PHYSICS

BOOKS - OSWAAL PUBLICATION PHYSICS (KANNADA ENGLISH)

CURRENT ELECTRICITY

Topic 1 Electric Current Resistance Calls Very Shory Answer Type Questions

1. a resistor is marked with colours red , red, orange and gold .

Write the value of its resistance .

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2. The colour code of a carbon resistor is Brown-Red-Brown-Gold. What is its resistance ?

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3. Name the charge carriers in metallic conductors.

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4. How does the resistance of a conductor vary with the increase of temperature ?

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5. Which combination of resistance gives maximum current ?

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6. What is the color of the third band of a coded resistor of resistance $2.3 \times 10^3 \Omega$?

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7. Name the colors corresponding to the digits 4 and 7 in the color code scheme for carbon resistors.

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8. How does the random motion of free electrons in a conductor get affected when a potential difference is appplied across its ends ?

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9. Write the expression for the drift velocity of charge carriers in a conductor of length l across which a potential difference V is applied.

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10. Show variation of resistivity of copper as a function of temperature in a graph.

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11. Why is that the terminal potential difference is always less than the e.m.f. of a cell?

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12. Two wires of equal length, one of copper and the other of manganin have the same resistance. Which wire is thicker ?

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13. A wire of resistance 8R is bent in the form of a circle. What is the effective resistacne between the ends of a diameter AB ?

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Topic 1 Electric Current Resistance Calls Shory Answer Type Questions I

1. Give any two practical limitations of Ohm's law.

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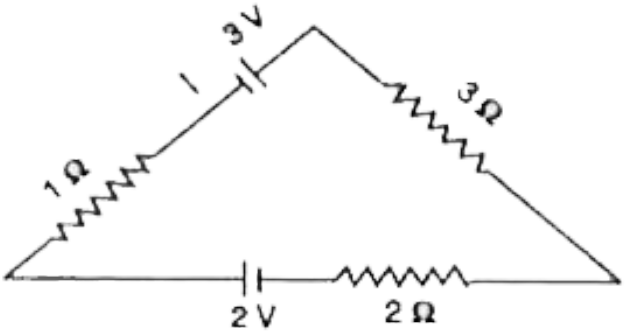
2. Calculate the value of I in the circuit given below.



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3. An example of a non ohmic device is

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4. Draw a plot showing the variation of resistivity of a (i) conductor and (ii) semiconductor, with the increse in temperature.

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5. Distinguish between emf (E) and terminal voltage (V) of a cell having internal resistance 'r'.

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6. Draw a plot showing the variation of terminal voltage (V) v/s the current (I) drawn from the cell.

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7. Draw a graph showing variation of resistivity with temperature of nichrome. Which property of nichrome is used to make standard resistance coils ?

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Topic 1 Electric Current Resistance Calls Shory Answer Type Questions Ii

1. State and explain ohm's law

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2. Define the term current density.

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3. Define the terms (i) drift velocity, (ii) relaxation time. A conductor of length L is connected to a d.c. source of emf ε. If this conductor is replaced by another conductor of same material and same area of cross-section but of length 3L, how will the drift velocity change ?

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4. Mention any two factors on which the internal resistance of the cell depends.

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Topic 1 Electric Current Resistance Calls Long Answer Type Questions

1. Obtain an expression for the equivalent emf and internal resistance of two cells connected in parallel.

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2. Obtain an expression for equivalent resistance of two resistors connected in parallel.

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3. What is drift velocity of free electrons ? Deduce $I = nAeV_d$ where the symbols have their usual meaning.

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4. Two resistors of 5Ω and 10Ω are connected in parallel with a cell of emf 3 V and internal resistacne 1Ω. Calculate the current through each of the resistors.

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5. Derive an expression of affective resistance of four resistors connected in parallel.

