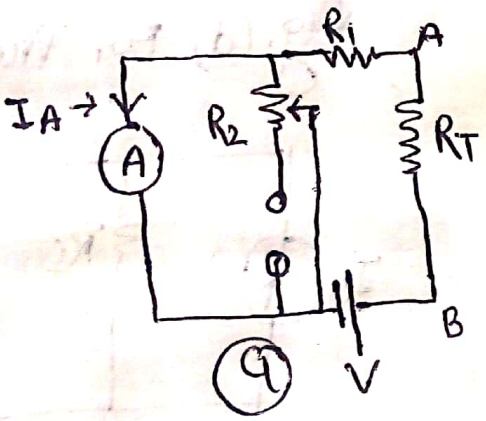
Topic: ohmmeter

ohm meter: It is used for measure the medium resistance

Medium resistance value – 1 ohm – 100 ohm

There are two types of ohmmeter

- Series type ohmmeter
- Parallel (shunt) type ohmmeter



Where,

(A) → Ammeter

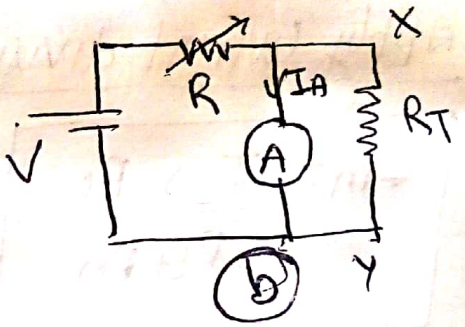
DC Source ⟶ V → Battery (Fixed)

R_T → Test resistance

I_A → current

R_2 → Variable resistance

R_1 → limiting resistance to control burning



Where,

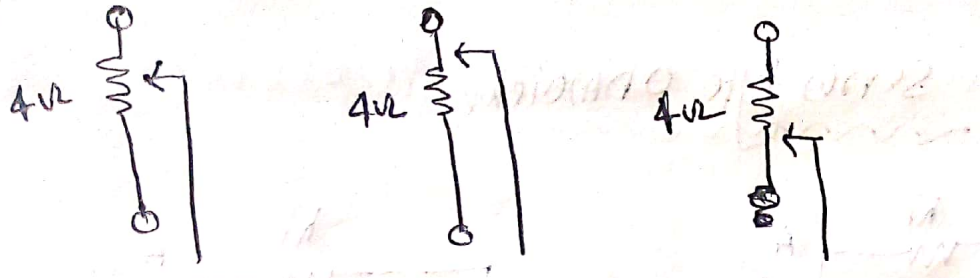
V → DC Source

R_T → Test resistance

(A) → Ammeter

R → Variable resistance

Note: Battery (V), Ammeter (A) and R_1 (limiting resistance) connected in series. Hence, it called Series type ohm meter



Ans = 2Ω Ans = 4Ω Ans = 0Ω

Concept of Potentiometer

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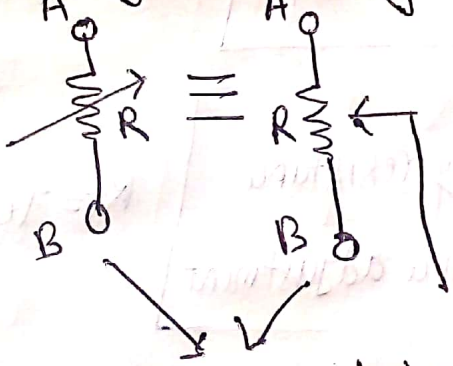
It is used to measure the variable resistance.

Sometimes it is also represented by in this way

(a)



(b)

