Topic 17 Electric fields

Summary

- Insulators may be charged by friction.
- Like charges repel; unlike charges attract each other.
- When charged objects are placed near conductors, they cause a redistribution of charge in the conductor, thereby inducing charges.
- An electric field is a region of space where a stationary charge experiences a force.
- Electric field strength is the force per unit positive charge: $E = F/Q$
- The electric field between parallel plates is uniform. The field strength is given by: $E = V/d$
- The motion of a charged particle moving in the direction of the electric field can be analysed using the equations of constant acceleration.
- The motion of a charged particle moving with a uniform velocity in one direction and a uniform acceleration in a perpendicular direction is parabolic.

Definitions and formulae

- Electric field strength is defined as the force per unit positive charge.
- Unit of electric field strength N C^{-1}
- Direction of electric field is from positive to negative.
- A uniform field has equally spaced parallel field lines.
- $E = V/d$ (uniform field between parallel plates)
- Unit of electric field strength also V m^{-1} equivalent to N C^{-1}
- Force F on charge Q in a uniform electric field is $F = EQ$