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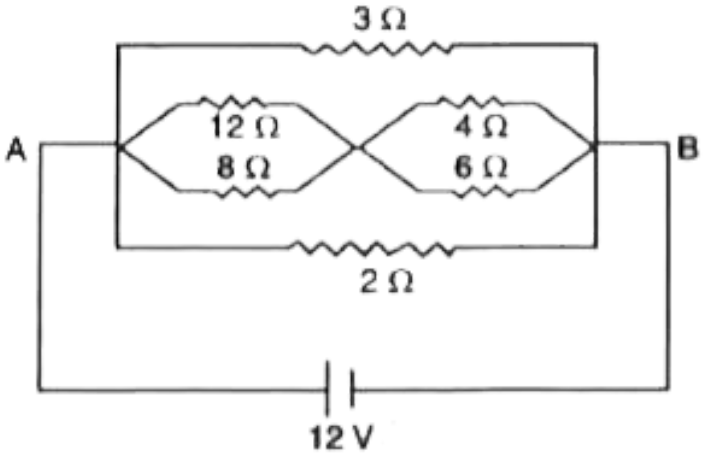
Topic 1 Electric Current Resistance Calls Numerical Problems

1. In the given circuit , calculate the (i) effective resistance between A and B (ii) current through the circuit and (iii)

current through 3Ω resistor.



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2. Calculate the internal resistance of the given cell using the following data. Balancing length for in open circuit $= l_1 = 0.60m$

Trial No.	Resistance connected to the cell in Ω	Balancing length in m	$r = R\left[\frac{l_1}{l_2} - 1\right]$ in Ω
(i)	3	0.4	1.5
(ii)	4	0.44	1.45
(iii)	5	0.46	1.52

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3. Three resistors of $3\Omega, 6\Omega \text{ and } 9\Omega$ are connected in parallel. A potential difference of 18 V is maintained across the combination. Find the current in each resistor.

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4. A battery of internal resistance 3Ω is connected to 20Ω resistor and the potential difference across the resistor is 10V. If another resistor 30Ω is connected in series with the first resistor and battery is again connectecl to the combination, then calculate the e.m.f and terminal potential difference across the combination..

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5. The resistance of the platinum wire of a platinum resistance thermometer at the ice point is 5Ω and at steam point ins 5.23Ω When the thermomenter is inserted in a hot bath, the resistance of the platinum wire is 5.795Ω. Calculate the temperature of the bath.

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6. A copper wire of $10^{-6}m^2$ area of cross section, carries a current of 2A. If the number of electrons per cubic meter is 8×10^{28}, calculate the current density and average drift velocity.

Given,$e1.\ 6 \times 10^{-19}C)$

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7. The resistance of a copper wire of length 5 m is 0.5Ω. If the diameter of the wire is $0.05cm$, determine its specific resistance.

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8. Two wires of same material and length have resistance $5\Omega \text{ and } 10\Omega$ respectively. Find the ratio of radii of the two wires.

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9. Find the current flowing across three resistors $3\Omega, 5\Omega \text{ and } 2\Omega,$ connected in parallel to a 15 V supply. Also

find the effective resistance and total current drawn from the supply.

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Topic 2 Kirchhoff S Laws Applications Short Answer Type Questions I

1. State Kirchhoff's laws of Electrical network.

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2. Draw Wheatstone bridge and write the condition for balance.

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Topic 2 Kirchhoff S Laws Applications Short Answer Type Questions Ii

1. Why are the connections between the resistors in a meter bridge made of thick copper strips ?

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2. Why is it generally preferred to obtain the balance point in the middle of the meter bridge wire ?

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3. Which material is used for the meter bridge wire and why ?

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Topic 2 Kirchhoff S Laws Applications Long Answer Type Questions

1. Deduce the condition for balance of a wheatstone's bridge using Kirchoffs rules .

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2. Describe an experiment to determine to determine the temperature co-efficient of a thermistor using a meter bridge.

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3. Explain the experiment to determine the resistivity of the material of the wire using meter bridge.

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Topic 2 Kirchhoff S Laws Applications Numerical Problems

1. Two cells of emf 2V and 4V and internal resistance 1Ω and 2Ω respectively are connected in parallel so as to send the current in the same direction through an external resistance of 10Ω. Find the potential difference across 10Ω resistor.

