PHYSICS

BOOKS - TARGET PHYSICS (HINGLISH)

CURRENT ELECTRICITY

Classical Thinking

1. According to the Kirchhoff's laws in an electric circuit, the algebraic sum of current at any junction is

A. negligible

B. zero

C. infinite

D. finite

Answer:

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2. According to Kirchhoff's law, the algebraic sum of products of current and resistance as well as e.m.f.s in a closed loop is

A. greater than zero

B. zero

C. less than zero

D. determined by the e.m.f.

Answer:

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3. In a closed circuit, the vector sum of total e.m.f.s is equal to the sum of the

A. currents.

B. resistances.

C. products of current and the resistances.

D. internal resistance of cell.

Answer:

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4. What determines the conventional direction of the product of current and resistance while applying the Kirchhoff's law ?

A. Magnitude of current

B. Value of resistance

C. Direction of current

D. Value of P.D.

Answer:

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5. On sending the current in the Wheatstone's network, the network is said to be balanced, if

A. there is no diflection in the galvanometer.

B. there is a full deflection in the galvanometer.

C. there is partial deflection in the galvanometer.

D. there is zero P.D. between two ends.

Answer:

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6. Wheaststone bridge is most sensitive when the resistance of all four arms are

A. different order.

B. same order.

C. partially different order.

D. no connection with the order.

Answer:

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7. Which of the following instruments is generally used with a galvanometer to show null reading ?

A. Ammeter

B. Potentiometer

C. Voltmeter

D. Metrebridge

Answer:

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8. Accuracy of a metrebridge is maximum when the null point is obtained at the midpoint of the bridge wire. This is because

A. the error due to non uniformity of diameter of the wire is minimum in that case.

B. the error due to the end resistances is minimum.

C. the error due to heating up of wire is minimum.

D. the error due to faulty galvanometer is minimum.

Answer:

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9. In Kelvin's method of finding the resistance of a galvanometer, we

A. use the balance point method.

B. use the null point method.

C. use the half deflection method.

D. interchange the positions of the battery and the galvanometer.

Answer:

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10. A metrebridge cannot be used to determine

A. resistance of a wire.

B. Specific resistance.

C. conductivity.

D. e.m.f of a cell.

Answer:

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11. Select the WRONG statement.

A. A potentiometer is a constant voltage device.

B. A potentiometer is a constant current device.

C. A potentiometer is used to measure e.m.f. of a cell.

D. A potentiometer is used to measure potential drop between two points in an electric circuit.

Answer:

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12. Slide wire bridge does not operate on the same principle as the

A. Wheatstone bridge

B. Potentiometer

C. post office box arrangement

D. metrebridge

Answer:

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13. Which of the following can cause the null point of a potentiometer to shift beyond the wire ?

A. Low e.m.f. of auxiliary battery.

B. High e.m.f. of auxiliary battery.

C. Shorter length of wire.

D. Longer length of wire.

Answer:

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14. In potentiometer experiment, when the galvanometer shows no deflection, then no current flows in

A. potentiometer wire

B. galvanometer circuit

C. main circuit

D. battery

Answer:

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15. Potentiometer is better for measuring the potential difference than the voltmeter because

A. it uses a long wire.

B. it uses an auxiliary battery of large e.m.f.

C. it does not disturb the potential difference to be measured.

D. it is based on the principle of Wheatstone bridge.

Answer:

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16. In potentiometer experiment to determine internal resistance of the cell, balance point has been obtained in fourth wire. It can be shifted to 5^{th} wire by

A. decreasing the current through potentiometer wire.

B. increasing the current through potentiometer wire.

C. connecting suitable shunt resistance across the cell.

D. connecting a resistance in series with the cell.

Answer:

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17. The potential gradient along the length of uniform wire is $10\ \mathrm{Vm}^{-1}$. The length of the wire is 1 m. What is the potential difference across two points on the wire separated by 25 cm?

A. $2.5\ \mathrm{V}$

B. $5.0\ \mathrm{V}$

C. $7.5\ \mathrm{V}$

D. $10\ \mathrm{V}$

Answer:

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18. In a potentiometer experiment the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2Ω, the balancing length becomes 120 cm.The internal resistance of the cell is

A. 4Ω

B. 2Ω

C. 1Ω

D. 0.5Ω

Answer:

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19. In a metrebridge, copper strips are used to

A. decrease contact resistance.

B. to reduce thermoelectric effect.

C. to increase grip of wire.

D. none of these.

Answer:

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20. In potentiometer experiment, a cell is balanced by length 120 cm. When a cell is shunted by resistance of 5Ω, the balancing length is 80 cm. The internal resistance of cell is

A. 2.5Ω

B. 3Ω

C. 4Ω

D. 5Ω

Answer:

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21. A 2.0 V potentiometer is used to determine the internal resistance of $1.5V$ cell. The balance point of the cell in the circuit is $75cm$. When a resistor of 10Ω is connected across

cel, the balance point sifts to $60cm$. The internal resistance of the cell is

A. 1.5Ω

B. 2.5Ω

C. 3.5Ω

D. 4.5Ω

Answer:

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22. Assertion: We prefer a potentiometer with a longer bridge wire.

Reason : By doing this, the sensitivity of the bridge is increased because for longer wire potential drop per unit length will be small.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False

D. Assertion is False but Reason is True.

Answer:

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23. Assertion : The e.m.f. of the drivercell in the potentiometer experiment should be greater than the e.m.f. of the cell to determined.

