FREE REVISION PACK

Electric Fields & Coulomb's Law

Pearson Edexcel International Advanced Level Physics · Unit 4 (WPH14) · Specification points 92–95

Easy | Medium | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Field pattern for opposite charges	Edexcel IAL January 2023 · Unit 4 · Q6	1 mark
2	Easy	Reading charge from a field pattern	Edexcel IAL October 2022 · Unit 4 · Q4	1 mark
3	Easy	Charge from Coulomb's law	Edexcel IAL June 2022 · Unit 4 · Q4	1 mark
4	Medium	Electric field strength between two charges	Edexcel IAL January 2021 · Unit 4 · Q7	1 mark
5	Medium	How E varies with distance from a point charge	Edexcel IAL October 2021 · Unit 4 · Q4	1 mark

Key ideas to have ready

- Coulomb's law: $F = kQ_1Q_2/r^2$, $k = 1/(4\pi\varepsilon_0) = 8.99 \times 10^9$ N m^2 C^{-2}.
- Field strength $E = F/Q$; for a point charge $E = kQ/r^2$.
- Field lines go from + to −; their density shows field strength.
- Fields from several charges add as vectors.

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 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

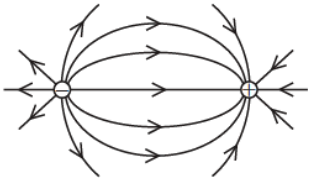
Choose **one** answer for each question and put a cross in the box next to it.

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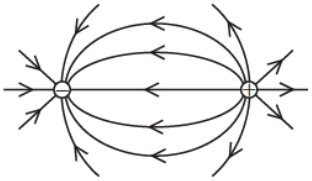
1 Point charges of equal magnitude are placed close together, as shown.



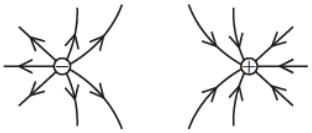
Which of the following diagrams shows the electric field around the charges?



A



B



C

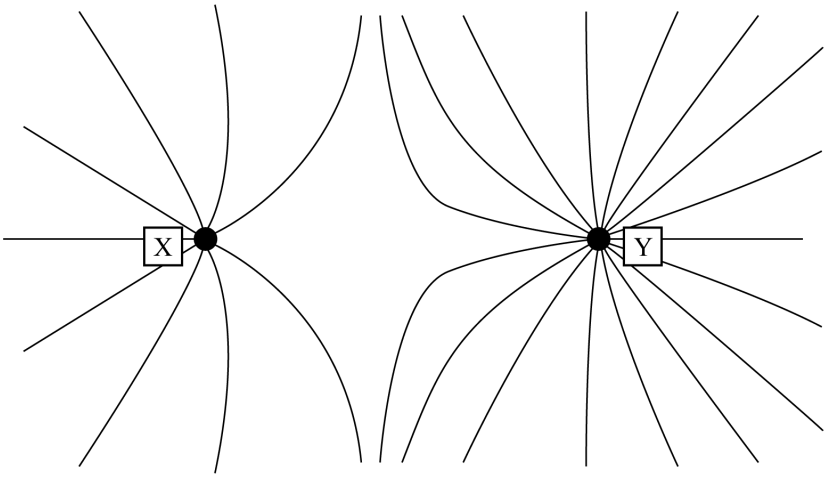


D

- ☒ **A**
- ☒ **B**
- ☒ **C**
- ☒ **D**

Edexcel IAL October 2022 · Unit 4 · Q4

2 The diagram shows the shape of the electric field pattern between two charged particles, X and Y.



X has a charge of $-Q$.

Which of the following could be the charge of Y?

- ☐ **A** $-Q$
- ☐ **B** $-2Q$
- ☐ **C** $+Q$
- ☐ **D** $+2Q$

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3 Two equally-charged ions exert a force of 4.0×10^{-9} N on each other. The distance between the centres of the ions is 2.4×10^{-10} m.

Which of the following is equal to the charge on each ion?

- ☐ **A** $\sqrt{\dfrac{4.0 \times 10^{-9} \times (2.4 \times 10^{-10})^2}{8.99 \times 10^{9}}}$
- ☐ **B** $\sqrt{\dfrac{4.0 \times 10^{-9} \times (2.4 \times 10^{-10})^2}{4 \times \pi \times 8.85 \times 10^{-12}}}$
- ☐ **C** $\dfrac{4.0 \times 10^{-9} \times (2.4 \times 10^{-10})^2}{8.99 \times 10^{9}}$
- ☐ **D** $\dfrac{4.0 \times 10^{-9} \times (2.4 \times 10^{-10})^2}{4 \times \pi \times 8.85 \times 10^{-12}}$

Medium

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

Questions 4–5

Edexcel IAL January 2021 · Unit 4 · Q7

4 Point charges of 2 μC and 3 μC are placed 1.2 m apart as shown.



What is the electric field strength at the point labelled X?

☒ **A** $\frac{2\times10^{-6}}{4\pi\varepsilon_0(0.4)^2}+\frac{3\times10^{-6}}{4\pi\varepsilon_0(0.8)^2}$

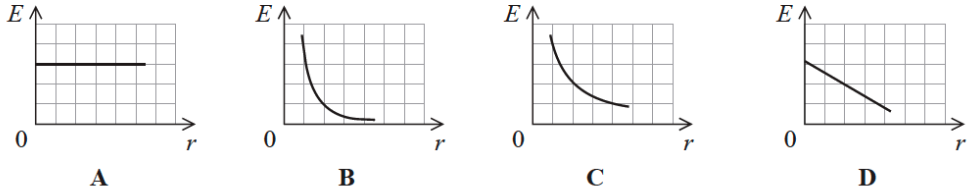
☒ **B** $\frac{2\times10^{-6}}{4\pi\varepsilon_0(0.4)^2}-\frac{3\times10^{-6}}{4\pi\varepsilon_0(0.8)^2}$

☒ **C** $\frac{2\times10^{-6}}{4\pi\varepsilon_0(0.8)^2}+\frac{3\times10^{-6}}{4\pi\varepsilon_0(0.4)^2}$

☒ **D** $\frac{2\times10^{-6}}{4\pi\varepsilon_0(0.8)^2}-\frac{3\times10^{-6}}{4\pi\varepsilon_0(0.4)^2}$

Edexcel IAL October 2021 · Unit 4 · Q4

5 Which of the following graphs shows how the electric field strength E varies with distance r from a positive point charge?



☒ **A**

☒ **B**

☒ **C**

☒ **D**

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