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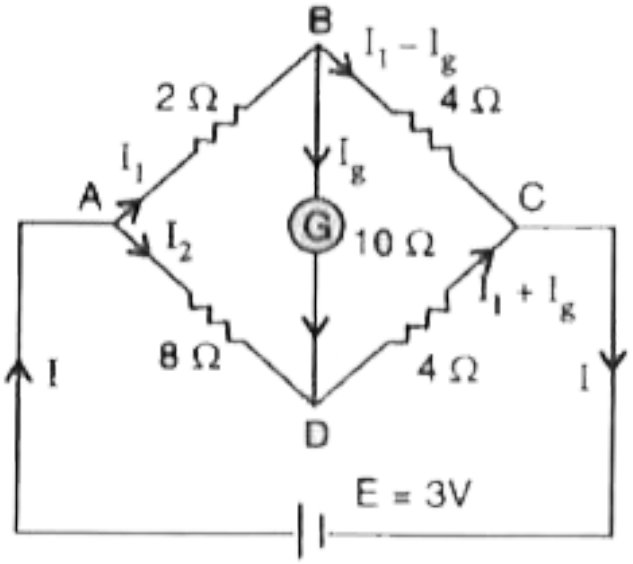
2. Determine the current through the galvanometer in the circuit. Given

$: P = 2\Omega, Q = 4\Omega, R = 8\Omega S = 4\Omega G = 10\Omega, E = 5$ and $r = 0.$



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3. The folllowing reading are obtained in a meter bridge experiment to find the resistivity of the material of a given wire. Calculate the resistivity of the material of the wire.

Diameter of the wire $= d = 0.36mm,$ length of the wire

$L = 60cm.$

Tr. No.	Resistance in the right gap in Ω	Balancing length in cm
1	3	59.0
2	6	43.0

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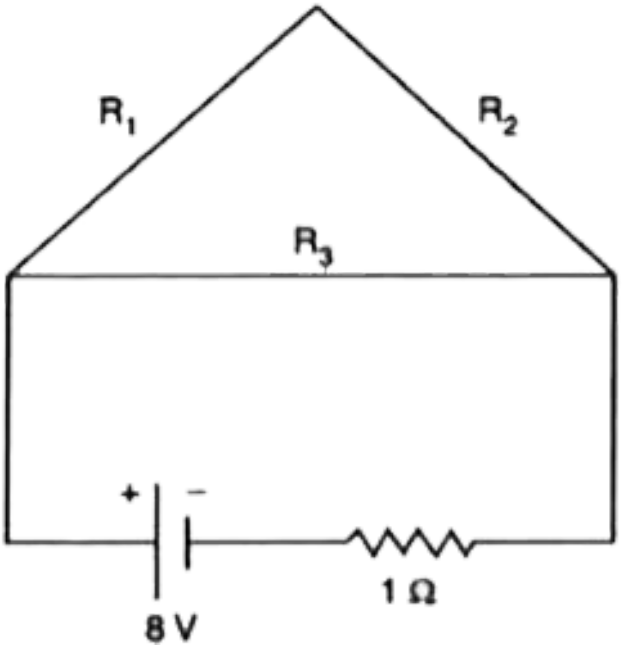
4. A uniform wire of resistance 12Ω is cut into three pieces so that the ratio of the resistances $R_1 : R_2 : R_3 = 1 : 2 : 3$ and the three pieces are connected to form a triangle across which a cell of emf 8V and internal resistance 1Ω is connected as shown.



Calculate the current through each part of the circuit.

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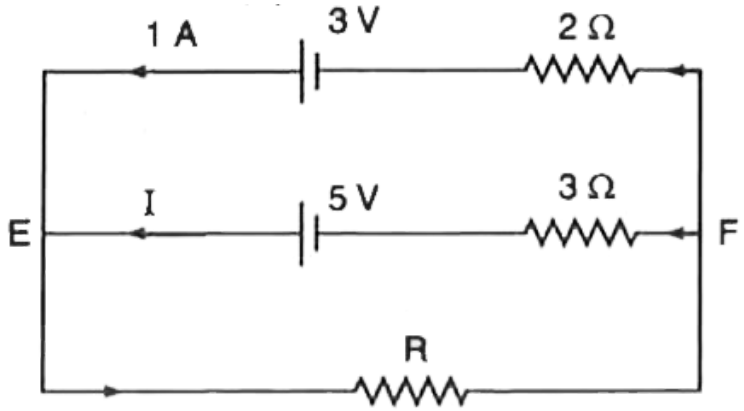
5. Using Kirchhoffs rules in the given circuit, determine (i) the voltage drop across the unknown resistor R and (ii) current I in

the arm EF.



