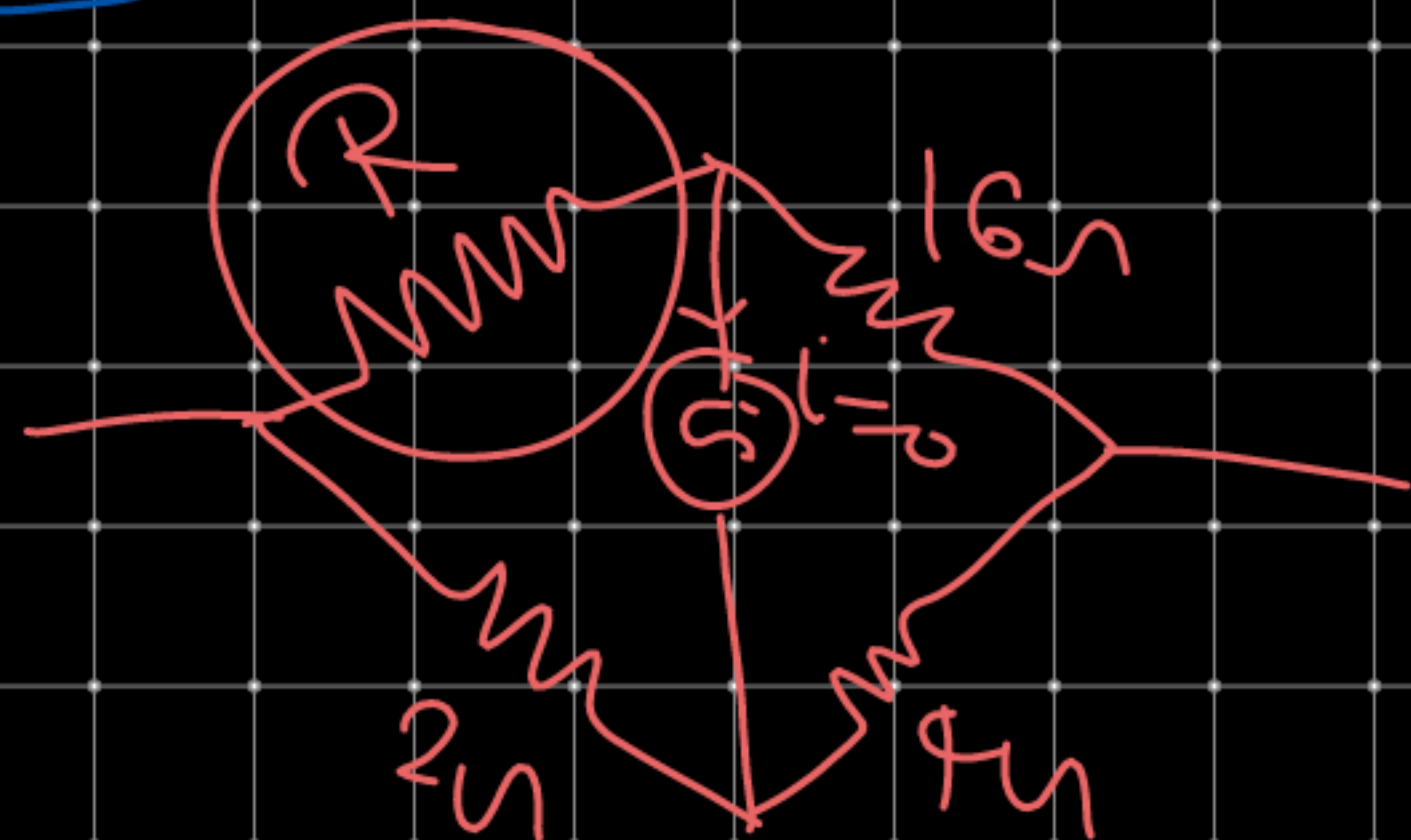




Balance wheat stone bridge:-

↳ Working :- Null deflection of galvanometer

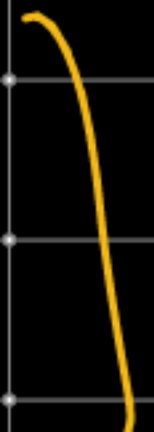
↳ Use :- To find unknown resistance.



