

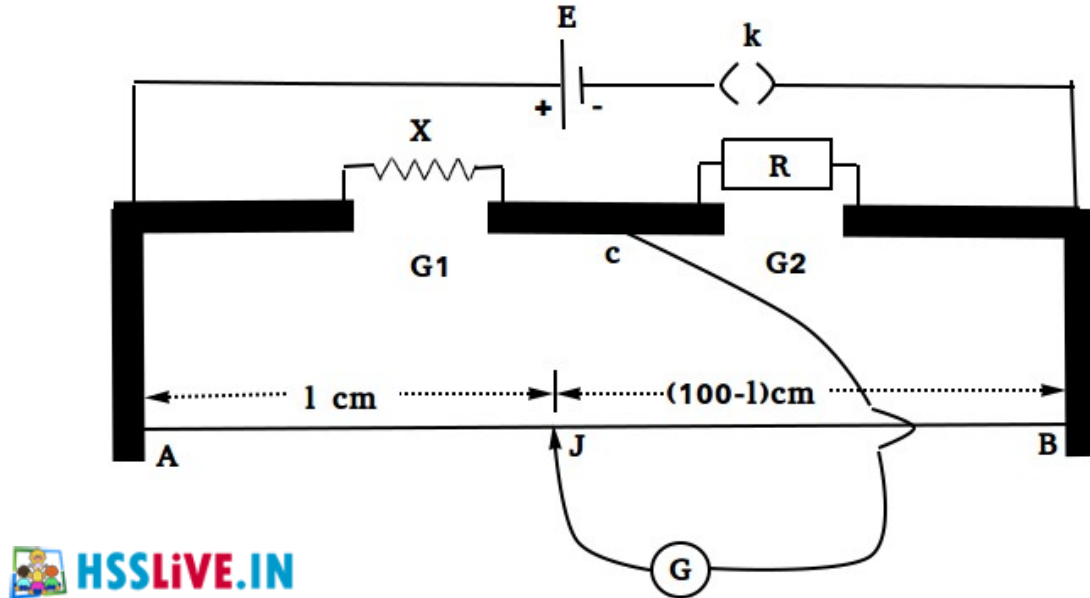
Metre Bridge I

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

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

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

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

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	$X = \frac{l}{(100-l)} R \quad \Omega$
		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 $P = \frac{\text{Distance Moved}}{\text{Number of Rotations}} = \text{mm}$

Number of Divisions on the head scale $N =$

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

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					

CALCULATIONS:

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

Mean Resistance $X = \Omega$

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

$= \Omega \text{ m}$

RESULTS:

1. Resistance of the given wire $= \Omega$

2. Resistivity of the material of the wire $= \Omega \text{ m}$