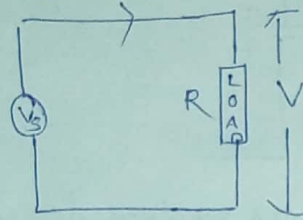


Sources → There are two type of Sources $\begin{cases} \text{Voltage Source} \\ \text{Current Source} \end{cases}$
Independent Source

(I) Voltage Source:-

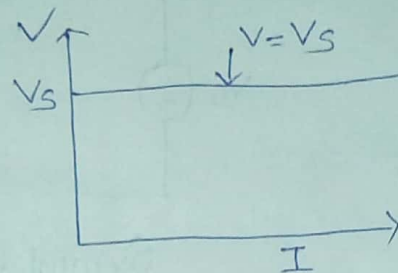
(a) Ideal Voltage Source → An ideal Voltage Source that provide Constant Voltage across it terminal, irrespective of Current flowing it, i.e. the internal resistance is zero or negligible.



$$V = V_S - I r_S$$

$$V = V_S$$

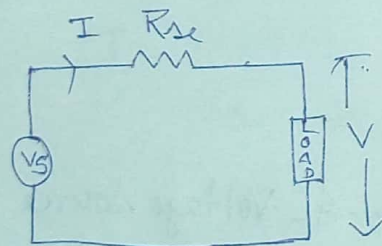
(a)



V-I chara.

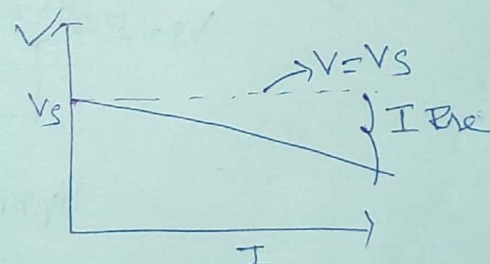
(b)

(b) Practical Voltage Source → Practically, every voltage Source has Finite Smaller internal resistance, because of this voltage across the terminal decrease slightly with increase in Current



$$V = V_S - I R_{se}$$

(a)



V-I char.

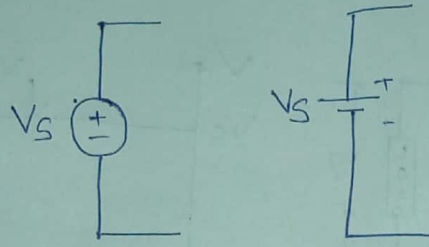
(b)

Voltage Source are further classified into:→

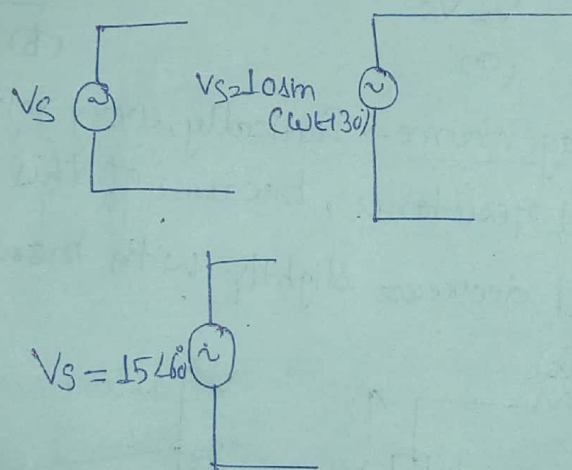
(i) Time Invariant Voltage Source / DC Voltage Source

→ Source Voltage is not Varying with the time
are known as Time invariant

(ii) Time Variant Voltage Source or AC Voltage Source

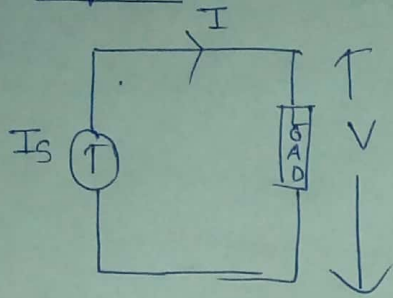


Symbol for DC Voltage Source

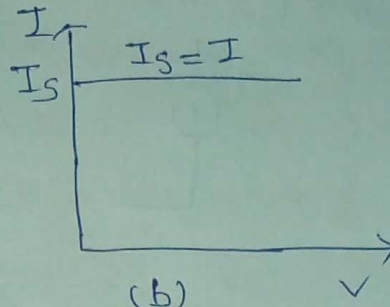


Symbol for AC Voltage Source

(II) (a) Ideal Current Source \rightarrow It is a Source which give Constant Current at its terminal irrespective of Voltage across it terminal. Internal resistance of ideal Current source is infinite

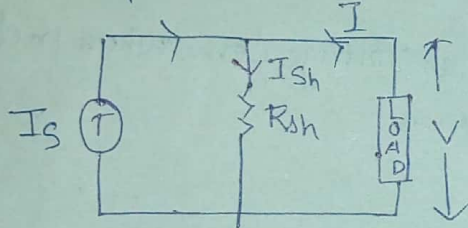


(a) Ckt.