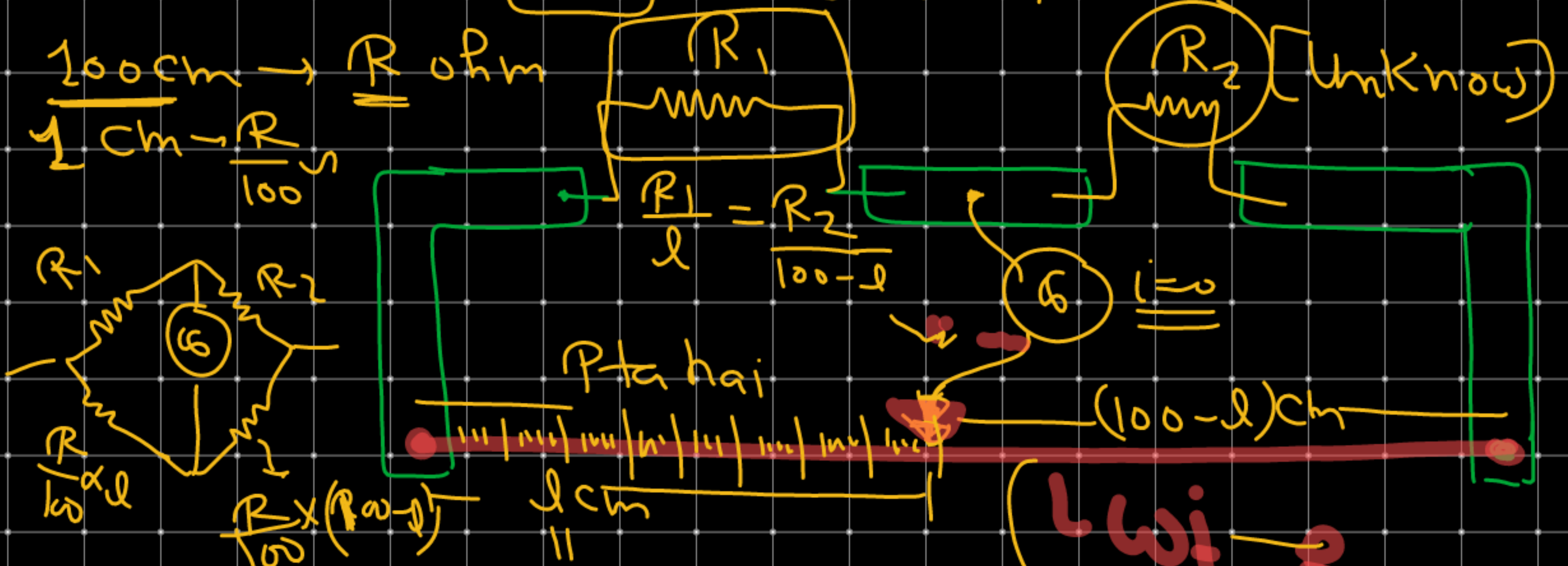
$$\frac{R}{2} = \frac{16}{4}$$

$$\frac{R}{2} = 4$$

$$\underline{\underline{R = 8\Omega}}$$



Meter bridge:- based on null deflection of galvanometer
 (OR) based on Balance wheel stone bridge.



Wire \rightarrow
 length = 100 cm
 = 1 m
 Resistance of wire = R

$\frac{R}{100 \times l} = \frac{R_2 \left(\frac{R}{100 \times (100-l)} \right)}{\frac{R}{100} (100-l)}$

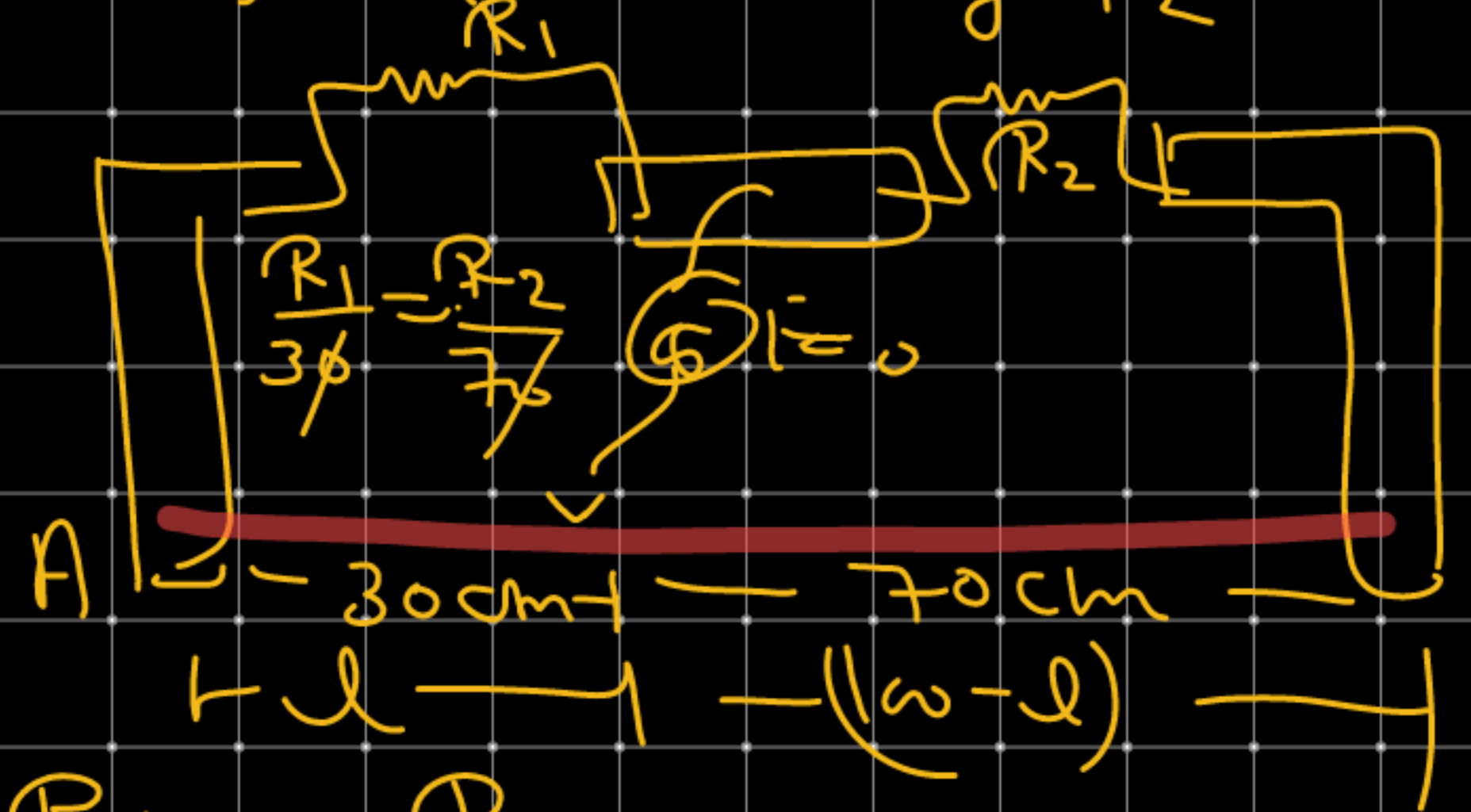
$\frac{R_1}{R_2} = \frac{l}{100-l}$ $R_2 = \frac{R_1 (100-l)}{l}$

Q1) Consider a part of meter bridge experiment shown in figure. When resistance in the two gaps are R_1 & R_2 then balancing length from end A is 30cm. If $R_1 = 30\Omega$, find value of R_2 .