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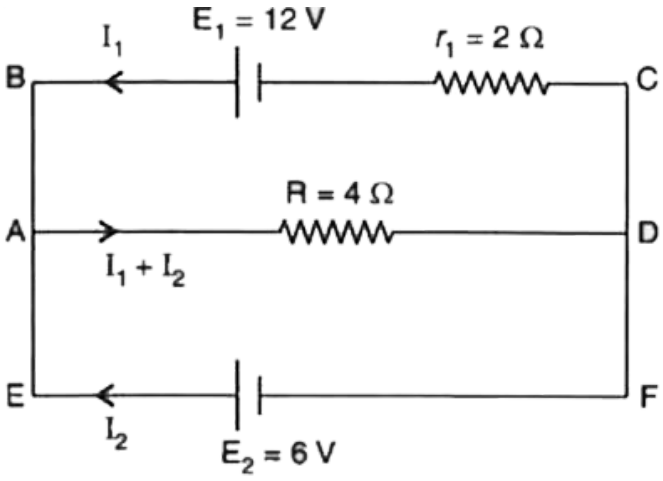
6. In the electric ntework shown in the figure, use Kirchhoffs rules to calculate the power consumed by the resistance

$R = 4\Omega$.



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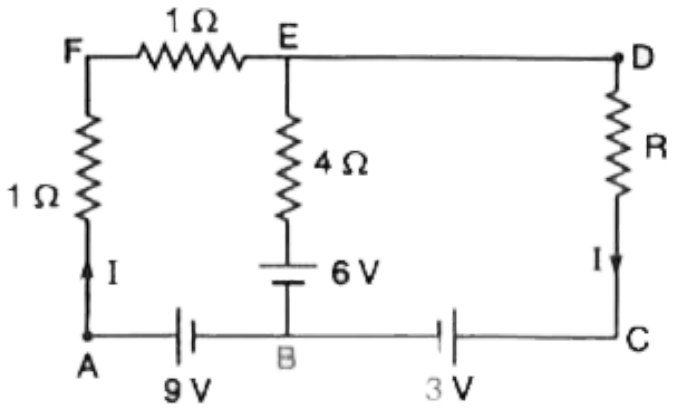
7. Using Kirchhoff's rules determine the value of unknown resistance R in the circuit so that no current flows through 4Ω

resistance. Also find the potential difference between A and D.



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Topic 3 Potentiometer Applications Vert Short Answer Type Questions

1. State the underlying principle of a potntiometer.

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2. What is a potentiometer?

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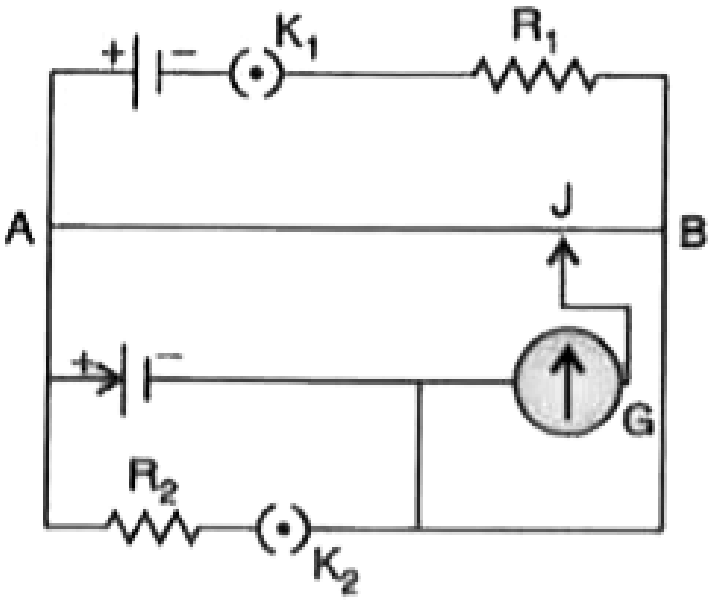
Topic 3 Potentiometer Applications Short Answer Type Questions I

