FREE REVISION PACK

Electromagnetic Induction

Pearson Edexcel International Advanced Level Physics · Unit 4 (WPH14) · Specification points 108–110

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

6	6	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Inducing an alternating e.m.f. in a nearby coil	Edexcel IAL October 2022 · Unit 4 · Q10	1 mark
2	Easy	Unit of magnetic flux	Edexcel IAL October 2023 · Unit 4 · Q4	1 mark
3	Easy	Lenz's law: magnet moving away from a coil	Edexcel IAL January 2024 · Unit 4 · Q8	1 mark
4	Medium	Poles of a coil as a magnet falls through	Edexcel IAL October 2020 · Unit 4 · Q10	1 mark
5	Hard	Induced e.m.f. from an alternating current	Edexcel IAL June 2022 · Unit 4 · Q10	1 mark
6	Hard	Change in flux linkage after half a turn	Edexcel IAL October 2021 · Unit 4 · Q5	1 mark

Key ideas to have ready

- Flux $\varphi = BA$ (Wb = T m^2); flux linkage = $N\varphi$.
- Faraday: induced e.m.f. = rate of change of flux linkage.
- Lenz: the induced current opposes the change that causes it.
- Only a changing flux induces an e.m.f.; an alternating current induces an alternating e.m.f.

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

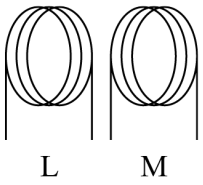
Definitions and one-step ideas. Most students get these right.

Questions 1–3

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

Edexcel IAL October 2022 · Unit 4 · Q10

1 Two coils, L and M, are placed next to each other as shown.



An alternating e.m.f. is induced across coil M.

Which of the following could produce this?

- ☒ **A** an alternating current in coil L
- ☒ **B** a constant current in coil L
- ☒ **C** a decreasing current in coil L
- ☒ **D** an increasing current in coil L

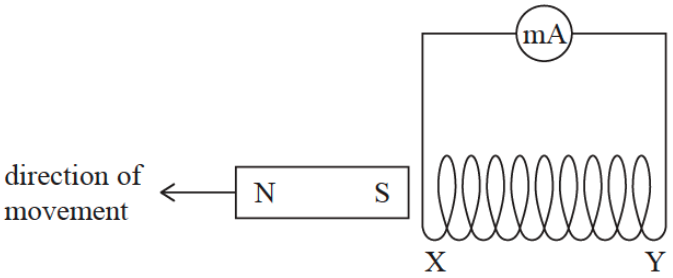
Edexcel IAL October 2023 · Unit 4 · Q4

2 Which of the following is a possible unit for magnetic flux?

- ☒ **A** $\mathrm{T\,m^2}$
- ☒ **B** $\mathrm{T\,m^{-2}}$
- ☒ **C** $\mathrm{Wb\,m^2}$
- ☒ **D** $\mathrm{Wb\,m^{-2}}$

Edexcel IAL January 2024 · Unit 4 · Q8

3 A magnet is moved away from a coil, as shown.



A current is produced in the coil, which creates a magnetic field around the coil.

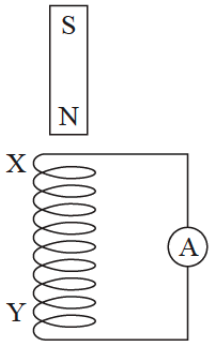
Which row of the table shows the magnetic pole at X and the magnetic pole at Y?

	Magnetic pole at X	Magnetic pole at Y
☒ **A**	north	north
☒ **B**	north	south
☒ **C**	south	north
☒ **D**	south	south

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

Edexcel IAL October 2020 · Unit 4 · Q10

4 A magnet is dropped vertically through a coil, producing a current in the coil which creates a magnetic field around it.



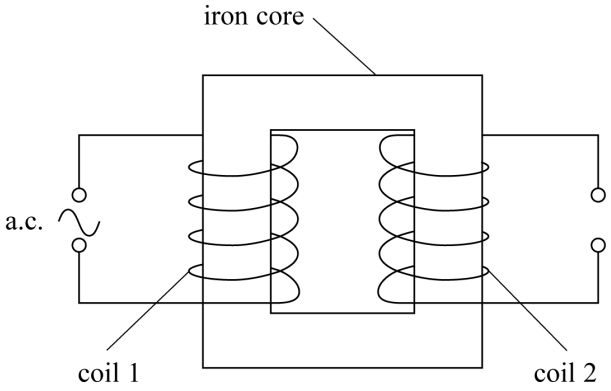
Which line of the table correctly shows the pole at X when the magnet enters the coil, and the pole at Y when the magnet leaves the coil?

	pole of field due to coil at X	pole of field due to coil at Y
☒ **A**	north	north
☒ **B**	north	south
☒ **C**	south	north
☒ **D**	south	south

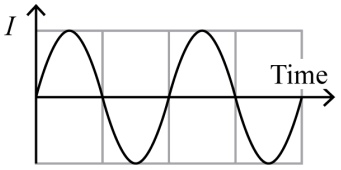
Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Questions 5–6**

Edexcel IAL June 2022 · Unit 4 · Q10

5 Two coils are linked by an iron core as shown. Coil 1 carries an alternating current I.

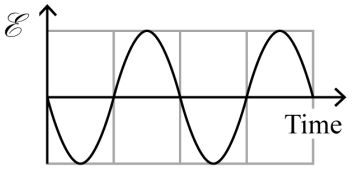


The graph shows the variation of I with time for two complete cycles.

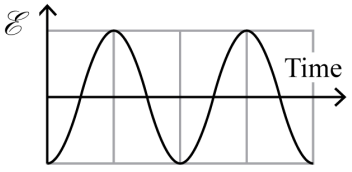


Which of the following graphs gives the corresponding induced e.m.f. $\mathscr{E}$ across coil 2?

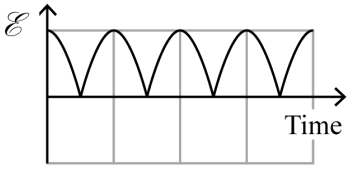
☒ **A**



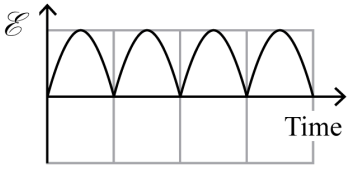
☒ **B**



☒ **C**

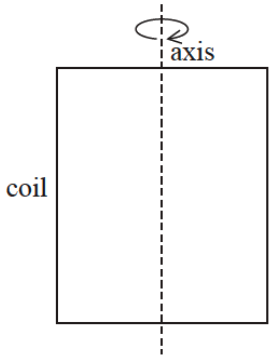


☒ **D**



Edexcel IAL October 2021 · Unit 4 · Q5

6 The diagram shows a rectangular coil of N turns. The coil rotates around an axis as shown. A magnetic field acts perpendicular to the plane of the coil in the position shown.



The magnetic flux linkage with the coil is $N\phi$. The coil is rotated through an angle of π radians.

Which of the following is equal to the change in magnetic flux linkage with the coil?

☒ **A** 0

☒ **B** $N\phi/2$

☒ **C** $N\phi$

☒ **D** $2N\phi$

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