$$\frac{R_1}{30} = \frac{R_2}{70}$$

$$\frac{30}{3} = \frac{R_2}{7}$$

$$R_2 = 70\Omega$$

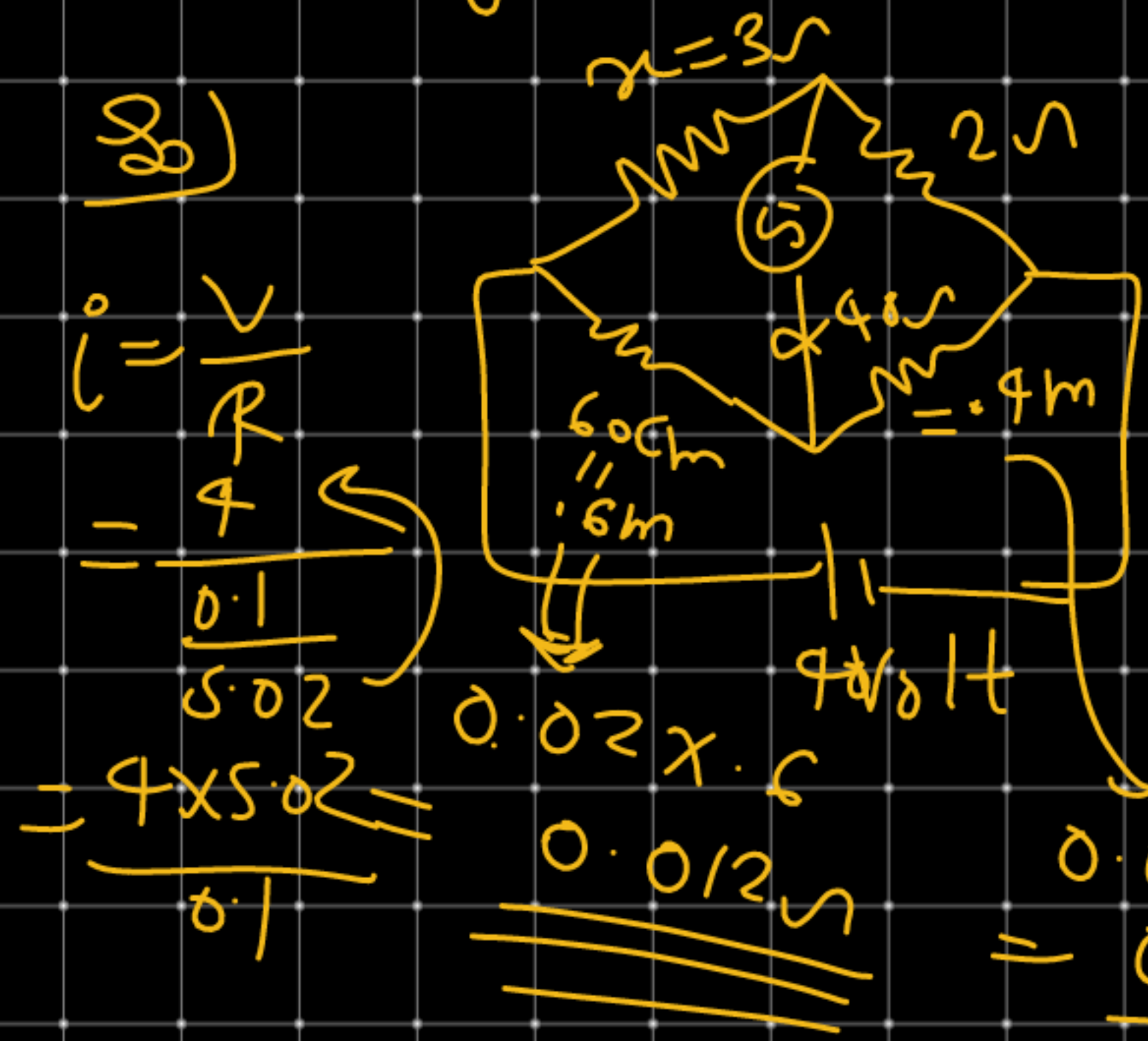


$$\frac{30}{3} \frac{R_1}{1} = \frac{R_2}{7}$$

$$R_2 = 70\Omega$$

Calculate Current Supply from battery, if galvanometer show null deflection.

8) null deflection.