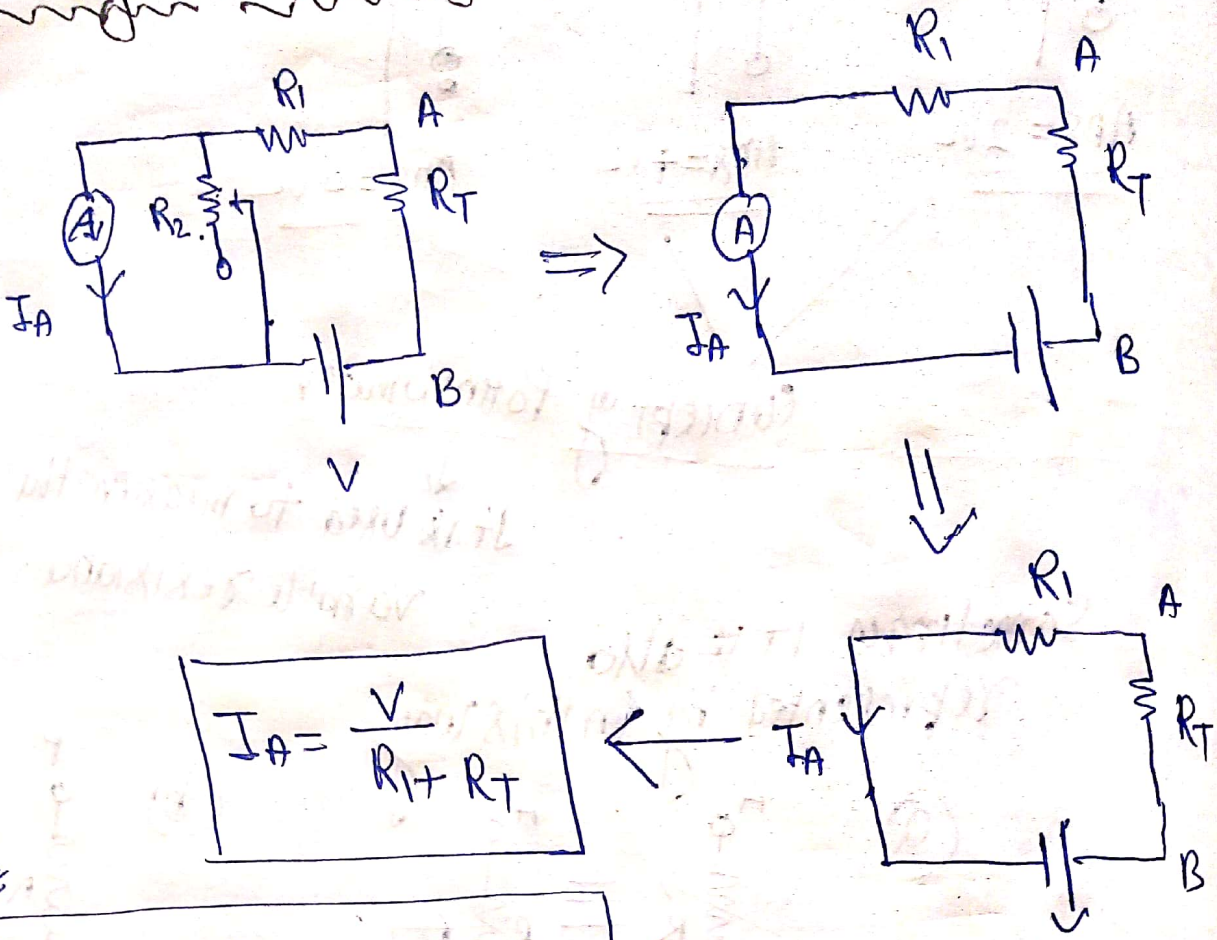
Fixed Resistor

Both are behaves like variable resistance.

Note: (a) When Ammeter (A) is connected in series with test resistance (R_T). This is named as series type ohm meter as shown in Fig. (a)

(b) When Ammeter (A) is connected with test in parallel with test resistance (R_T). This is called as parallel type or Shunt type ohm meter as shown in Fig. (b)

Working of Series type ohmmeter



$$I_A = \frac{V}{R_1 + R_T}$$

Note

R_1 = current limiting resistance

R_2 = zero resistance adjustment

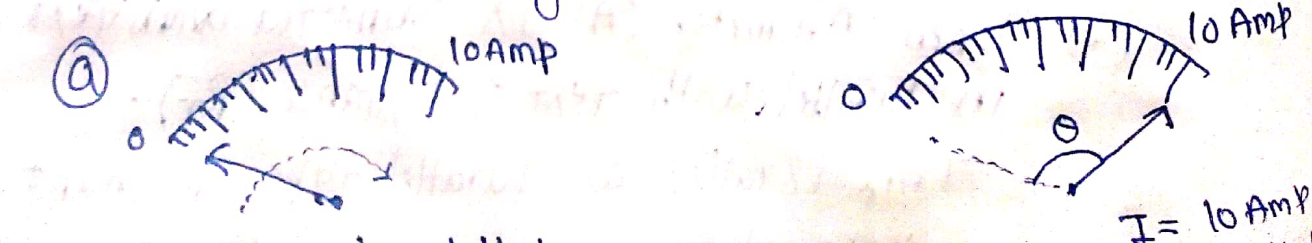
R_T = Test resistance

(A) = Ammeter is used here to measure the current.

① if no current flow in the circuit, the deflection will be zero

① if current start to flow, in the circuit, the deflection will be happened.

