‘G’ by P. O. Box

Object: To determine the galvanometer resistance with Post office Box.

Apparatus Used: P. O. Box, cell, rheostat, galvanometer, connecting wires.

Formula Used: The following formula is used for the determination of galvanometer resistance.

$$G = \frac{Q}{P} R$$

Here, G: galvanometer resistance (CD arm resistance of P. O. Box)

P: AB arm resistance of P. O. Box

Q: BC arm resistance of P. O. Box

R: AD arm resistance of P. O. Box

Circuit Diagram:

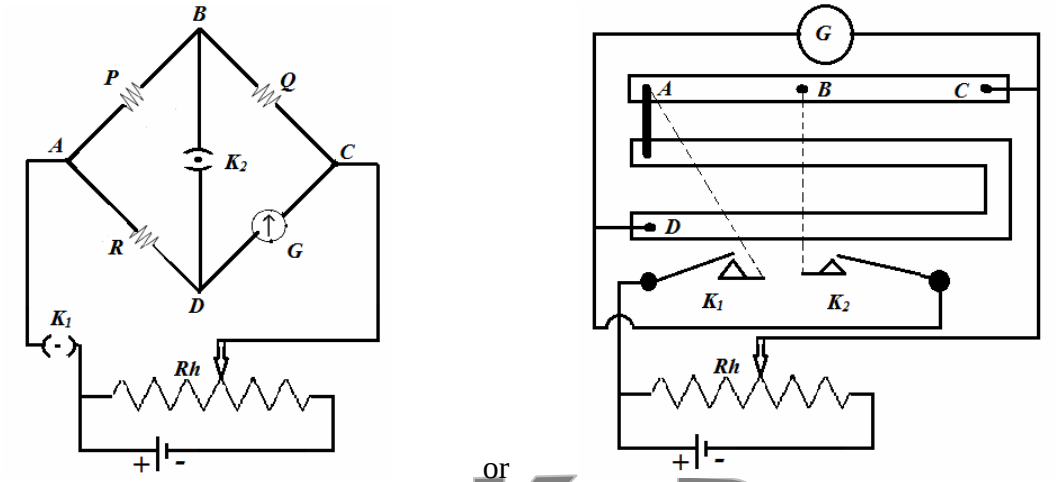

Figure X

Procedure:

1. Make connections as shown in figure X.
2. Now give a resistance in AB and BC arm (resistance P and Q) of the P. O. Box.
3. After it, press key K_1. You will get a deflection in galvanometer (see figure 1). If it is out of scale then control it with rheostat.
4. Now give a resistance in AD arm and press first key K_1 then key K_2. You will observe that galvanometer give a deflection at first and then it reduces (goes left) or increases (goes right) (see figure 2a and 2b).
5. Now change the value of resistance in AD arm such that there is no change in deflection even pressing key K_2 after the K_1 (see figure 3). The amount of resistance in AD arm gives the value of R.
6. Repeat the Points 2 to 5 for the different set of P and Q values.
7. Calculate the value of G with each set of P,Q and R.

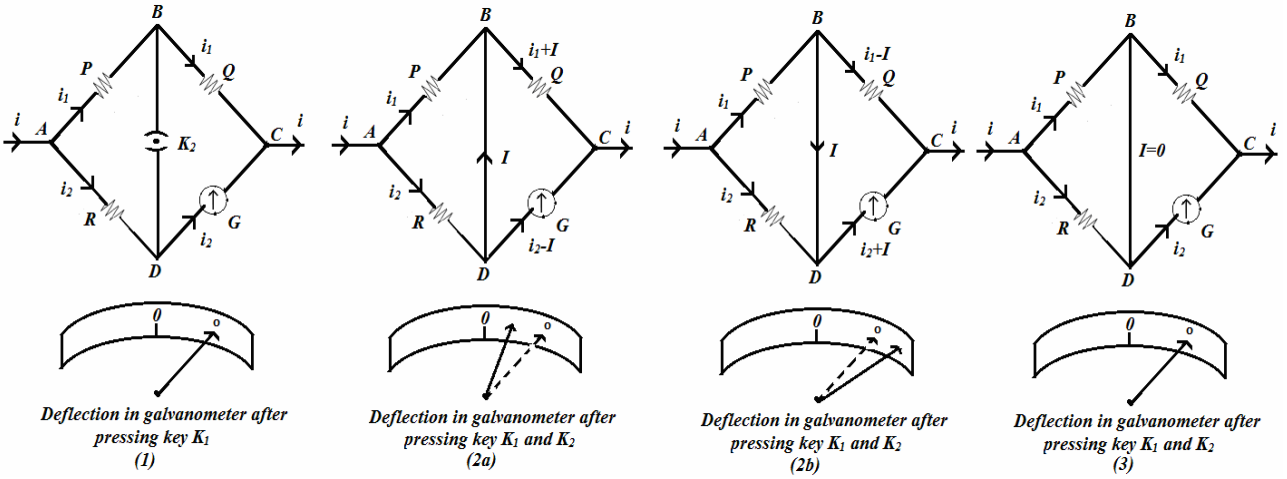

Figure (1) Figure (2a) Figure (2b) Figure (3)

Observation:

1. Table for the value of P, Q and R resistances

Sr. No.	P(Ω)	Q(Ω)	Deflection in Galvanometer with R	R(Ω) (at no change in deflection of galvanometer)	G(Ω)
Ex.	10	10	R=59Ω, left deflection R=60Ω, no change in deflection R=61Ω, right deflection	60	60
1.	100	100			
2.	1000	1000			
3.	100	10			
4.	1000	100			

Calculation: Show calculation for all value of G and their mean value.

Result: Galvanometer resistance= …….Ω

Precaution:

1. Connections should not be loose.
2. Key K_2 should be always pressed after pressing key K_1.
3. If there is found a range of no deflection then total range should be noted and mean of them should be taken for R at no deflection.
4. In P.O. Box the keys should be very tight.
5. Avoid pressing keys for large time otherwise cell will be discharged.