- The **Joule heating** that takes place in the fuse melts it to break the electric circuit.
- Overloading can also occur due to an accidental hike in the supply voltage. Sometimes overloading is caused by connecting too many appliances to a single socket.

Summary

- An electromagnet consists of a core of soft iron wrapped around with a coil of insulated copper wire.
- A current-carrying conductor when placed in a magnetic field experiences a force.
- If the direction of the field & that of the current are mutually perpendicular to each other, then the force acting on the conductor will be perpendicular to both & will be given by **Fleming's left-hand rule**. This is the **basis of an electric motor**.
- The phenomenon of **electromagnetic induction** is the production of **induced current in a coil** placed in a region where the magnetic field changes with time. If the coil is placed near to a current-carrying conductor, the magnetic field may change either due to a change in the current through the conductor or due to the relative motion between the coil & conductor. The direction of the induced current is given by the **Fleming's right-hand rule**.
- In our houses we receive AC electric power of220 V with a frequency of 50 Hz.

Q. Which of the following correctly describes the magnetic field near a long straight wire?

a) The field consists of straight lines perpendicular to the wire.
b) The field consists of straight lines parallel to the wire.
c) The field consists of radial lines originating from the wire.
d) The field consists of concentric circles centred on the wire.

Q. The phenomenon of electromagnetic induction is

a) the process of charging a body.
b) the process of generating magnetic field due to a current passing through a coil.
c) producing induced current in a coil due to relative motion between a magnet & the coil.
d) the process of rotating a coil of an electric motor.

Q. The essential difference between an AC generator & a DC generator is that

a) AC generator has an electromagnet while a DC generator has permanent magnet.
b) DC generator will generate a higher voltage.
c) AC generator will generate a higher voltage.
d) AC generator has slip rings while the DC generator has a commutator.

Answer: option four

Q. When is the force experienced by a current-carrying conductor placed in a magnetic field largest?

- Ans: when the magnetic field & electric current are perpendicular to each other (**Fleming's left-hand rule**).

Q. Imagine that you are sitting in a chamber with your back to one wall. An electron beam moving horizontally from back wall towards the front wall, is deflected by a strong magnetic field to your right side. What is the direction of magnetic field?