

POTENTIOMETER, WHEATSTONE'S BRIDGE & METRE BRIDGE

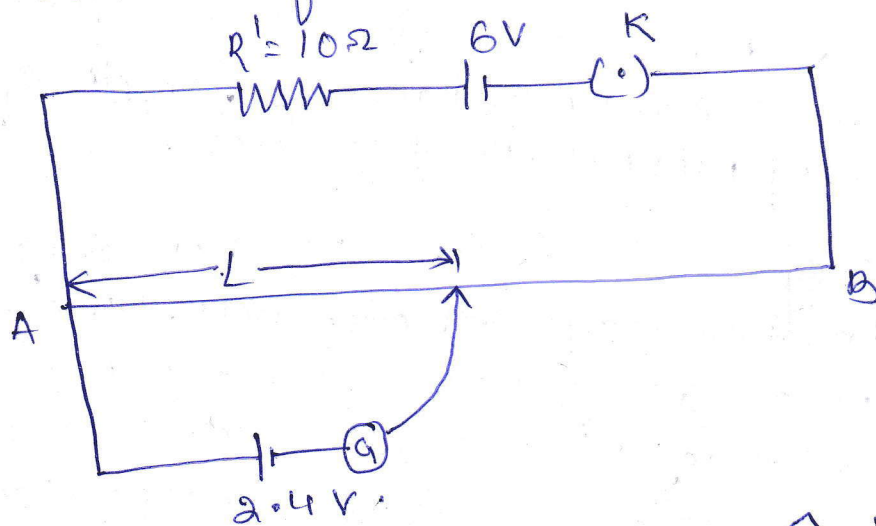
- 1) A resistance of a potentiometer wire of length 10 m is 20Ω . A resistance box and a 2 volt accumulator are connected in series with it. What resistance should be introduced in the box to have a potential drop of one microvolt per millimetre of the potentiometer wire?
- 2) In a potentiometer arrangement, a cell of emf 1.2 V gives a balance point at 30 cm length of the wire. This cell is now replaced by another cell of unknown emf. If the ratio of the emfs of the two cells is 1.5, calculate the difference in the balancing length of the potentiometer wire in the two cases.
- 3) Two cells of emfs $\mathcal{E}_1$ and $\mathcal{E}_2$ are connected together in two ways shown here. The 'balance points' in a given potentiometer experiment for these two combinations of cells are found to be at 351 cm and 70.2 cm respectively. Calculate the ratio of the emfs of the two cells.



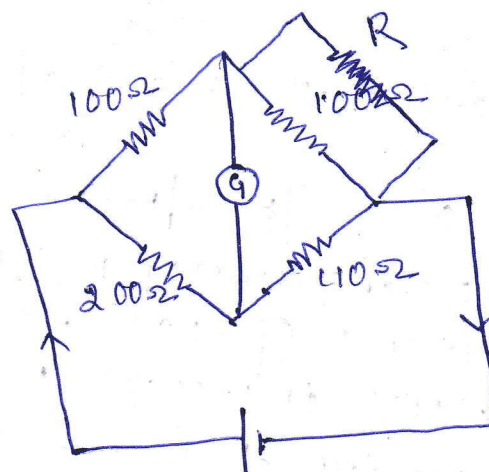
- 4) A potentiometer wire of length 4 m has a resistance of 10Ω . It is connected to a 6V battery in series with a resistance of 5Ω . Determine the emf of the primary cell which gives a balance point at 40 cm.

5) In a potentiometer arrangement for determining the emf of a cell, the balance point of the cell in open circuit is 350 cm. When a resistance of 9Ω is used in the external circuit of the cell, the balance point shifts to 300 cm. Determine the internal resistance of the cell.

6) The potentiometer wire of length 200 cm has a resistance of 20Ω . It is connected in series with a resistance 10Ω and an accumulator of emf 6V having negligible resistance. A source of 2.4V is balanced against a length 'L' of the potentiometer wire. Find the value of L.

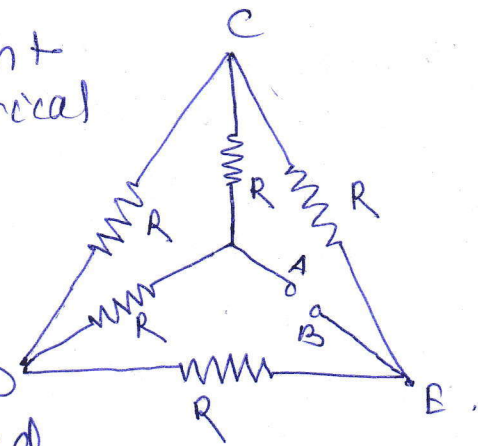


7) A wheatstone bridge is not showing any deflection in the galvanometer joined between the points B and D. Compute the value of R.