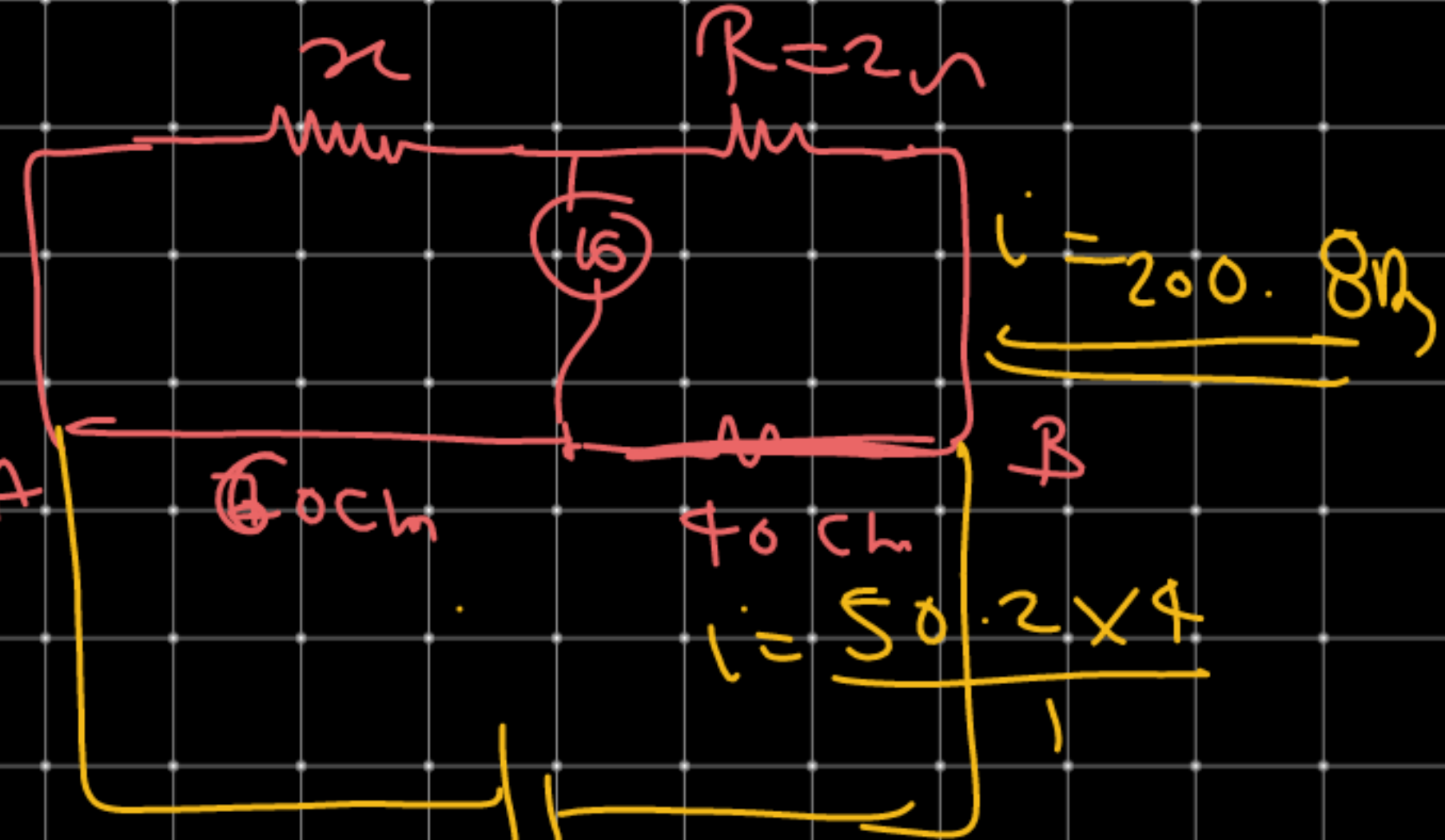


Extra point) resistance per unit length = $0.02 \Omega/m$

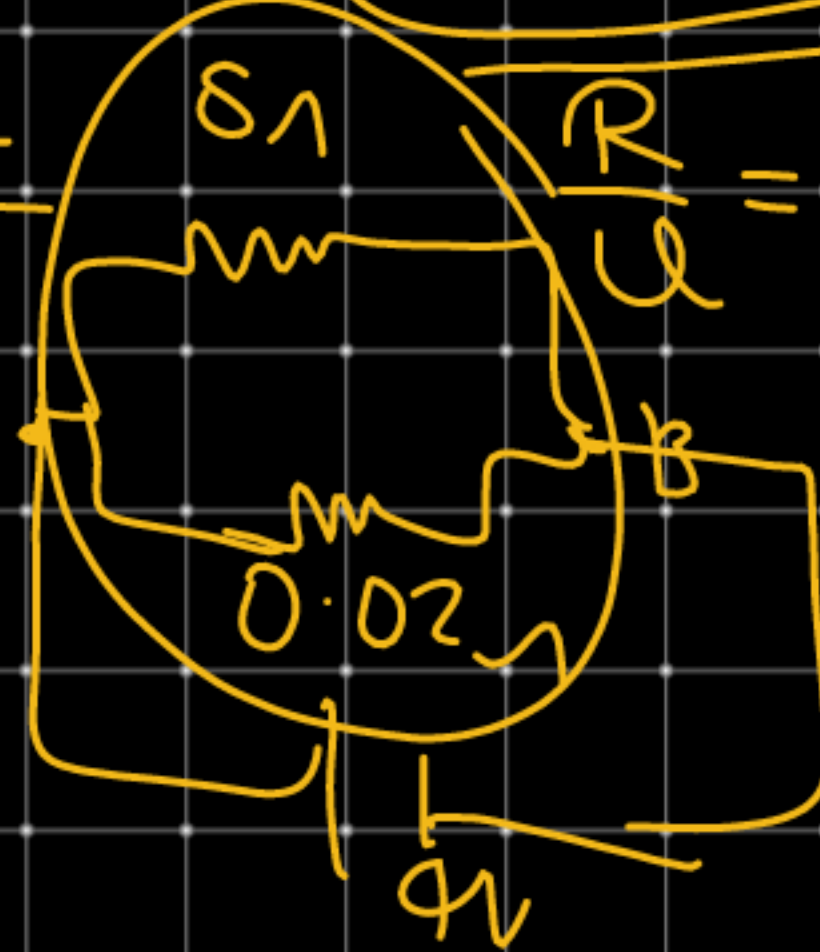
$$\frac{x}{8\%} = \frac{2}{27\%}$$

$$x = 3\Omega$$

$$0.02 \times 4 = 0.08\Omega$$



$$\frac{R}{2m} = 0.02\Omega$$



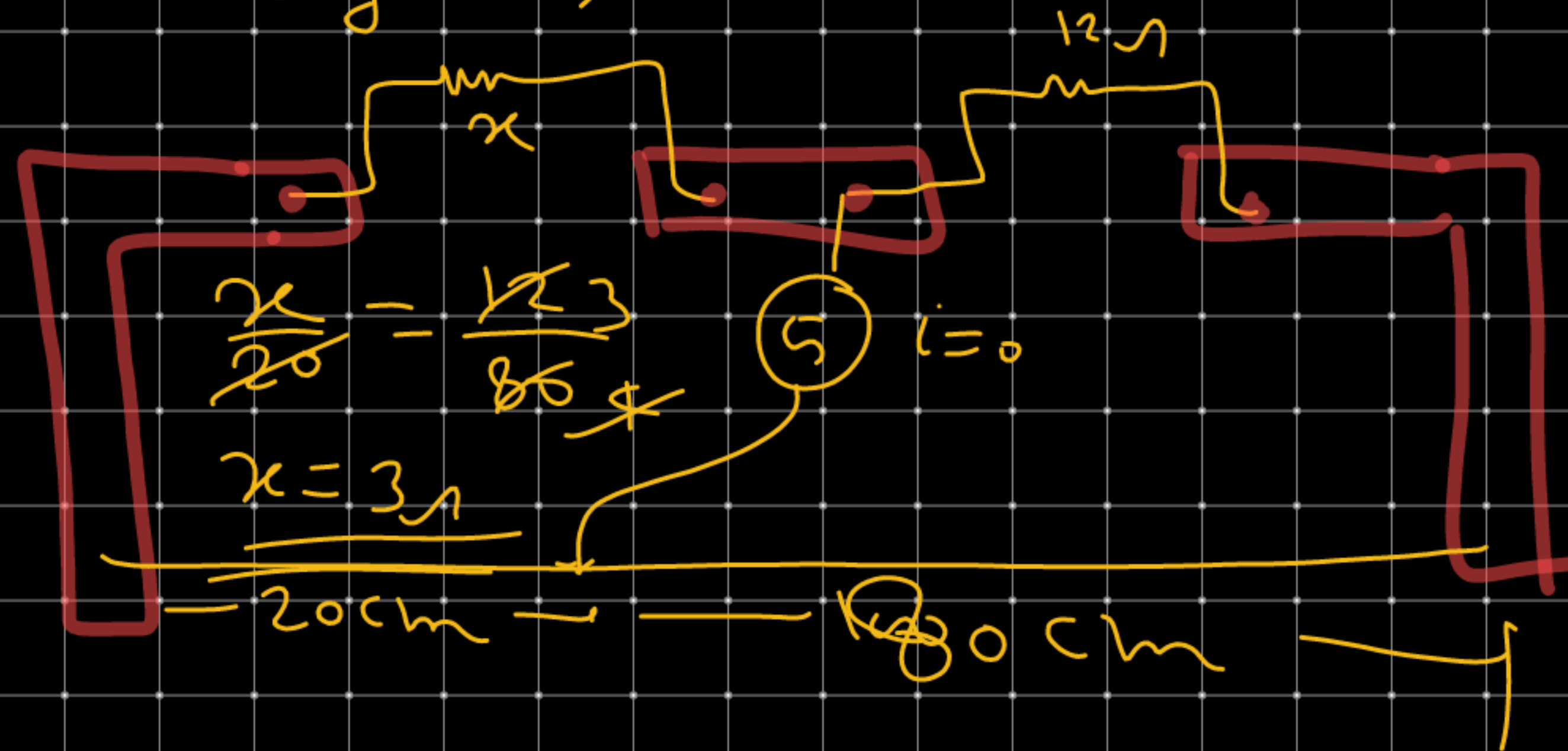
$$\frac{R}{5} = 0.02\Omega/m = 0.1$$

