

# OCR B Physics A Level

## 6.1.1 - Magnetic Fields

Flashcards



# What is magnetic flux?



## What is magnetic flux?

Magnetic flux describes the magnetic field or magnetic field lines passing through a given area.



# What is magnetic flux density?



## What is magnetic flux density?

Magnetic flux density is a measure of the strength of a magnetic field.



What does the direction that magnetic field lines point in represent?



What does the direction that magnetic field lines point in represent?

Magnetic field lines show the direction of a force acting on a positive charge.

Magnetic field lines also point from the North to the South face of a magnet.



What is always true about magnetic field lines?





What is always true about magnetic field lines?

Magnetic field lines never cross over each other.



If the field is stronger at a given position,  
what can be said about the field lines?



If the field is stronger at a given position, what can be said about the field lines?

The density of field lines is greater at that position.



State the equation linking magnetic flux and magnetic flux density.



State the equation linking magnetic flux and magnetic flux density.

$$\Phi = BA$$

Where  $\Phi$  = flux,  $B$  = flux density and  
 $A$  = area



# What is the unit of magnetic flux?



What is the unit of magnetic flux?

Weber, Wb



What is the unit of magnetic flux density?





What is the unit of magnetic flux density?

Tesla, T



# What is magnetic flux linkage?



# What is magnetic flux linkage?

The product of the flux and the number of coils it passes through.



What happens when there is relative movement between a conductor and a magnetic field?



What happens when there is relative movement between a conductor and a magnetic field?

A potential difference is induced across the ends of the conductor.



If the conductor moving in a magnetic field forms a complete loop, what else is produced?



If the conductor moving in a magnetic field forms a complete loop, what else is produced?

The induced potential difference causes a current to flow.



# What does Faraday's Law state?





## What does Faraday's Law state?

Faraday's law states that the emf induced is directly proportional to the rate of change of magnetic flux linkage.



What law governs the direction of the induced emf?



What law governs the direction of the induced emf?

Lenz's Law



# What does Lenz's law state?



## What does Lenz's law state?

The direction of an induced emf is such that it opposes the motion that caused it.



What is the defining equation of Faraday's Law, taking Lenz's Law into account?



What is the defining equation of Faraday's Law, taking Lenz's Law into account?

$$\varepsilon = \frac{-\Delta N\Phi}{\Delta t}$$

Where  $\varepsilon$  is the induced emf,  $N$  is the number of turns of the coil,  $\Phi$  is the magnetic flux and  $t$  is the time



What does it mean if a magnetic system is said to have a high permeance?





What does it mean if a magnetic system is said to have a high permeance?

The magnetic system conducts flux easily.



Why do gaps between metallic materials reduce the magnetic field significantly?



Why do gaps between metallic materials reduce the magnetic field significantly?

The gaps are filled with air which has a very low permeability and so doesn't carry a magnetic field easily.



What is the consequence of increasing the cross-sectional area of a magnetic circuit?



What is the consequence of increasing the cross sectional area of a magnetic circuit?

The permeance is increased.