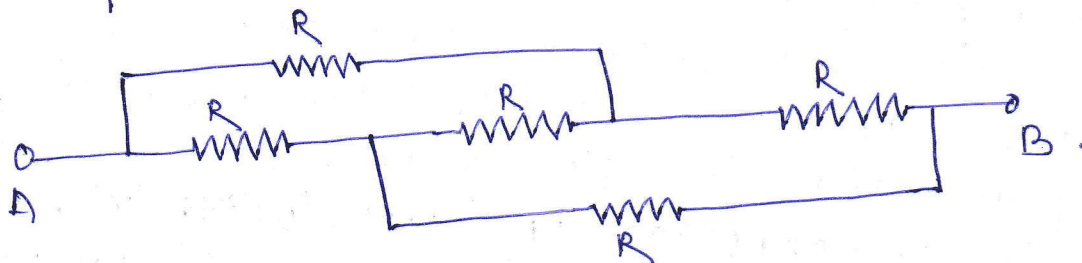


8) i) Calculate the equivalent resistance of the given electrical network between points A and B.

ii) Also calculate the current through CD and ACB, if a 10V d.c source is connected between A and B, and the value of R is assumed as 2Ω .

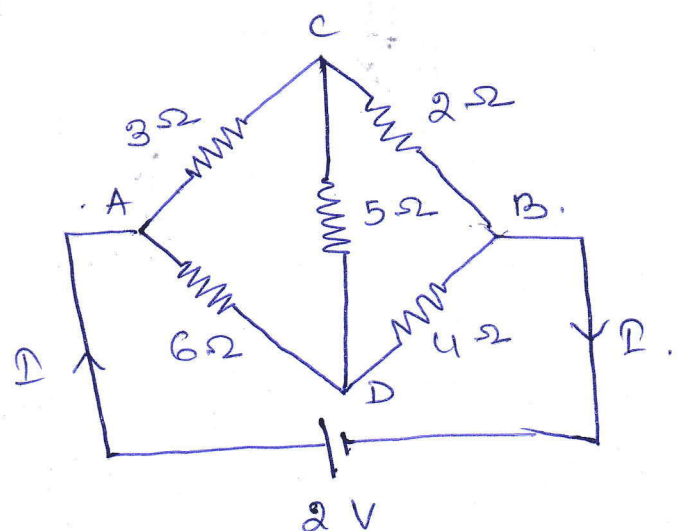


9) Calculate the equivalent resistance between the points 'A' and 'B' of the following network

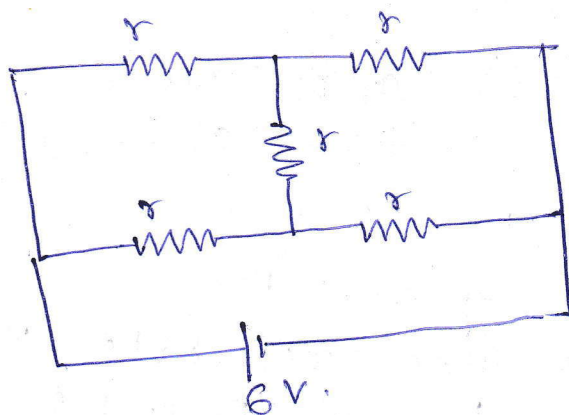


10) Calculate the value of unknown resistance 'x' and the current drawn by the circuit, assuming that no current flows through the galvanometer. Assume the resistance per unit length of the wire AB to be $0.01\Omega/\text{cm}$.

11) Find the current in the given circuit.



- 12) Each resistor ' r ' in the given circuit has a resistance of 10Ω and the battery has an emf of $6V$. Find the current supplied by battery.



- 13) In a metre bridge, the length of the wire is 100 cm . At what position will the balance point be obtained if the two resistances are in the ratio $2:3$?

- 14) In the meter bridge experimental setup, shown in fig., the null point 'D' is obtained at a distance of 40 cm from end 'A' of the metre bridge wire. If a resistance of 10Ω is connected in series with 'X', null point is obtained at $AD = 60\text{ cm}$. Calculate the values of X and Y.

