FREE REVISION PACK

Uniform Electric Fields

Pearson Edexcel International Advanced Level Physics · Unit 4 (WPH14) · Specification points 97

Easy | Medium | Hard | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Field strength in a uniform field	Edexcel IAL January 2020 · Unit 4 · Q5	1 mark
2	Easy	Charge on a stationary oil drop	Edexcel IAL October 2020 · Unit 4 · Q6	1 mark
3	Easy	Reducing the deflection in a cathode ray tube	Edexcel IAL January 2022 · Unit 4 · Q6	1 mark
4	Medium	Accelerating a helium nucleus in the same field	Edexcel IAL January 2023 · Unit 4 · Q10	1 mark
5	Hard	Field strength between parallel plates	Edexcel IAL January 2024 · Unit 4 · Q5	1 mark

Key ideas to have ready

- Between parallel plates, E = V/d and the field is uniform.
- Force on a charge F = EQ; acceleration a = EQ/m.
- A stationary charged drop: EQ = mg.
- The field points from the positive plate to the negative plate.

How to use this pack

1. The questions are grouped into levels (Easy, Medium and Hard). 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 Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

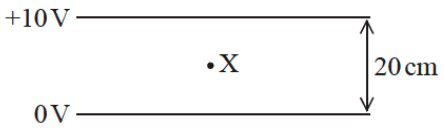
Definitions and one-step ideas. Most students get these right.

Questions 1–3

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL January 2020 · Unit 4 · Q5

1 The diagram shows a potential difference applied across two conducting parallel plates.



Point X is midway between the plates.

Which of the following is the electric field strength at point X?

☒ **A** $50\,\text{V m}^{-1}$ upwards

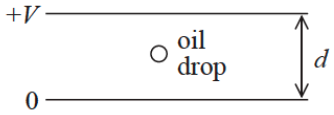
☒ **B** $50\,\text{V m}^{-1}$ downwards

☒ **C** $100\,\text{V m}^{-1}$ upwards

☒ **D** $100\,\text{V m}^{-1}$ downwards

Edexcel IAL October 2020 · Unit 4 · Q6

2 An oil drop with charge q and mass m remains stationary between two metal plates with a potential difference V across them. The plates are separated by distance d.



What is the charge on the oil drop?

☒ **A** $\frac{md}{V}$

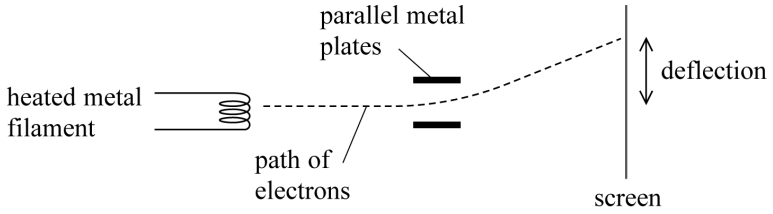
☒ **B** $\frac{mV}{d}$

☒ **C** $\frac{mgd}{V}$

☒ **D** $\frac{mgV}{d}$

Edexcel IAL January 2022 · Unit 4 · Q6

The diagram shows some of the components in a cathode ray tube.



3 When a potential difference is applied across the parallel metal plates, the electrons are deflected.

Which of the following changes would decrease the deflection of the electrons?

☒ **A** increasing the current in the metal filament

☒ **B** increasing the distance between the plates

☒ **C** increasing the length of the plates

☒ **D** increasing the potential difference across the plates

Medium Two or three steps. Roughly a third to a half of students get these right. **Question 4**

Edexcel IAL January 2023 · Unit 4 · Q10

4 A proton is accelerated by a uniform electric field. After time t the speed of the proton has increased by Δv.

A helium nucleus ${}^{4}_{2}\text{He}$ is accelerated by the same electric field.

After what time will the helium nucleus achieve the same change in speed?

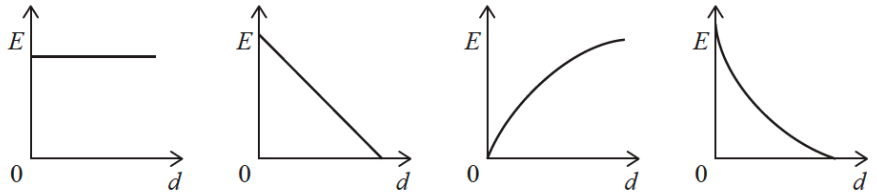
- ☒ **A** $4t$
- ☒ **B** $2t$
- ☒ **C** $\frac{t}{2}$
- ☒ **D** $\frac{t}{4}$

Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Question 5**

Edexcel IAL January 2024 · Unit 4 · Q5

5 A potential difference is applied across two parallel metal plates.

Which of the following graphs shows how the electric field strength E varies with distance d from the positive plate?



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