

EXPERIMENT 3

Verifying laws of combination (parallel) of resistance using meter bridge:

Aim: To verify laws of combination (parallel) of resistance using meter bridge.

Apparatus: a meter bridge , a leclanche cell , a galvanometer , a jockey , a jockey , a resistance box , two resistance wire , connecting wires , set square .

Theory:

The resistance (r) of a resistance wire or coil is given by $r = (100-l)/L * R$ where R is the resistance from resistance box in the left gap and L is the length of meter bridge wire from O end upto balance point.

When r_1 and r_2 are connected in parallel, then their combined resistance

$$R_p = r_1 r_2 / r_1 + r_2$$

Procedure:

1. Mark the two resistance wires as r_1 and r_2
2. Connect the two coils r_1 and r_2 in parallel as shown in fig. in the right gap of Meter Bridge and find the resistance of this combination. Take at least three set of observation
3. Record your observation.

Value of r_1 :

Resistance of R.B. (ohm)	Balance L (cm)	(100-l) (cm)	$[(100-l)*R]/L$	Mean r_1
0.5	59	41	0.347	0.6393
1	37	63	0.587	
2	33	67	0.985	

Value of r_2 :

Resistance of R.B. (ohm)	Balance L (cm)	(100-l) (cm)	$[(100-l)*R]/L$	Mean r_2
0.5	83.2	16.8	0.1009	1.729
1	80.8	19.2	4.208	
2	69.4	30.6	0.881	

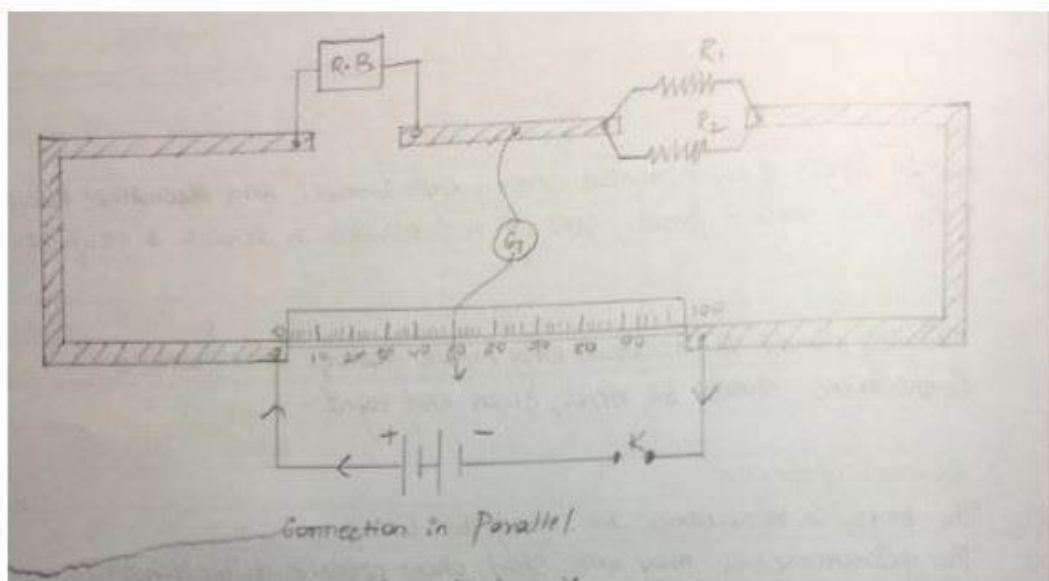
Value of r_p :

Resistance of R.B. (ohm)	Balance L (cm)	(100-l) (cm)	$[(100-l)*R]/L$	Mean r_p
0.1	27	73	0.27	0.36
0.2	32	68	0.42	
0.5	56	44	0.39	

Calculations:

$$R_p = (R_1 R_2) / R_1 + R_2 = (0.693 \times 1.729) / (0.693 + 1.729) = 0.4667 \text{ ohm}$$

$$\text{Experimental Error} = [(0.36 - 0.4667) / (0.36)] * 100 = 29.6\%$$



Result:

Within limit of experimental error, experimental and theoretical values of R_p are same. Hence law of resistance in parallel are verified.

Precaution:

The key should be inserted only while taking observation.

Connection should be neat and tight.