$$R_{eq} = \frac{5 \times 0.02}{5 + 0.02}$$

$$R_{eq} = \frac{5 \times 0.02}{5 + 0.02}$$

$$= \frac{0.1}{5.02}$$

⊗ find value of $x \rightarrow$

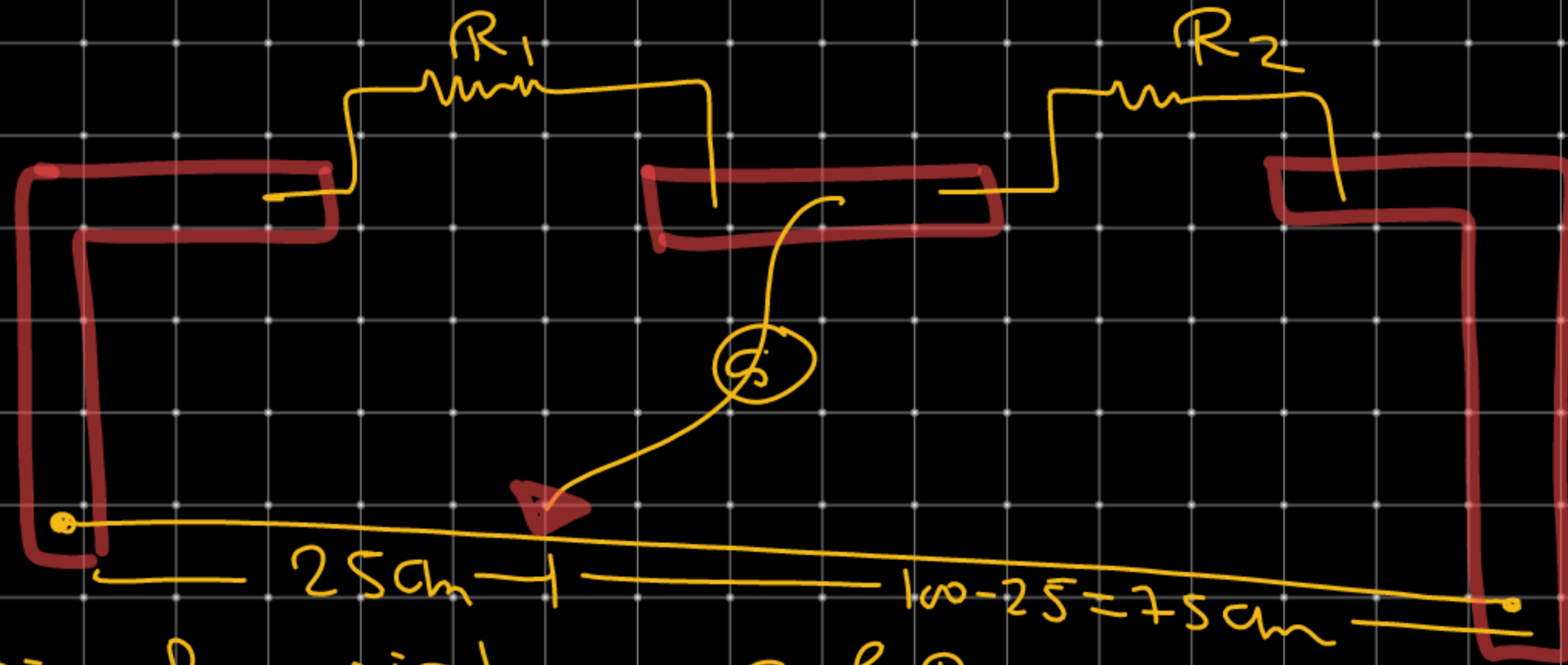


\Rightarrow

$$\frac{x}{20} = \frac{123}{80}$$

$$x = 3\Omega$$

~~##~~



Find Ratio of resistance R_1 & R_2

(a) $\frac{1}{3}$

(b) $\frac{2}{3}$

(c) 1:1

(d) N.O.T.

