack. Get Better At Physics is an independent tutor and is not affiliated with or endorsed by AQA. Free for personal revision and classroom use.

Easy

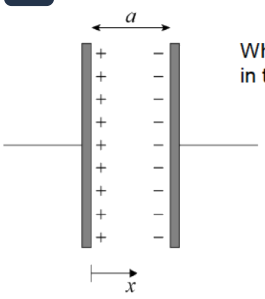
Definitions and one-step ideas. Most students get these right.

Questions 1–3

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

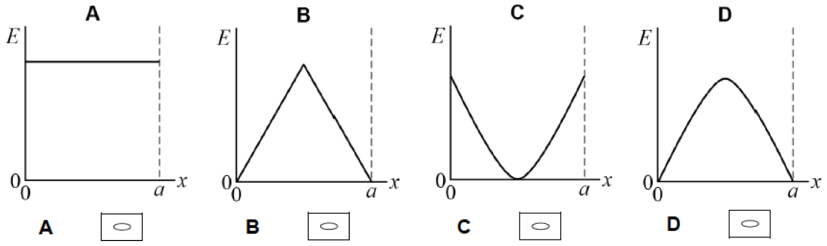
AQA June 2017 · A-level Paper 2 · Q15

1 Two parallel metal plates of separation a carry equal and opposite charges.



Which graph best represents how the electric field strength E varies with the distance x in the space between the two plates?

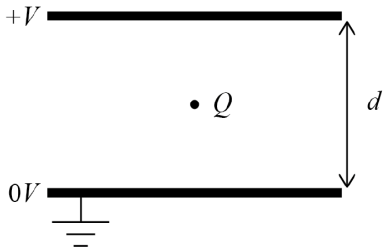
[1 mark]



A ⬭ B ⬭ C ⬭ D ⬭

AQA June 2019 · A-level Paper 2 · Q14

2 A small object of mass m has a charge Q. The object remains stationary in an evacuated space between two horizontal plates. The plates are separated by a distance d and the potential difference between the plates is V.



What is V?

[1 mark]

A $\frac{mQg}{d}$ ⬭

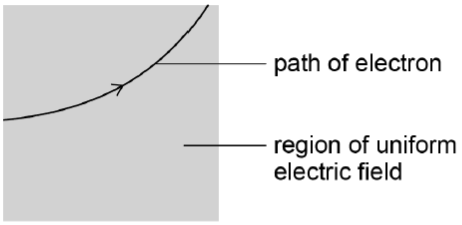
B $\frac{mdg}{Q}$ ⬭

C $\frac{mQ}{d}$ ⬭

D $\frac{md}{Q}$ ⬭

AQA June 2023 · A-level Paper 2 · Q16

3 The diagram shows the path of an electron in a uniform electric field.
The electron moves in a vertical plane.



The direction of the electric field is

[1 mark]

A vertically down the plane. ⬭

B vertically up the plane. ⬭

C horizontally into the plane. ⬭

D horizontally out of the plane. ⬭

Medium

Two or three steps. Roughly a third to a half of students get these right.

Questions 4–6

AQA June 2019 · A-level Paper 2 · Q16

4 An electric field acts into the plane of the paper. An electron enters the field at $90°$ to the field lines.

The force on the electron is

[1 mark]

A zero. ⬭

B along the direction of the field. ⬭

C at $90°$ to the field. ⬭

D opposite to the direction of the field. ⬭

AQA June 2024 · A-level Paper 2 · Q27

5 An ion has a specific charge of $-7.1 \times 10^{7}\ \text{C kg}^{-1}$.
It is held stationary in a vertical electric field on the surface of the Earth.

What are the magnitude and direction of the electric field?

[1 mark]

A $1.38 \times 10^{-7}\ \text{V m}^{-1}$ upwards ⬭

B $1.38 \times 10^{-7}\ \text{V m}^{-1}$ downwards ⬭

C $7.24 \times 10^{6}\ \text{V m}^{-1}$ upwards ⬭

D $7.24 \times 10^{6}\ \text{V m}^{-1}$ downwards ⬭

AQA June 2022 · A-level Paper 2 · Q15

6 A particle of mass m and charge Q is accelerated from rest through a potential difference V. The final velocity of the particle is u.

A second particle of mass $\frac{m}{2}$ and charge $2Q$ is accelerated from rest through a potential difference $2V$.

What is the final velocity of the second particle?

[1 mark]

A $\sqrt{2}u$ ⬭

B $2\sqrt{2}u$ ⬭

C $4u$ ⬭

D $8u$ ⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
www.getbetteratphysics.co.uk