Eduqas Physics – Component 3

Module 9: Magnetic Fields

This topic covers the concept of magnetic fields and investigates the forces on current carrying conductors and moving charges in magnetic fields. The magnetic fields due to currents and the force between current carrying conductors is investigated. Learners also study the deflection of beams of charged particles in electric and magnetic fields.

You should be able to demonstrate and show your understanding of:	Progress and understanding:			
	1	2	3	4
How to determine the direction of the force on a current carrying conductor in a magnetic field				
How to calculate the magnetic field, B, by considering the force on a current carrying conductor in a magnetic field i.e. understand how to use $F = BIl\sin\theta$				
How to use $F = Bqv\sin\theta$ for a moving charge in a magnetic field				
The processes involved in the production of a Hall voltage and understand that $V_H \propto B$ for constant I				
The shapes of the magnetic fields due to a current in a long straight wire and a long solenoid				
The equations $B = \frac{\mu_0 I}{2\pi a}$ and $B = \mu_0 nI$ for the field strengths due to a long straight wire and in a long solenoid				
The fact that adding an iron core increases the field strength in a solenoid				
The idea that current carrying conductors exert a force on each other and to predict the directions of the forces				
Quantitatively, how ion beams of charged particles, are deflected in uniform electric and magnetic fields				
The motion of charged particles in magnetic and electric fields in linear accelerators, cyclotrons and synchrotrons				
SPECIFIED PRACTICAL WORK				
Investigation of the force on a current in a magnetic field				
Investigation of magnetic flux density using a Hall probe				