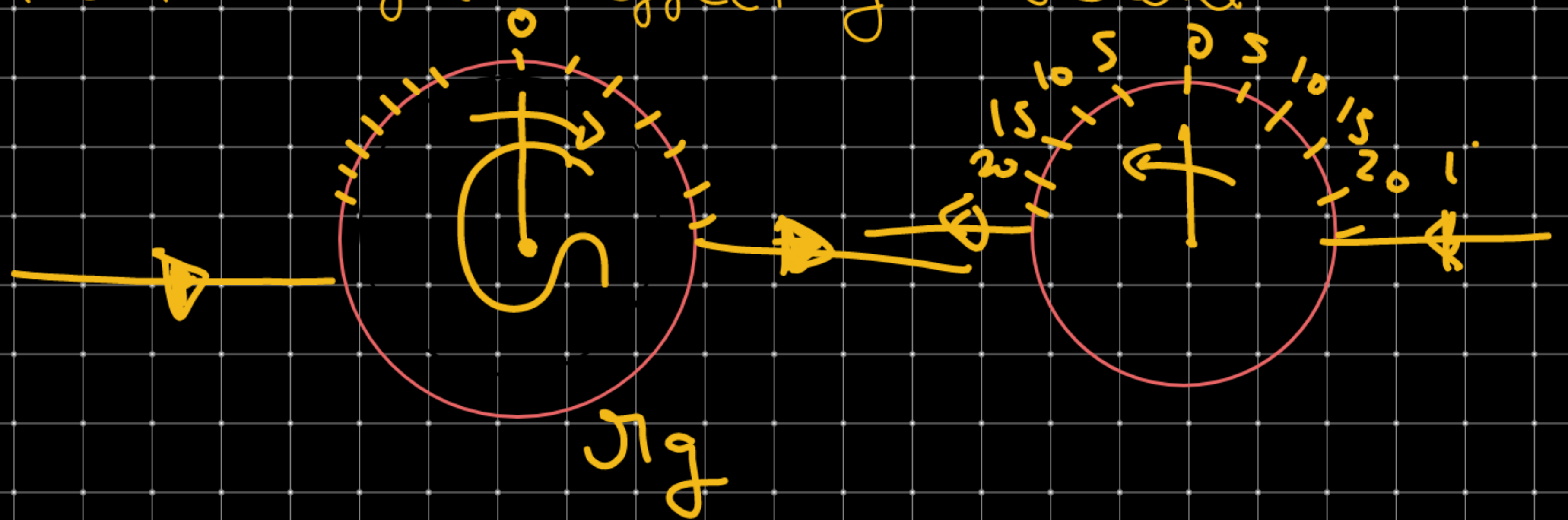
$$\frac{R_1}{25} = \frac{R_2}{75}$$

$$\Rightarrow \frac{R_1}{R_2} = \frac{25}{75} = \frac{1}{3}$$

Measuring instrument :-

(i) Galvanometre:- it is a simple device which measure small current (in range of 10^{-2} to 10^{-3} A)

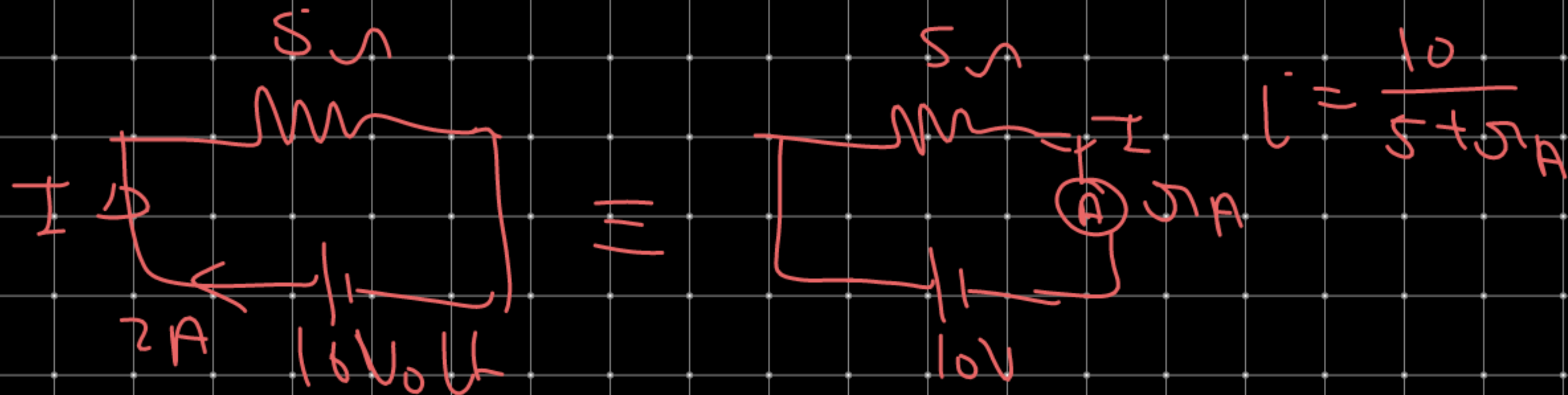
↳ based on magnetic effect of current





Ammeter

It is a current measuring device, which measure current in circuit, & it connect is circuit in series.



