Edexcel Physics A-Level

Topic 7.3 - Magnetic Fields

Flashcards

What is a magnetic field?

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A magnetic field is a region in which a magnetic pole will experience a non-contact force.

In which direction do magnetic field lines point?

In which direction do magnetic field lines point?

From North to South.

What is magnetic flux density?

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Magnetic flux density is a measure of the strength of a magnetic field. It can be viewed as the number of magnetic field lines that pass through a given area.

What three factors determine the force exerted on a charge moving through a magnetic field?

What three factors determine the force exerted on a charge moving through a magnetic field?

1. The magnetic flux density
2. The charge of the particle
3. The velocity of the particle perpendicular to the field

State the equation used to calculate the force exerted on a charge moving through a magnetic field.

State the equation used to calculate the force exerted on a charge moving through a magnetic field.

$$F = Bqv\sin\theta$$

What is the relationship between the direction of a charge's motion and the direction of the magnetic force it experiences?

What is the relationship between the direction of a charge's motion and the direction of the magnetic force it experiences?

The force is always perpendicular to the charge's motion.

Describe and explain the path taken by a charge in a magnetic field.

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The charge will move in a circular path. This is because the magnetic force always acts perpendicular to the charge's motion and so acts as a centripetal force.

What is produced by a current-carrying wire?

What is produced by a current-carrying wire?

A magnetic field is produced in concentric circles around a wire when a current passes through it.

What occurs when a current-carrying wire is placed in a magnetic field?

What occurs when a current-carrying wire is placed in a magnetic field?

The wire will experience a force due the permanent magnetic field interacting with the wire's magnetic field.

What three factors affect the force experiences by a current-carrying wire placed in a magnetic field?

What three factors affect the force experiences by a current-carrying wire placed in a magnetic field?

1. The magnetic flux density of the field
2. The current passing through the wire
3. The length of the wire

State the equation used to calculate the force experienced by a current-carrying wire placed in a magnetic field.

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$$F = BIL\sin\theta$$

What is Fleming's left-hand rule used for?

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To determine the direction of the force experienced by a current-carrying wire or moving charge in a magnetic field.

What does the thumb represent when using Fleming's left-hand rule?

What does the thumb represent when using Fleming's left-hand rule?

The thumb represents the direction of the force.

What does the first finger represent when using Fleming's left-hand rule?

What does the first finger represent when using Fleming's left-hand rule?

The direction of the field.

What does the second finger represent when using Fleming's left-hand rule for a moving charge?

What does the second finger represent when using Fleming's left-hand rule for a moving charge?

The direction that a positive charge would move. This means that if it is a negative charge, you must point you second finger on the opposite direction to its motion.

What does the second finger represent when using Fleming's left-hand rule for a current-carrying wire?

What does the second finger represent when using Fleming's left-hand rule for a current-carrying wire?

The direction of conventional current flow.