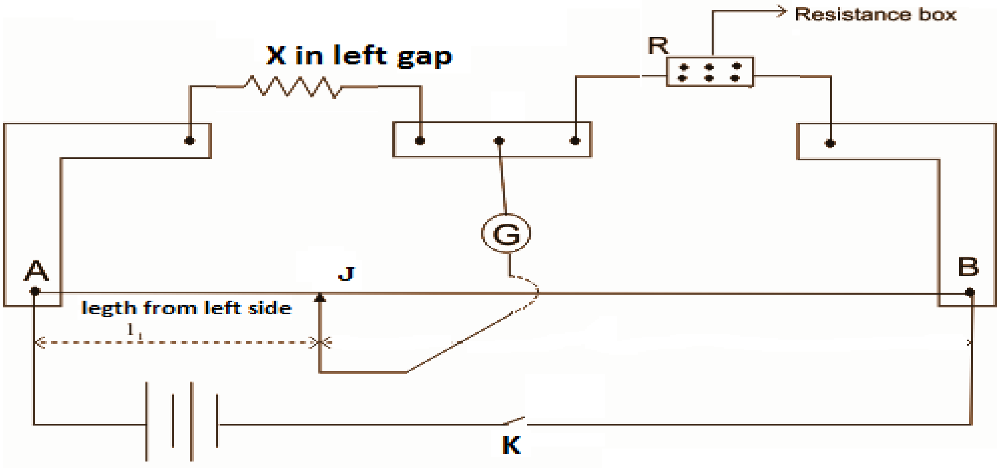

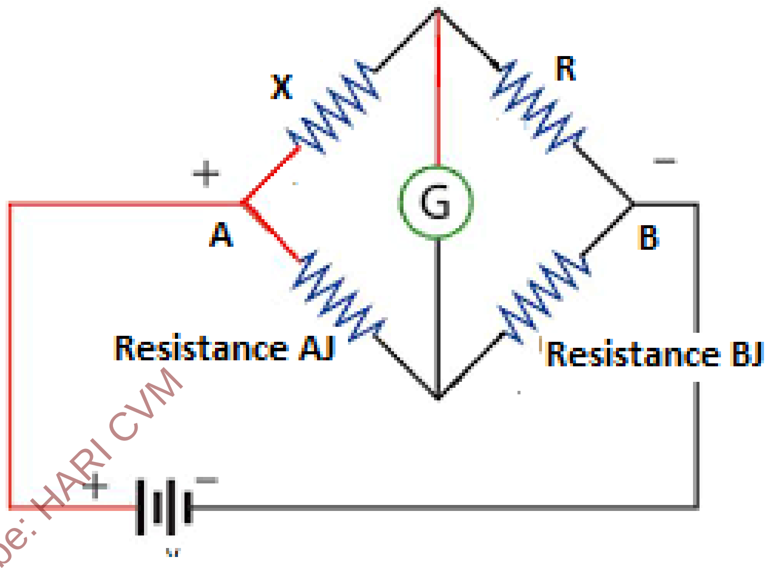

Observations and Calculation (resistor -length of wire L=25 cm)

Trial no	Resistance In the box **R** in ohm	Resonating length when X is in		Mean $l = \frac{(l_1 + l_2)}{2}$	$(100 - \ell)$	$X = \frac{R\ell}{(100 - \ell)}$ in ohm
		Left gap ℓ_1 in cm	Right gap ℓ_2 in cm			
1	1					
2	2					
3	3					
4	4					
5	5					
6	6					

Mean X = ……………..ohm

THE METER BRIDGE (R & ρ)

AIM

1. To determine resistance of the given wire
2. To determine resistivity of the material of given wire

APPARATUS

Meter bridge, given wire, resistance box, single key, connecting wire, and galvanometer

THEORY

The working principle of Meter Bridge is Wheatstone bridge. If ℓ is the balancing length the bridge wire from the side of unknown resistance X and R is the known resistance, then

$$\frac{X}{R} = \frac{\ell}{(100 - \ell)}$$

Unknown resistance $\boldsymbol{X} = \frac{\boldsymbol{R\,l}}{(\mathbf{100} - \boldsymbol{l}\,)}$

Resistivity of the given wire, **ρ =** $\frac{\boldsymbol{\pi r^2 X}}{\boldsymbol{L}}$

Where r = radius of the wire

L = length of the wire

To find the radius of wire using screw gauge

Least Count = $\frac{pitch}{\text{No.of divisions on the head scale}} = \frac{1\,mm}{100}$ = 0.01mm

Zero coincidence = ……………………

Zero correction, **Z** = …………………

Diameter of the wire					
Si No	**PSR mm**	**Observed HSR**	**Corrected HSR = (HSR+Z)**	**Corrected HSR X LC mm**	**Total Reading = PSR + (Corrected HSR x LC) mm**
1					
2					
3					
4					
5					

Mean diameter **d** = …………………… mm

Radius of the wire **r** = $\frac{d}{2}$ = ……………… mm = …………… m

Length of the wire L = …………………cm = ……………. m

Resistivity of material of wire, **ρ** = $\frac{\pi r^2 X}{L}$ = …………… ohmmeter

PROCEDURE

Connections are made as shown in figure. The unknown resistance is connected in the left gap and resistance box is introduced in the right gap. The key is closed and a suitable resistance R = 1 ohm is introduced in the box. The jockey is moved over the meter bridge wire till null deflection is obtained. The balancing length AJ = ℓ_1 is measured from the side of unknown resistance.

Now X and R are interchanged and balancing length BJ = ℓ_2 is measured. The mean balancing length is obtained. Thus unknown resistance is calculated.

The experiments are repeated for different values of R and mean X is calculated.

Radius is determined by using a screw gauge and length by a scale. Then resistivity is calculated.

RESULT

1. The resistance of the given wire, **X** = ... ohm
2. The resistivity of the material wire, **ρ** = ... ohm meter