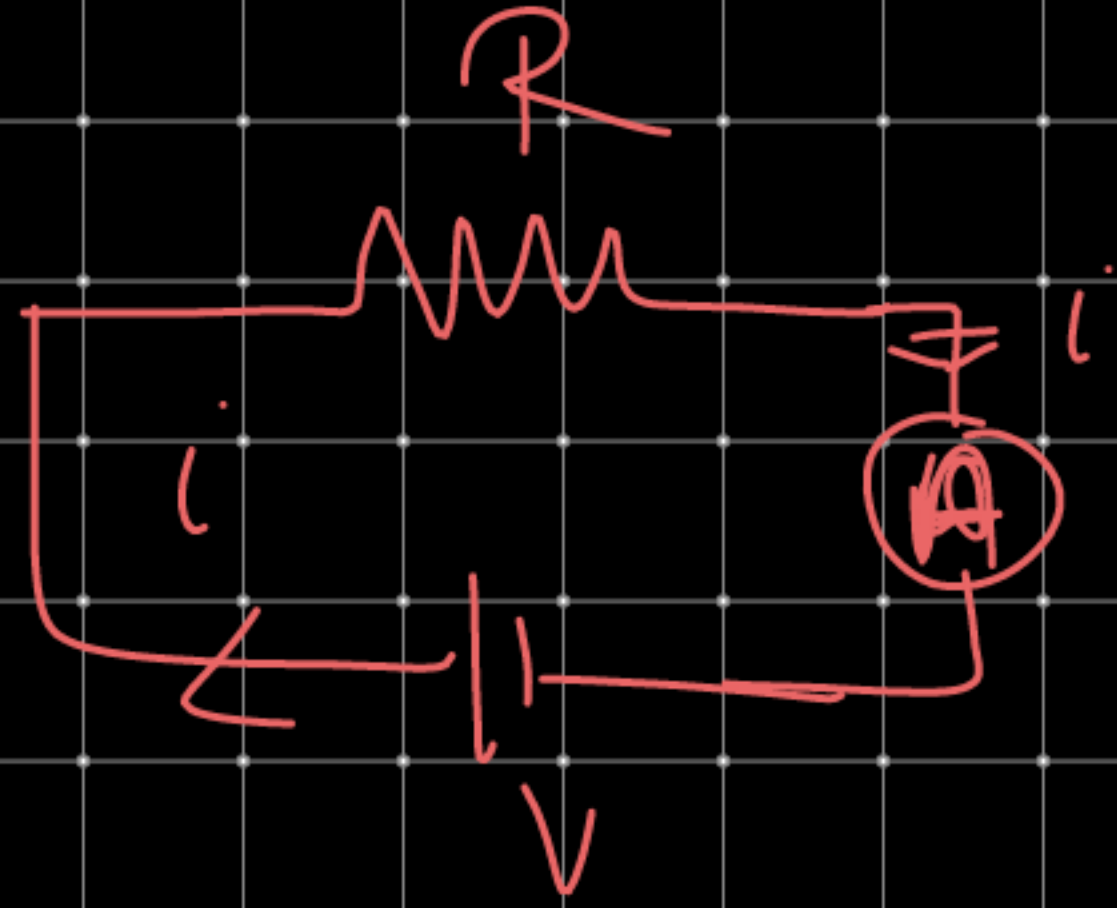
\Rightarrow Ideal ammeter have zero resistance

$I_A \rightarrow$ very small

How to make ammeter - Using galvanometer.

