

Q what is resistance 'R'

Date:

Page No.

heating Effect of Current

heating Effect of Current - Joule's law

Whenever the electric current is passed through a conductor, it becomes hot after some time, this indicates that the electric energy is being converted into heat energy. This effect is known as heating effect of current or Joule heating effect.

ex. electric bulb, electric furnace, electric press, heat-converter etc.

Amount of heat produced H , when current I flows through a conductor of resistance

Consider a conductor AB of resistance R .

Let $V =$ Potential difference (in Volt) applied on the AB

$I =$ Current (in amp) flow^{ing} through AB.

$t =$ time for which current is flowing.

Total charge flowing through A to B in time t is

$$q = I t \quad (\because \text{charge} = \text{Current} \times \text{time})$$

* } Potential difference, work done in carrying unit charge from A to B $= V$.

Total work done in carrying a charge q from A to B is

$$\begin{aligned} W &= V \times q = V \times I t \\ &= I R \times I t \quad [\because V = I R] \\ &= I^2 R t \end{aligned}$$

This work done is called electric work.

* } Amount of heat produced is given by