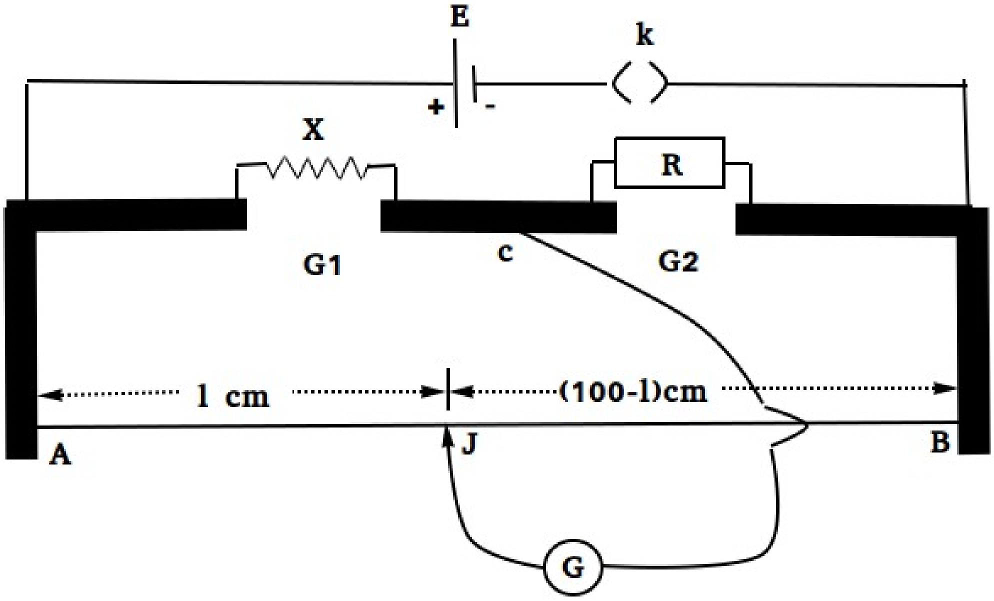
Metre Bridge I

Aim:

To determine the **resistance** and hence the **resistivity** of the material of the wire.

Apparatus:

Metre Bridge, Cells, Key, Resistance Box, Resistance wire, Galvanometer, Jockey, Screw Gauge, Metre Scale etc.



Theory:

According to the Wheatstone's principal, when bridge is balanced at a balancing length ***l***

$\frac{X}{R} = \frac{lr'}{(100-l)r'} = \frac{l}{(100-l)}$ where r' is the resistance per unit length of the wire AB.

That is resistance of the wire $X = \frac{l}{(100-l)} R$

and the resistivity $\rho = \frac{\pi r^2 X}{L}$

where **r is** radius of the wire and **L** is the length of the wire.

Observations:

1. To find the resistance of the wire (X)

Trial No	Resistance R Ω	Balancing length when X is in		Mean l cm	(100 -l) cm	$X = \frac{l}{(100-l)} R$ Ω
		Left gap	Right gap			
1						
2						
3						
4						
5						
6						

Mean **X**= Ω

Length of the wire **L** = cm

2. **To find the radius of the wire (r)**

Value of One Pitch Scale Division = mm

Pitch of the screw P = $\frac{Distance\ Moved}{Number\ of\ Rotations}$ = mm

Number of Divisions on the head scale N =

Least Count **LC** = $\frac{Pitch}{N}$ = mm

Zero Coincidence = Divisions Zero Correction = Divisions

Sl No	Pitch Scale Reading (**PSR**) mm	Observed Head Scale Reading (**HSR**)	Corrected Head Scale Reading (**Corr. HSR**)	Total Reading PSR + (Corr. HSR x LC)	Mean (d) mm
1					
2					
3					
4					
5					
6					

<u>CALCULATIONS</u>:

Radius of the wire r = $\frac{d}{2}$ = cm = m

Mean Resistance X = = Ω

The resistivity of the material of the conductor $\rho = \frac{\pi r^2 X}{L}$ =

= Ω m

<u>RESULTS</u>:

1. Resistance of the given wire = Ω
2. Resistivity of the material of the wire = Ω m