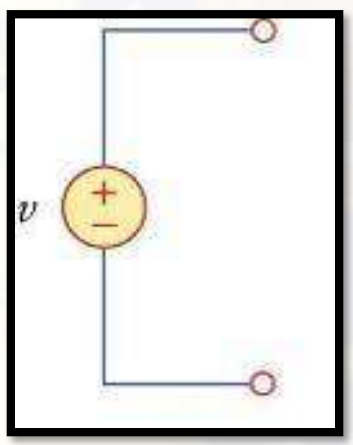
UNIT I

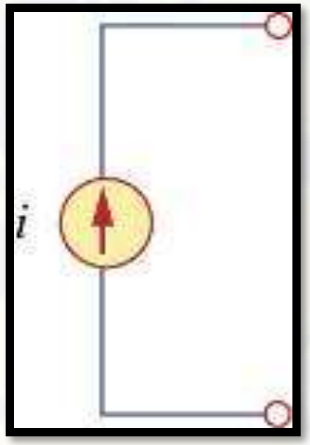
DC CIRCUITS

IDEAL SOURCES

An **ideal source** is an active element that provides a specified voltage or current that is completely independent of other circuit elements.



DC Voltage Source



DC current source

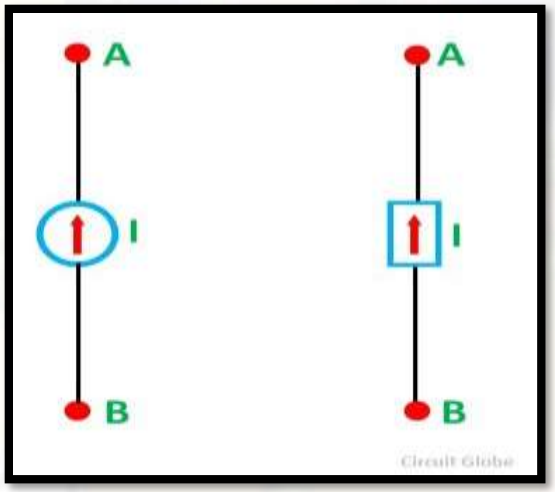
CURRENT SOURCES

In general, a current source determines the direction and magnitude of the current in the branch where it is located.

Furthermore, the magnitude and the polarity of the voltage across a current source are each a function of the network to which the voltage is applied.

IDEAL CURRENT SOURCE

An Ideal current source is a two-terminal circuit element which supplies the same current to any load resistance connected across its terminals .It is important to keep in mind that the current supplied by the current source is independent of the voltage of source terminals.
It has infinite resistance.



PRACTICAL CURRENT SOURCE

A **practical current source** is represented as an ideal current source connected with the resistance in parallel. The symbolic representation is shown below

