

Definitions and Concepts for Edexcel Physics A Level

Topic 7: Electric and Magnetic Fields

Capacitance: The ratio of the charge stored in a capacitor to the potential difference between the two sides of the capacitor.

Coulomb's Law: The size of the force that acts between two point charges is proportional to the product of their charges and inversely proportional to the square of their separation. It is attractive for opposite charges and repulsive for like charges.

Dielectric: An insulating material placed between capacitor plates that prevents charge from crossing between the plates. The dielectric becomes polarised when the capacitor is charged and changes the capacitance of the capacitor.

Eddy Current: Small closed loops of current within a conductor or magnet. In a transformer these currents act against the magnetic flux that generates a current in the secondary coil making the transformer less efficient and heating the core.

Electric Field: A region of space in which charged particles experience either an attractive or repulsive force depending on the charge of the particle and direction of the field.

Electric Field Lines: A way of representing an electric field in a diagram, they point in the direction that a positive charge would experience a force, point positive to negative.

Electric Field Strength: Defined at a point. The electrostatic force experienced by a unit positive charge at a that point in the field.

Electric Potential: Defined at a point. The work done moving a unit positive charge from an infinite distance away to that point.

Electric Potential Difference: The work done moving a unit positive charge between two points.

Electromagnetic Induction: When a current carrying conductor moves relative to a magnetic field an EMF is induced in the conductor.

Electrostatic Force: The force generated between charges due to Coulomb's Law.

Equipotential: Planes of points where the electric potential is the same, no work is done moving charge along these lines.

Faraday's Law: The magnitude of the induced EMF is directly proportional to the rate of change of magnetic flux linkage.



Fleming's Left hand Rule: The relative direction of motion, field direction and current direction in the motor effect can be represented by the thumb, first finger and second finger of the left hand respectively. For the motion of a charged particle in a magnetic field, its direction replaces the current direction.

Frequency: The number of complete oscillations of the current (or voltage) in an A.C circuit per second.

Lamination: When a transformers core is made up of sets of layers to prevent eddy currents.

Lenz's Law: The direction of an induced current is such that it opposes the current that created it.

Magnetic Field: A region of space in which magnetic materials and moving electric charges feel a force.

Magnetic Flux: The magnetic field passing through a given area. Given by the product of the magnetic flux density and the area.

Magnetic Flux Density: The strength of a magnetic field measured in Tesla.

Magnetic Flux Linkage: The magnetic flux of a coil found by the product of the magnetic flux and number of turns of a coil.

Motor Effect: The force felt by a current carrying wire in a magnetic field.

Oscilloscope: A device used to monitor periodically time changing quantities such as voltage or current in an A.C circuit.

Peak Value: The maximum voltage or current that an A.C circuit achieves.

Period: The time taken for the current (or voltage) in an A.C circuit to complete one full cycle.

Radial Field: A field with field lines originating from a point like spokes on a wheel.

Root-Mean-Square (RMS) Value: For an A.C circuit RMS is the value of the voltage or current that would produce the same power dissipation in a D.C circuit as the A.C circuit. It is defined as the peak voltage divided by square root 2.

Time Constant: Describes the rate of charge or discharge of a capacitor. It is the time taken for the capacitor to charge from zero to 63% of its full value or to discharge from full to 37% of its full value.

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Transformer: A device used to increase or decrease the voltage with two sets of coils with different numbers of turns wrapped around a magnetic core. The transformer is step-up if the number of coils on the secondary coil is greater than the number on the primary coil. The transformer is step-down if the number of coils on the secondary coil is fewer than the number on the primary coil.

Uniform Field: A field with parallel field lines.