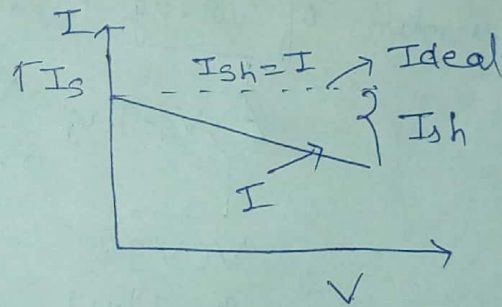
(b)

(b) Practical Current Source \rightarrow It has finite internal resistance and it deliver energy at specified Current which depend on Voltage across source. In this, R_{sh} is in parallel with Current source



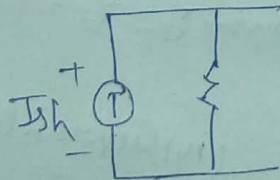
$$I = I_s - I_{sh}$$

$$I = I_s - \frac{V}{R_{sh}}$$

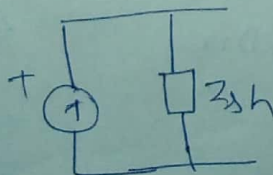


They are further divided into

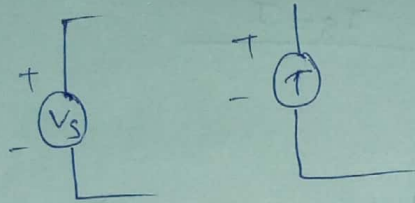
(a) Time invariant Current source or DC source



(b) Time Variant

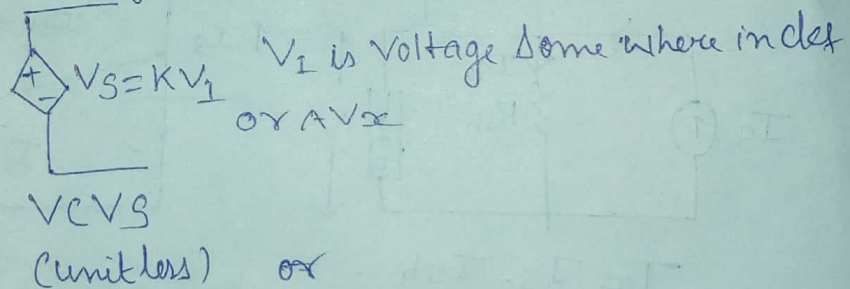


Independent Source → The Source does not depend on other voltage or current in network for their values. These are represented by Circle with polarity of Voltage overall direction of Current indicated inside

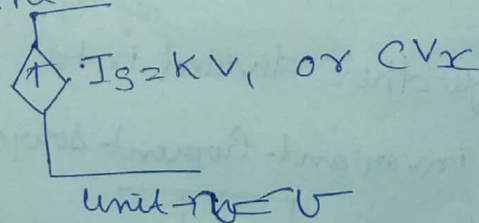


Dependent sources → Those source whose value depend on other source present in ckt. Representation → \diamond

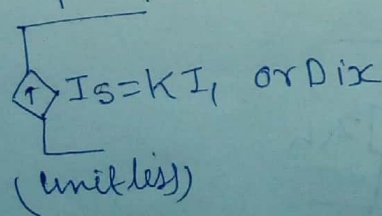
(i) Voltage dependent Voltage source → It produces Voltage as function of Voltage in the given ckt



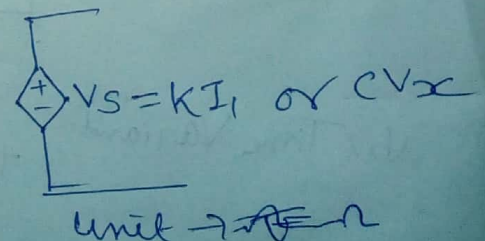
(ii) Voltage dep. Current source (VCCS)



(iii) Current dep. Current source



(iv) Current dep Voltage source



(2) Inductance (L) → It is the property of material by which it oppose any change of current through it. Thus, the current through inductor can not change instant. It

$$L = \frac{\psi}{I}$$

ψ = flux linkage

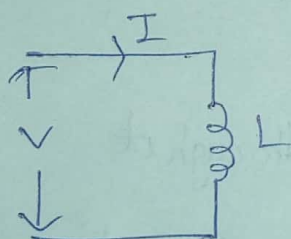
$$\Rightarrow N\phi$$

$N \rightarrow$ no. of turn, $\phi \rightarrow$ flux in web.

$$L = \frac{N\phi}{I}$$

Unit \rightarrow Henry

Inductor → If terminal voltage of an element is prop. to derivative of current w.r.t time, then element is inductor



$$V \propto \frac{di}{dt}$$

$$V = L \frac{di}{dt}$$

$L \rightarrow$ Henry

* (i) When the magnetic flux linking with any ckt changes emf is induced in the ckt
or Whenever Conductor cut across the magnetic field emf induced in the Conductor

(ii) The magnitude of induced emf in Coil is directly prop. to rate of change of flux

$$e = N \frac{d\phi}{dt}$$

$N \rightarrow$ no. of turn

$$\phi \propto i$$