1. For the circuit shown here, would the balancing length increse, decrease or remain the same, if



(i) R_1 is decreased:

(ii) R_2 is increased ,

without any other change, (in each case) in the rest of the circuit. Justify your answers in each case.

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2. Write two factors on which the sensitivity of a potentiometer depends.

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Topic 3 Potentiometer Applications Short Answer Type Questions Ii

1. State the underlying principle of a potentiometer. Why is it necessary to (i) use a long wire, (ii) have uniform area of cross-section of the wire ?

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Topic 3 Potentiometer Applications Long Answer Type Question

1. Write the principle of working of a potentiometer. Describe briefly, with the help of circuit diagram, how a potentiometer is

used to determine the internal resistance of a given cell.

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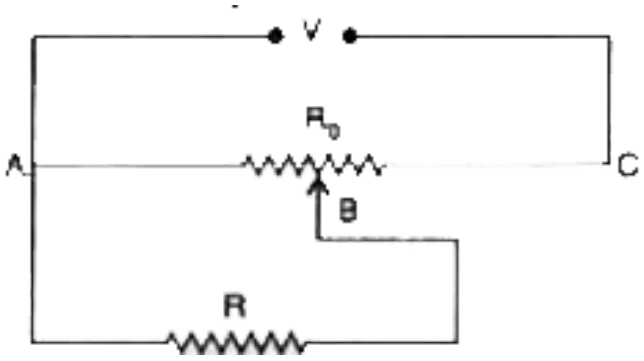
Topic 3 Potentiometer Applications Numerical Problems

1. A resistance of $R\Omega$ draws current from a potentiometer. The potentiometer has a total resistance $R_0\Omega$. A voltage V is supplied to the potentiometer. Derive an expression for the voltage across R when the sliding contact is in the middle of the potentiometer.



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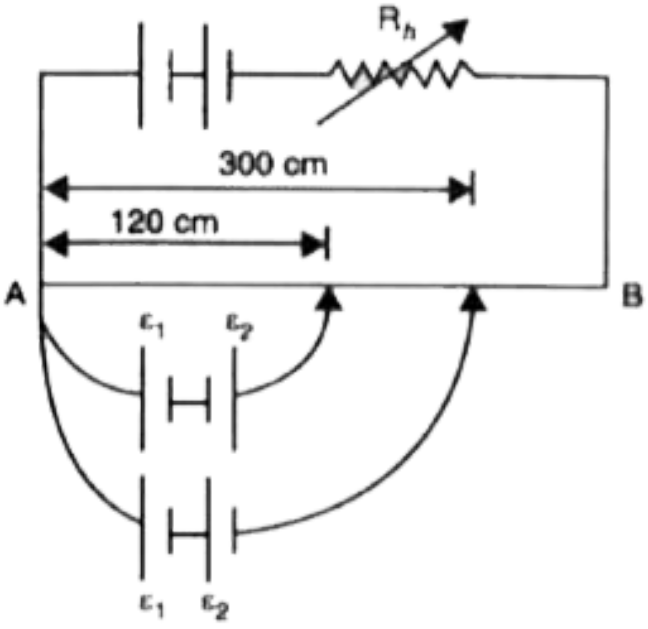
2. Figure shows a long potentiometer wire AB having a constant potential gradient. The null points for the two primary cells of emfs ε_1 and ε_2 connected in the manner shown are obtained at a distance of $l_1 = 120cm$ and $l_2 = 300cm$ from the end A. Determine $(i)\varepsilon_1/\varepsilon_2$ and (ii) position of null point for the cell ε_1 only.



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