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Lakshya Siddhi learning center

12th Science- 2020 : Physics
Current Electricity,

DATE: _____

TIME: 1 hr

MARKS: 25

SEAT NO:

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Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and Write the correct answer.

(4)

1. The length of a potentiometer wire is 5 m. An electron in this wire experiences a force of 4.8×10^{-19} N, emf of the main cell used in potentiometer is _____
A) 3V B) 15V
C) 1.5V D) 5V
2. Potential gradient along the potentiometer wire is 6 mV/cm. The balancing length for a cell of emf 1.5 volt will be _____
A) 150 cm B) 200 cm
C) 250 cm D) 300 cm
3. In potentiometer experiment if l_1 is the balancing length for e.m.f. of cell of internal resistance r and l_2 is the balancing length for its terminal potential difference when shunted with resistance R
A) $l_1 = l_2 \left[\frac{R+r}{R} \right]$ B) $l_1 = l_2 \left[\frac{R}{R+r} \right]$
C) $l_1 = l_2 \left[\frac{R}{R-r} \right]$ D) $l_1 = l_2 \left[\frac{R-r}{R} \right]$
4. Kirchoff's voltage law is connected with
A) IR drops B) Junction voltages
C) Battery e.m.f's D) Both 'a' and 'c'

Q.2 Answer the following.

(3)

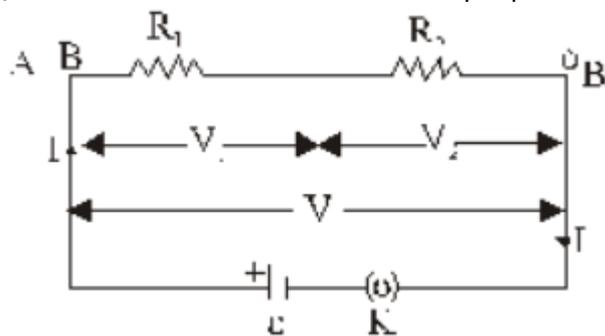
1. Define Junction.
2. A potential drop per unit length along a wire is 5×10^{-3} V/m. If the emf of a cell balances against length 216 cm of this potentiometer wire, find the emf of the cell.
3. Why should not the jockey be slid along the potentiometer wire?

Section B

Attempt any Four

- Q.3 A piece of copper and another of germanium are cooled from room temperature to look. What will happen to their conductivities? (2)
- Q.4 What is meant by sensitivity of potentiometer? How can it be increased? (2)
- Q.5 Of which material is a potentiometer wire normally made and why? (2)
- Q.6 A potentiometer is equivalent to a voltmeter of infinite resistance. Discuss. (2)

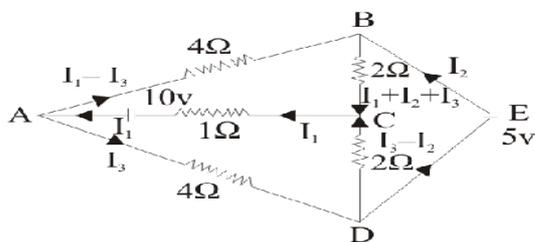
- Q.7 Obtain the expression for P.D. across each resistor, when two resistors are connected in series. (2)
(Show that P.D. is divided in direct proportion of resistance.)



- Q.8 The resistance of a potentiometer wire is 8Ω and its length is 8m. A resistance box and a 2V battery are connected in series with it. What should be the resistance in the box, if it is desired to have a potential drop of $1\mu\text{V}/\text{mm}$? (2)

Section C
Attempt any Two

- Q.9 Distinguish between Ammeter and Voltmeter. (3)
- Q.10 Explain practical application of potentiometer. (3)
- Q.11 Determine current in each branch of the network shown in the figure. (3)



Section D
Attempt any One

- Q.12 In a Wheatstone's meter-bridge experiment, the null point is obtained in middle one third portion of wire. Why is it recommended? (4)

A potentiometer wire has a length of 1.5 m and resistance of 10Ω . It is connected in series with the cell of emf 4 Volt and internal resistance 5Ω . Calculate the potential drop per centimeter of the wire.

- Q.13 Describe how a potentiometer is used to compare the emfs of two cells by combination method. (4)