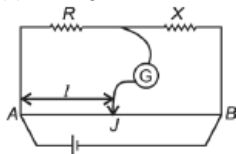
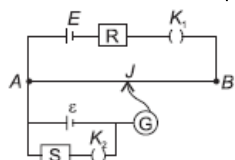


- 1 In the meter bridge experiment, balance point was observed at J with $AJ = l$.
 (i) The values of R and X were doubled and then interchanged. What would be the new position of balance point?
 (ii) If the galvanometer and battery are interchanged at the balance position, how will the balance point get affected?



2

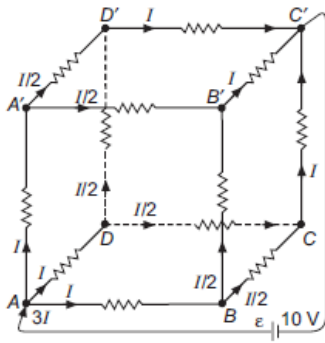
- 2 Two students X and Y perform an experiment on potentiometer separately using the circuit given below.



2

Keeping other parameters unchanged, how will the position of the null point be affected if

- (i) X increases the value of resistance R in the set-up by keeping the key K_1 closed and the key K_2 open?
 (ii) Y decreases the value of resistance S in the set-up, while the key K_2 remains open and the key K_1 closed.
- 3 Wheatstone bridge method is considered unsuitable for the measurement of very low resistances. Why? 2
- 4 (a) State the Kirchoff 's law.
 (b) A battery of 10V and negligible internal resistance is connected across the diagonally opposite corners of a cubical network consisting of 12 resistors each of resistance 1Ω in figure. Determine the equivalent resistance of the network and the current along each edge of the cube. 3



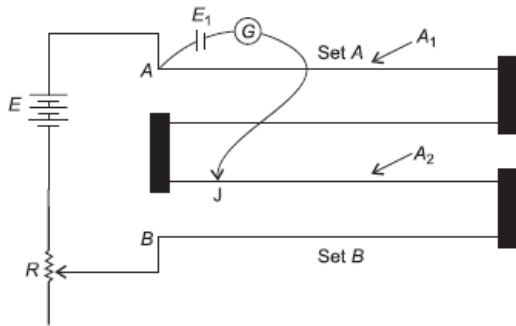
5 You are given two sets of potentiometer circuit to measure the emf E_1 of a cell.

Set A: consists of a potentiometer wire of a material of resistivity ρ_1 , area of cross-section A_1 and length l .

Set B: consists of a potentiometer of two composite wires of equal lengths $l/2$ each, of resistivity ρ_1, ρ_2 and area of cross-section A_1, A_2 respectively.

(i) Find the relation between resistivity of the two wires with respect to their area of cross-section, if the current flowing in the two sets is same.

(ii) Compare the balancing length obtained in the two sets.



3

6 (a) State the principle of working of a potentiometer.

(b) Figure shows the circuit diagram of a potentiometer for determining the emf ϵ of a cell of negligible internal resistance.

(i) What is the purpose of using high resistance R_2 ?

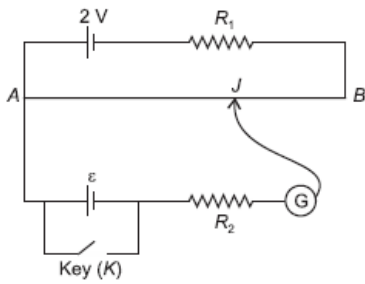
(ii) How does the position of balance point (J) change when the resistance R_1 is decreased?

(iii) Why cannot the balance point be obtained

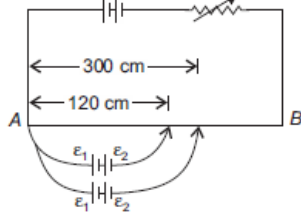
(1) When the emf ϵ is greater than 2 V, and

(2) When the key (K) is closed?

3

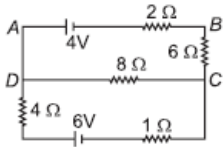


- 7 (a) State the principle of potentiometer. Define potential gradient. Obtain an expression for potential gradient in terms of resistivity of the potentiometer wire.
- (b) Figure shows a long potentiometer wire AB having a constant potential gradient. The null points for the two primary cells of emfs ϵ_1 and ϵ_2 connected in the manner shown are obtained at a distance of $l_1 = 120$ cm and $l_2 = 300$ cm from the end A . Determine (i) ϵ_1/ϵ_2 and (ii) position of null point for the cell ϵ_1 only.



5

- 8 State Kirchhoff's laws of an electrical network. Using Kirchhoff's laws, calculate the potential difference across the $8\ \Omega$ resistor.



5