D.C CIRCUITS 1 [Kirchhoff's Laws + Potentiometers].

02 March 2021 20:05

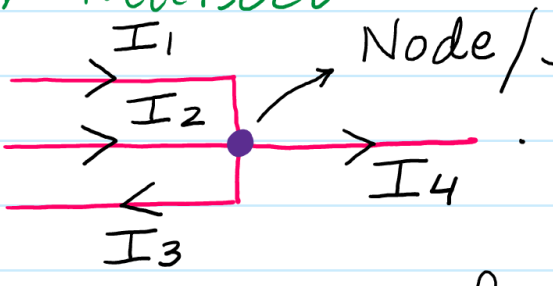
Kirchhoff's Laws.

- Purpose :. To help us determine the value of **current** in Electrical Circuits involving **multiple batteries**
- 2 Laws

① KCL (Kirchhoff's Current Law)
② KVL (Kirchhoff's Voltage Law)

① **KCL** :- This Law states that Current arriving at a Node or a Junction must be **equal to** the Current leaving the node or Junction

Node/Junction refers to any pt in a circuit where **multiple wires** meet or intersect.



form an equation for Current based on KCL

Current arriving (Node) = Current Leaving.

$I_1 + I_2 = I_3 + I_4$. (Node

Note :. This law KCL is based on Law of Conservation of Charge which states that Charges can neither be created nor destroyed.

Kirchhoff's Voltage Law (KVL)

4 points :.

. Consider any closed loop and imagine that you are moving in that loop.

① If you see a battery such that you observe the negative terminal first & than the positive terminal, assume that the voltage is getting **raised** & write down this voltage as a **positive value**.

② If instead you observe the positive terminal of the battery first & than the negative terminal, assume that the voltage is getting **dropped** & write down this voltage as a **negative value**

If while moving in the circuit you come across a Resistor than use rule ③ & ④

③ If your direction of movement is the **same** as the direction of Current in that branch, than write down the voltage of the Resistor with a **negative sign** (i.e $-IR$)

④ If your direction of movement is **Opposite** to the direction of Current in that branch, than write down the voltage of the Resistor with a **positive sign** (i.e $+IR$)

When you return back to your starting pt, equate your equation to zero. This Law is Based on Law of Conservation of Energy which states that the Voltage provided by the battery is **consumed** by the Resistor :.

Sum of voltage in a closed Loop is equal to Zero