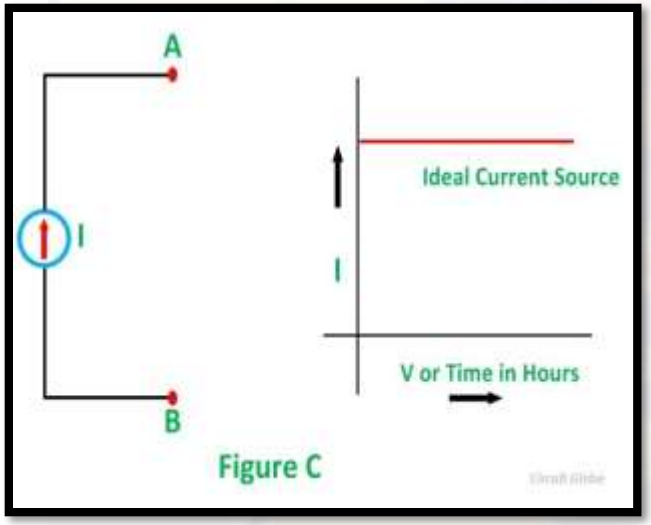


Figure C

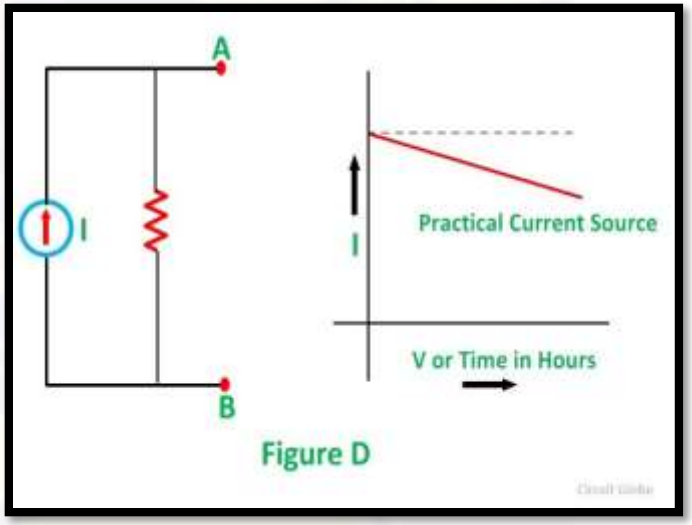
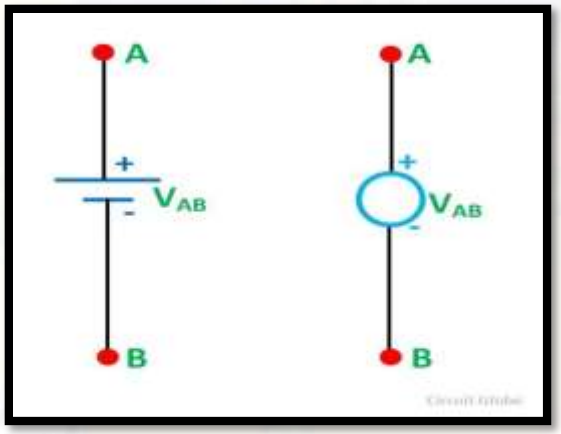


Figure D

IDEAL VOLTAGE SOURCE

A **voltage source** is a two-terminal device whose voltage at any instant of time is constant and is independent of the current drawn from it. Such a voltage source is called an **Ideal Voltage Source** and have zero internal resistance.

Practically an ideal voltage source cannot be obtained.



PRACTICAL VOLTAGE SOURCE

Sources having some amount of internal resistances are known as **Practical Voltage Source**. due to this internal resistance; voltage drop takes place, and it causes the terminal voltage to reduce. The smaller is the internal resistance (r) of a voltage source, the more closer it is to an Ideal Source. The symbolic representation of the ideal and practical voltage source is shown below.

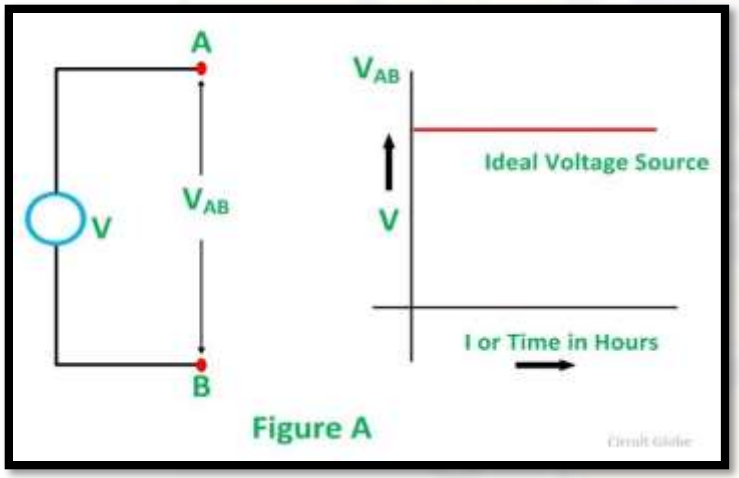


Figure A

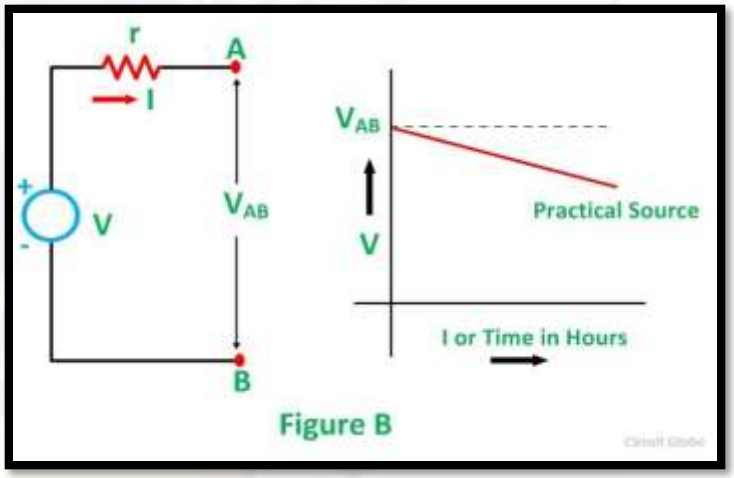


Figure B