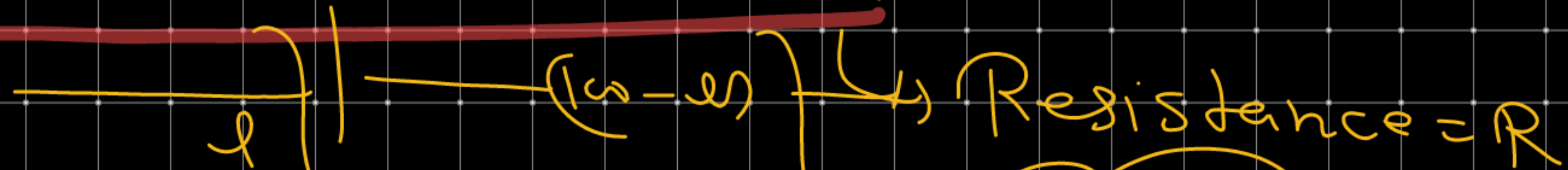


$$(I - I_g) S = I_g (R_g)$$



100 cm

100 cm



$$100 \text{ cm} = R$$
$$1 \text{ cm} = \frac{R}{100}$$

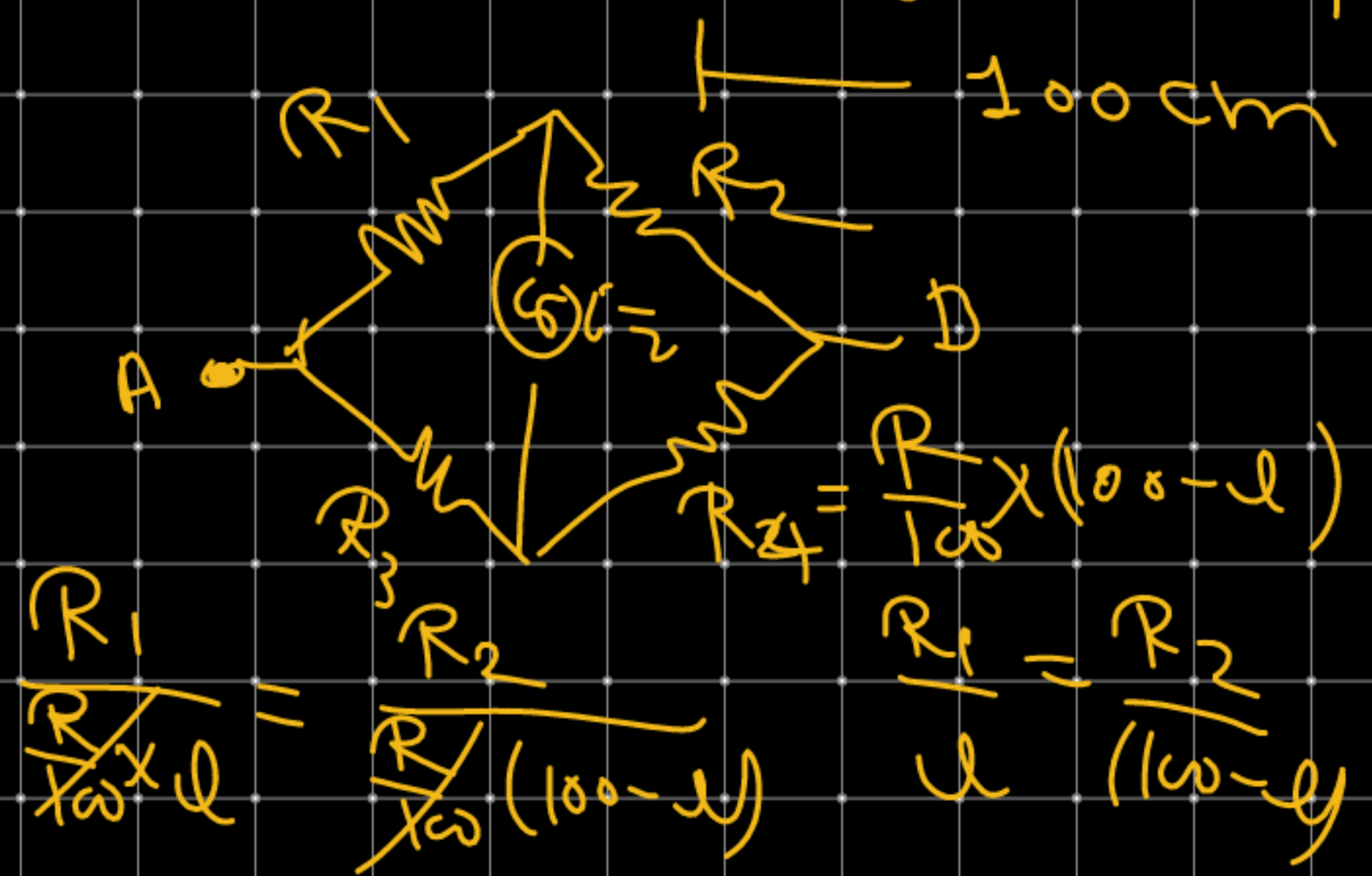
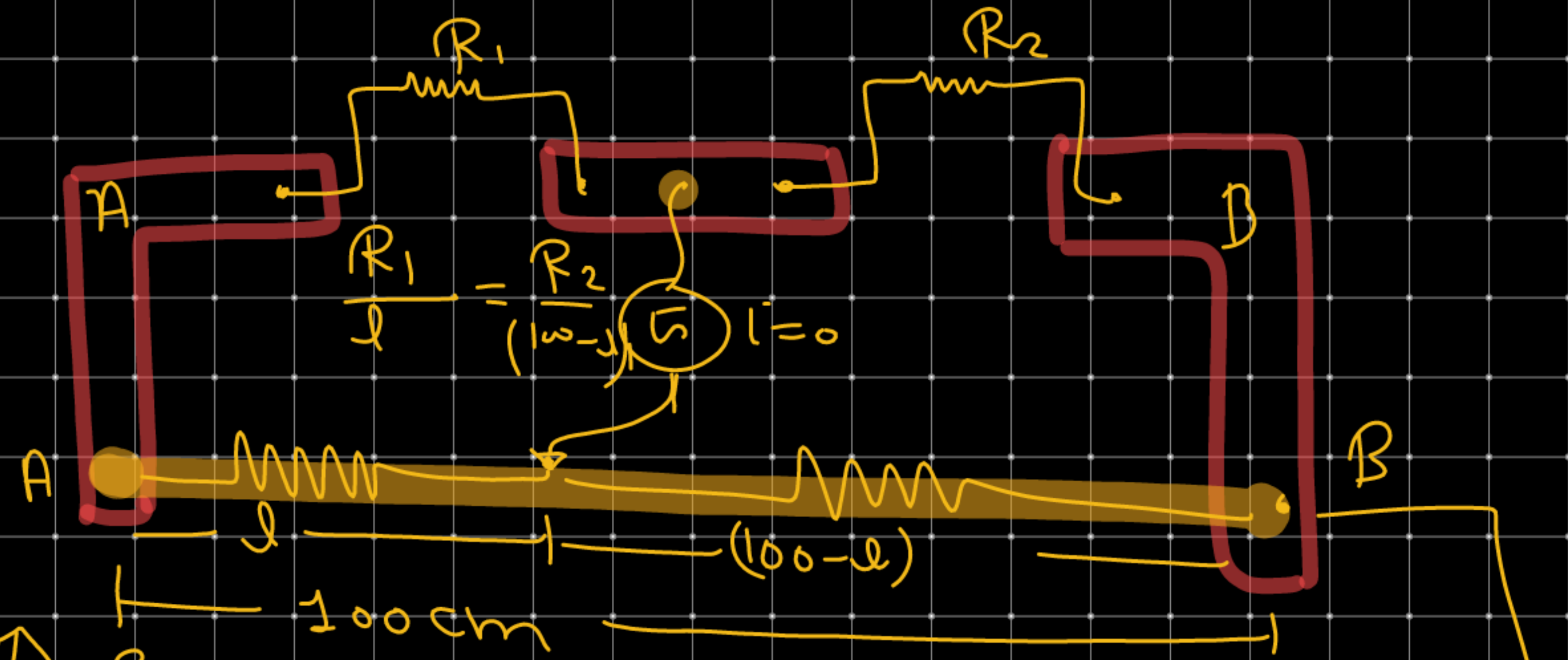
$$\frac{R}{100} \times l$$

$$\frac{R}{100} \times (100-l)$$

$$100 \text{ cm} = \frac{R}{100} \times 100$$



$100 \text{ cm} \rightarrow R$
 $1 \text{ cm} = \frac{R}{100}$
 $l \text{ cm} = \frac{R}{100} \times l$
 R_3



$\frac{R_1}{l} = \frac{R_2}{100-l}$
 $\frac{R_3}{l} = \frac{R_4}{100-l}$