

Electricity and Magnetism

PH11-11

3 inquiry questions · 13 dot points

1 How do charged objects interact with other charged objects and with neutral objects?

- conduct investigations to describe and analyse qualitatively and quantitatively:...
- apply the electric field model to account for and quantitatively analyse interactions between charged objects using:...
- analyse the effects of a moving charge in an electric field, in order to relate potential energy, work and equipotential lines, by applying:...

2 How do the processes of the transfer and the transformation of energy occur in electric circuits?

- investigate the flow of electric current in metals and apply models to represent current, including:...
- investigate quantitatively the current–voltage relationships in ohmic and non-ohmic resistors to explore the usefulness and limitations of Ohm's Law using:...
- investigate quantitatively and analyse the rate of conversion of electrical energy in components of electric circuits, including the production of heat and light, by applying $P=VI$ and $E=Pt$ and variations that involve Ohm's Law
- investigate qualitatively and quantitatively series and parallel circuits to relate the flow of current through the individual components, the potential differences across those components and the rate of energy conversion by the components to the laws of conservation of charge and energy, by deriving the following relationships:...
- investigate quantitatively the application of the law of conservation of energy to the heating effects of electric currents, including the application of $P=VI$ and variations of this involving Ohm's Law

3 How do magnetised and magnetic objects interact?

- investigate and describe qualitatively the force produced between magnetised and magnetic materials in the context of ferromagnetic materials
- use magnetic field lines to model qualitatively the direction and strength of magnetic fields produced by magnets, current-carrying wires and solenoids and relate these fields to their effect on magnetic materials that are placed within them
- conduct investigations into and describe quantitatively the magnetic fields produced by wires and solenoids, including:...
- investigate and explain the process by which ferromagnetic materials become magnetised
- apply models to represent qualitatively and describe quantitatively the features of magnetic fields