PROCEDURE:

1. Electric connection is made as shown in the figure. Connect all positive terminals to one terminals of potentiometer wire representing zero of the scale.
2. Close key K_1 and adjust the rheostat so that the galvanometer deflects towards left and right when tapped at the extreme ends of the potentiometer wire.
   Slide the jockey over potentiometer wire (starting from zero end) until you obtain zero deflection in the galvanometer. Note the corresponding balanced length (l_1).
3. Close the key K_2 too. Remove the key of resistance **1Ω** from resistance box. Maintain the constant current (same position of rheostat as in step 2) and slide the jockey over the wire and obtain zero deflection in the galvanometer. Note the corresponding balanced length (l_2).
4. Repeat steps 2 and 3 by adjusting rheostat at different positions. Each time increase the resistance in resistance box by **1Ω.**
   [*Note that the ammeter reading (current through wire) should be maintained constant for one set of experiment (in finding a set of l_1 and l_2). The current can be maintained constant by adjusting the rheostat*.]
5. Use appropriate formula and obtain the internal resistance of the cell.

OBSERVATIONS:

Least count of meter scale = …………. *cm*

Observation Table:

SN	Resistance in resistance box R Ω	Balanced length		Internal resistance of cell $r = \left[\dfrac{l_1}{l_2} - 1\right] \times R$	Mean r (Ω)	Remarks
		In open circuit l_1 (cm)	In close circuit l_2 (cm)			
1.	1					
2.	2					
3.	3					
4.	4					
5.	5					

CALCULATIONS:

From above table the mean value of internal resistance of the given test cell is: $r =$ …… Ω

RESULT:

The internal resistance of the test cell has been found to be ……… Ω.

CONCLUSION:

The internal resistance of the given test cell has been determined by using a potentiometer.

SOURCES OF ERROR:

1. The area of cross section of wire may not be uniform.
2. The null point may not be located accurately.
3. The emf of cell may not be constant throughout the experiment.
4. The error may be due to carelessness of the experimenter.