What is the meaning of Deflection



I = 0 ie deflection = 0 or movement = 0

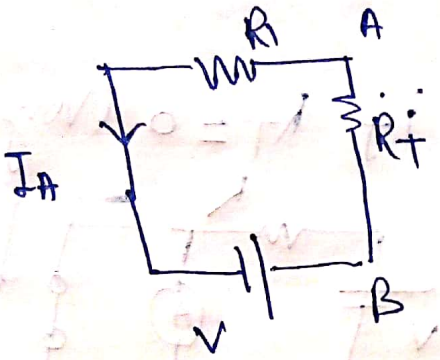
I = 10 Amp max m deflection

i.e Deflection $\propto$ Current

$$\theta \propto I \quad \text{or} \quad \theta = KI$$

if $\theta = 0 \quad I = 0$

if $\theta \neq 0 \quad I \neq 0$



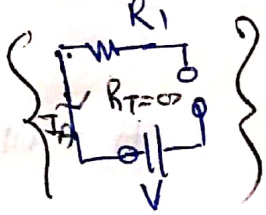
$$I = \frac{V}{R_1 + R_T}$$

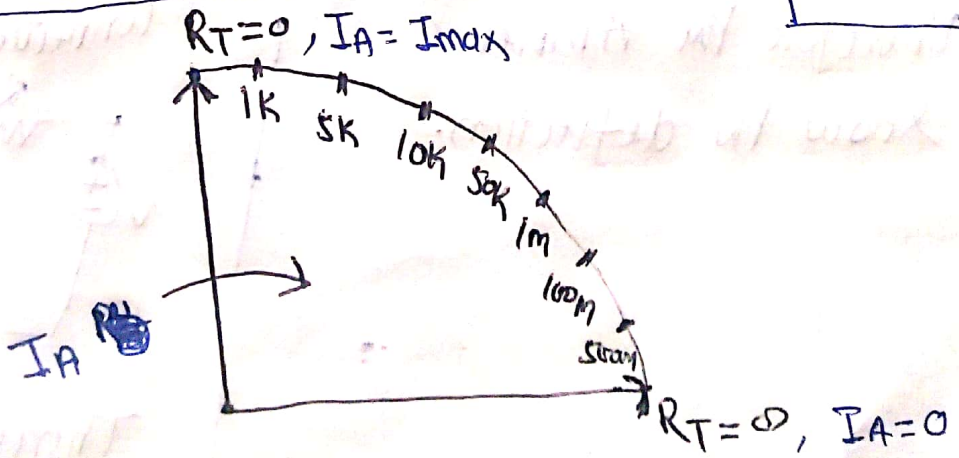
Case-1 if $R_T = 0$; $I_A = \frac{V}{R+0} = \frac{V}{R}$

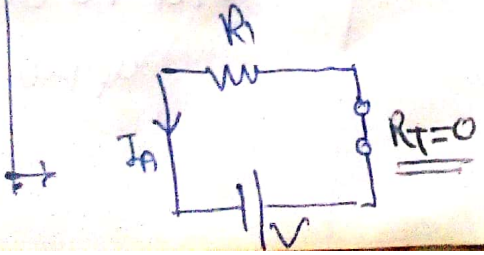
i.e $I \rightarrow$ increases {Imax flow}

Case-2 if $R_T \rightarrow \infty$; $I_A = \frac{V}{R+\infty} = 0$

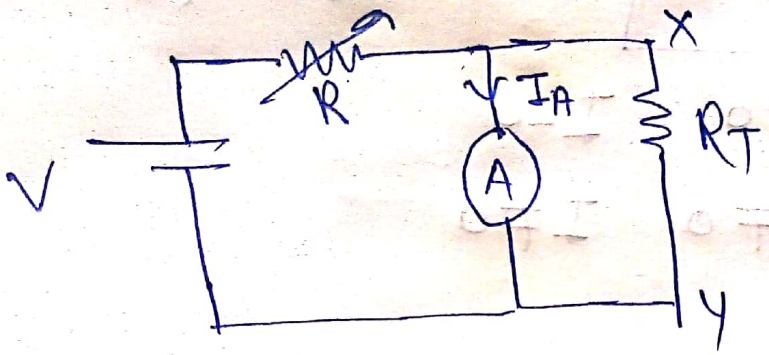
i.e $I \rightarrow$ decreases $\rightarrow 0$.



