FREE REVISION PACK

Particle Equations & Conservation Laws

Pearson Edexcel International Advanced Level Physics · Unit 4 (WPH14) · Specification points 116, 123–124

Easy | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Conclusions from particle tracks	Edexcel IAL October 2023 · Unit 4 · Q6	1 mark
2	Easy	Equation for neutron decay	Edexcel IAL January 2020 · Unit 4 · Q1	1 mark
3	Easy	Products of proton–antiproton annihilation	Edexcel IAL June 2022 · Unit 4 · Q2	1 mark
4	Easy	Which conservation law is broken	Edexcel IAL October 2020 · Unit 4 · Q2	1 mark
5	Easy	Which pion decay conserves everything	Edexcel IAL January 2024 · Unit 4 · Q6	1 mark

Key ideas to have ready

- In every interaction, charge, baryon number and lepton number are conserved.
- Baryons +1, antibaryons −1; leptons +1, antileptons −1; mesons have baryon number 0.
- β^- decay: $n \rightarrow p + e^- + \bar{\nu}_e$.
- Opposite curvature in the same field means opposite charge.

How to use this pack

1. The questions are grouped into levels (Easy). 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

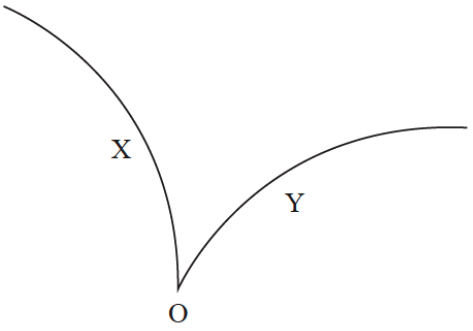
Definitions and one-step ideas. Most students get these right.

Questions 1–5

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

Edexcel IAL October 2023 · Unit 4 · Q6

1 A particle detector shows tracks produced by two particles X and Y. The particles were created by the decay of a kaon at O.



Which of the following can be concluded from the tracks?

☒ **A** A magnetic field acts into the page.

☒ **B** X is a positively charged particle.

☒ **C** Y is an electron.

☒ **D** X and Y have opposite charge.

Edexcel IAL January 2020 · Unit 4 · Q1

2 A neutron can decay to produce a proton.

Which of the following equations correctly shows neutron decay?

☒ **A** $n \rightarrow p + e^{+} + \bar{\nu}_e$

☒ **B** $n \rightarrow p + e^{+} + \nu_e$

☒ **C** $n \rightarrow p + e^{-} + \bar{\nu}_e$

☒ **D** $n \rightarrow p + e^{-} + \nu_e$

Edexcel IAL June 2022 · Unit 4 · Q2

3 A proton collides with an antiproton.

Which of the following could be produced by this collision?

☒ **A** $\pi^{+} + n$

☒ **B** $\pi^{-} + p^{+}$

☒ **C** $\pi^{+} + e^{-}$

☒ **D** $\pi^{+} + \pi^{-}$

Edexcel IAL October 2020 · Unit 4 · Q2

4 A student writes the following equation for the decay of a neutron.

$$n \rightarrow p + e^- + \nu_e$$

Which of the following conservation laws is violated by the equation he has written?

☒ **A** baryon number

☒ **B** charge

☒ **C** energy

☒ **D** lepton number

Edexcel IAL January 2024 · Unit 4 · Q6

5 A pion can decay into two leptons.

Which of the following decays is possible?

☒ **A** $\pi^- \rightarrow e^- + \nu_e$

☒ **B** $\pi^0 \rightarrow e^- + \bar{\nu}_e$

☒ **C** $\pi^0 \rightarrow e^+ + \bar{\nu}_e$

☒ **D** $\pi^+ \rightarrow e^+ + \nu_e$

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