

Topic:- Limitations of ohm's law, Superconductivity
Temperature dependence of Resistivity

[8] Limitations of ohm's law:- ohm's law is obeyed by many substances under certain condition but it is not a fundamental law of nature. Therefore substances can be classified in two types.

- Ohmic Conductors
- Non-ohmic Conductors.

Ohmic Conductors:- The conductors which obey ohm's law are called ohmic conductors. i.e. for these conductors the linear relationship b/w voltage & current ($V \propto I$) holds good. Ex -

- Metallic conductor for small current.
- electrolyte like Copper Sulphate solution with copper electrodes.

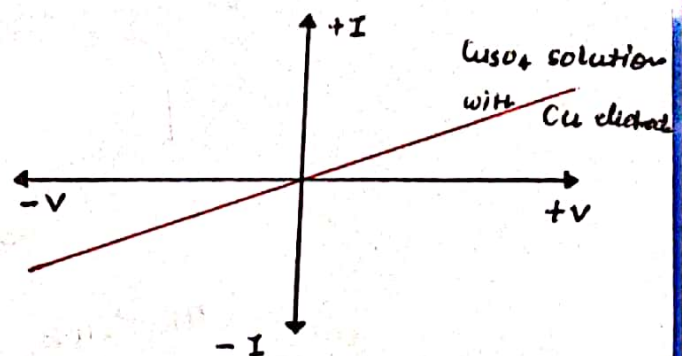
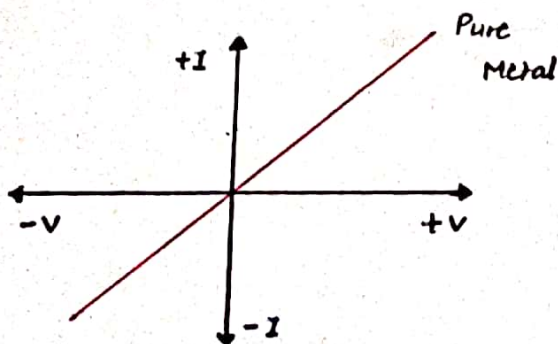
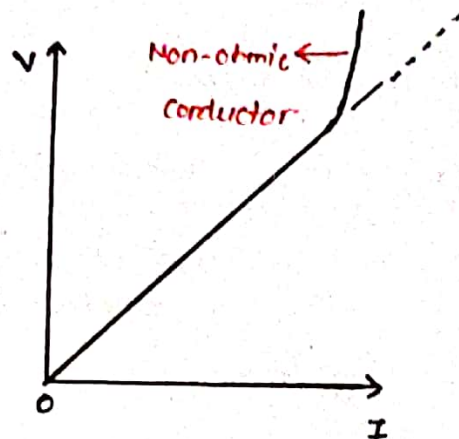


fig:- Ohmic Conductor

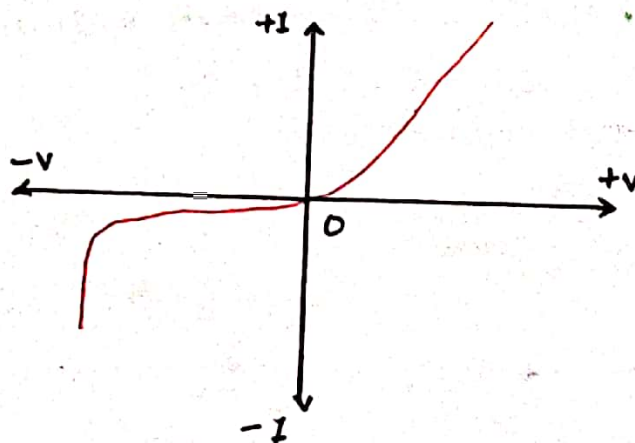
Non-ohmic Conductor :- The Conductors which do not obey ohm's law are called non-ohmic conductors. Non-ohmic situations may be of the following types.

- The straight line $V-I$ graph does not pass through the origin
- $V-I$ relationship is non linear

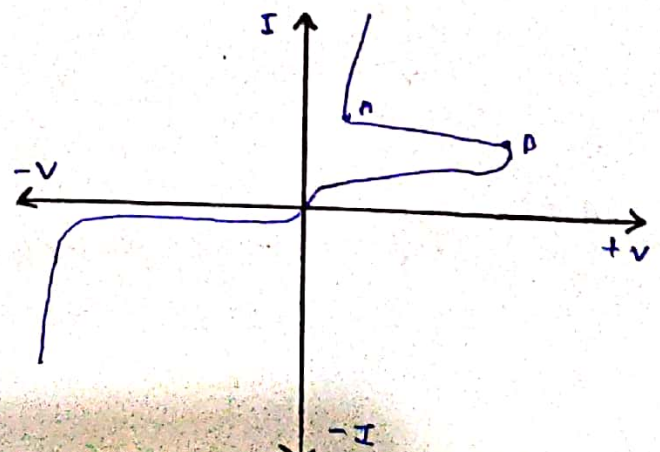
Example :- (i) Metallic Conductor at larger current



(ii) P-n Junction diode



(iii) Thyristor



(iv) Gallium Arsenide :-