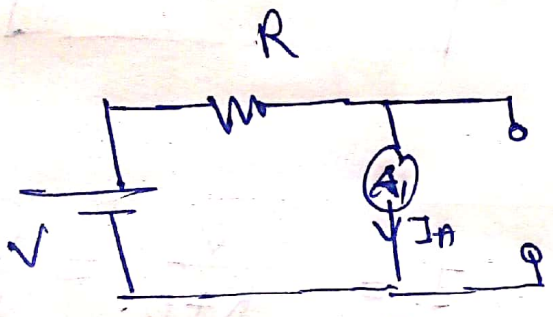




Working Operation of Parallel type ohmmeter



if $R_T = \infty$

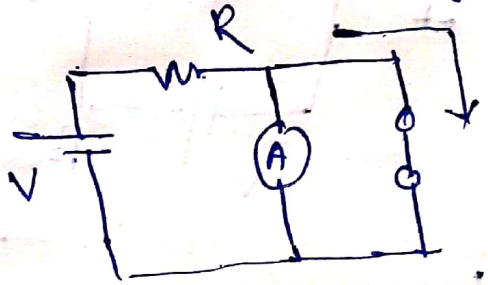


$$I_A = \frac{V}{R}$$

(A) → Ammeter show the current

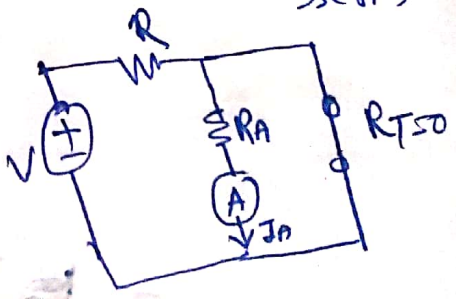
Therefore the Ammeter show the deflection.

if $R_T = 0$ (Very small value)

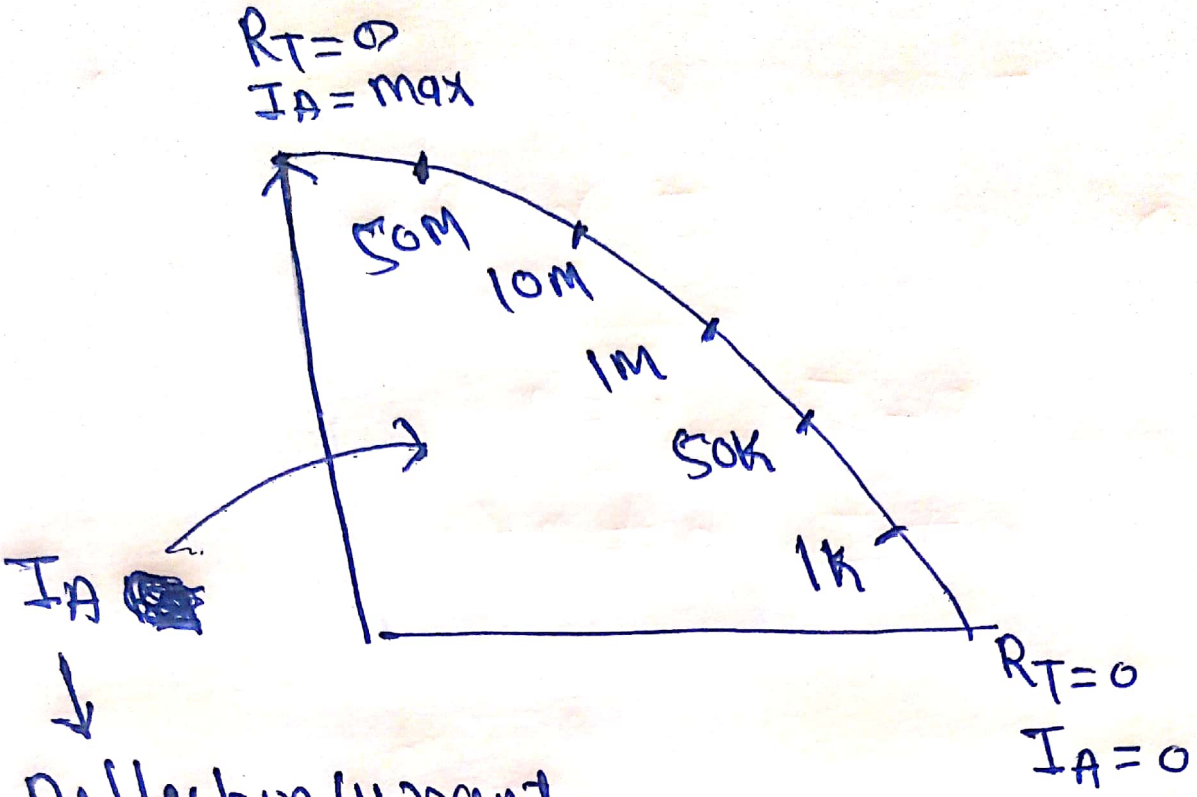


$$I_A = 0$$

Since (A) Ammeter having internal resistance which is connected in ~~parallel~~ series



Therefore $I_A = 0$ and no deflection happen



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Deflection current

$\theta \propto I_A$

$$\theta = K I_A$$