WHEATSTONE BRIDGE ( METRE BRIDGE)

AIM: To find the unknown resistance and resistivity of a given length of wire.

Apparatus: metre bridge, magnifying glass, resistance box. Micrometer screw gauge, connecting wires,, 1.5 v cells, jokey, WIRE OF UNKNOWN RESISTANCE, metre rule

Variables: --------------state variablesm

Manipulating

Responding

Controlled

**Diagram draw the diagram as per connections shown.**

Theory: metere bridge is a simpe apparatus based on the principle of Wheatstone’s bridge. It consists of a uniform resistance wire AB, one metere long, kept stretched on a wooden base. There is a metere scale fixed parallel to it. The ends of he wire are connected to thick copper strips. G1 and G2  are two gaps between the copper strips. The unknown resistance X is connected in on gap and a resistance box R in the other . A jokey is connected through a galvanometer and a high resistance H.R

Let the unknown resistance X is connected in the gap G1 and a known resistance in the gap G2. Let l be the balancing length on the side X . Then (100- l) is the balancing length corresponding to R.

Then by Wheatstone’s bridge principle  where -is the resistance per unit length of the AB.

Therefore 

If L is the length of the resistance wire and r , its radius, the resistivity of the material of the wire 

( please note that there are two lengths given. L and l

L- is the length of the wire given

l-is the BALANCING LENGTH OF METER WIRE.

PROCEDURE:

1. Draw the circuit diagram and arrange the apparatus according to arrangement.
2. Connect resistance wire (X) or resistance coil whose resistance is to be determined in the left gap G1.
3. Connect resistance box of low range in the right gap G2.
4. Make all other connections as shown in the circuit diagram
5. Take out some resistance (say 2ohms) from resistance box
6. Touch the jokey gently first at left end and then at the right end of the bridge wire.
7. Note the deflections in the galvanometer. If the galvanometer shows deflection in opposite direction, the connections are correct.
8. The jokey is moved along the wire from A to B. at some point on the wire, the galvanometer shows zero deflection.
9. Take the this balancing length as l(try to get balancing length between 40cm and 6o cm)
10. Take at least five sets of observations in the same way by changing the value of R in steps of one ohm from the resistance box.

OBSERVATIONS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SL. NO | Resistance from resistance box  R | Length ,AJ,  l / | Length ,BJ,  (100-l)/ | Unknown resistance  X=R.l/(100-l) |
|  |  |  |  |  |

Mean X=

Micrometer reading to find radius of wire

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trial | Circular scale reading(c.s.r)/mm | Linear scale reading(l.s.r) | Diameter of wire  c.s.r+( l.s.r x l.c) |  |
|  |  |  |  |  |

Mean d=

Radius r =

Specific resistivity,

Result;

Resistance of wire

Specific resistance

ERRORS

PRECAUTIONS