A. Assertion is True, Reason is True,

Reason is a correct explanation for

Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False

D. Assertion is False but Reason is True.

Answer:

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Critical Thinking

1. A $50V$ battery is connected across a 10 ohm resistor. The current is 4.5 amperes. The internal resistance of the battery is

A. 10Ω

B. 0.5Ω

C. 1.1Ω

D. 5Ω

Answer:

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2. Four resistors P, Q, R and S having resistances $3\Omega, 3\Omega, 4\Omega$ and 6Ω respectively, are arranged to form a Wheatstone's bridge. The value of the resistance with which S must be shunted in order to balance the bridge is

A. 12Ω

B. 3Ω

C. 4Ω

D. 16Ω

Answer:

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3. At which point will the null point be obtained on a metrebridge if the ratio of the resistances in the two gaps is $2:3$?

A. $25 \quad \mathrm{cm}$

B. $30 \quad \mathrm{cm}$

C. $40 \quad \mathrm{cm}$

D. $60 \quad \mathrm{cm}$

Answer:

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4. In a meter-bridge experiment with a resistance R_1 in left gap and a resistance X in a right gap. null point is obtained at $40cm$ from the left emf. With a resistance R_2 in the left gap, the null point is obtainned at $50cm$ from left hand. Find the position of the left gap is containing R_1 and R_2 (i) in series and (ii) in parallel.

A. 25.6 cm from left

B. 68.4 cm from left

C. 31.6 cm from left

D. 74.4 cm from left

Answer:

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5. Two resistances are connected in the two gaps of a meter bridge. The balance point is $20cm$ from the zero end. When a resistance 15Ω is connected in series with the smaller of

two resistance, the null point+ shifts to $40cm$. The smaller of the two resistance has the value.

A. 8Ω

B. 9Ω

C. 10Ω

D. 12Ω

Answer:

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6. The material of wire of potentiometer is

A. copper

B. steel

C. manganin

D. aluminium

Answer:

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7. A potentiometer wire is 10 m long and has a resistance of $2\Omega/\mathrm{m}$. It is connected in series with a battery of e.m.f. 3 V and a resistance of 10Ω. The potential gradient along the wire in V/m is

A. 0.01

B. 0.02

C. 0.1

D. 0.2

Answer:

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8. A potentiometer wire has a resistivity of $10^9 \Omega$ cm and area of cross-section is $10^{-2} \mathrm{cm}^2$. If current of $0.01\ \mathrm{mA}$ passes through the wire, potential gradient is

A. $10^9 \mathrm{V/m}$

B. $10^{10} \mathrm{V/m}$

C. $10^{11} \mathrm{V/m}$

D. $10^8 \mathrm{V/m}$

Answer:

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9. A battery of e.m.f. 2 V and internal resistance 2Ω is connected to an external resistance 8Ω. If the length of the conductor is 4 m, then potential gradient between the two ends of the wire is

A. $0.4 \ \mathrm{V/m}$

B. $8 \ \mathrm{V/m}$

C. $4 \ \mathrm{V/m}$

D. $2 \ \mathrm{V/m}$

Answer:

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10. A resistance of 990Ω and a cell of emf 2 V is connected in series with a potentiometer wire having a length 2 m and resistance 10Ω. The potential gradient along the wire will be

A. $0.01 \ \mathrm{V/m}$

B. $0.02 \ \mathrm{V/m}$

C. $0.03 \ \mathrm{V/m}$

D. $0.04 \ \mathrm{V/m}$

Answer:

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11. An accumulator of 5 volt is connected through a resistance of 40Ω to a potentiometer wire 10 m long and of

resistance 10Ω. For a cell, the null point is found at a length of 8 m from the common terminal. The current through the wire is

A. $0.05 \quad A$

B. $0.1 \quad A$

C. $0.15 \quad A$

D. 0.2

Answer:

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12. The resistance per unit length of a wire is $1\Omega/\mathrm{m}$. A Leclanche cell of e.m.f. 1.45 V is balanced against 2.9 m length of potentiometer wire. The current through the wire is

A. $1\ \mathrm{A}$

B. $2\ \mathrm{A}$

C. $0.5\ \mathrm{A}$

D. $0.1\ \mathrm{A}$

Answer:

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13. The e.m.f. E of the battery is balanced by p. d. across 75 cm of a potentiometer wire. For a standard cell of e.m.f. 1.02 V, the balancing length is 50 cm. The value of E is

A. 0.68 V

B. 1.24 V

C. 1.53 V

D. 1.08 V

Answer:

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14. A potentiometer having a wire of length 10 m and resistance 20Ω is connected to an accumulator of e.m.f. E through a resistance box. When the resistance in the box is 20Ω, a null point is observed at 5 m for a cell of e.m.f. E_1. The ratio of E to E_1 is

A. $1/4$

B. $2/1$

C. $3/1$

D. $4/1$

Answer:

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15. When two cells of e.m.f. 1.5 V and 1.1 V connected in series are balanced on a potentiometer, the balancing length is 260 cm.

The balancing length, when they are connected in opposition is (in cm)

A. 100

B. 110

C. 40

D. 65

Answer:

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16. When a balance point is obtained in a potentiometer for finding the internal resistance of a cell, the current through the potentiometer wire is due to

A. the cell whose internal resistance is to be found.

B. the auxiliary battery.

C. both cell and auxiliary battery.

D. neither cell nor the battery.

Answer:

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17. With resistances P and Q in the left and right gaps of a metre bridge, the balance point divides the wire in the rati 1/3. When P and Q are increased by 40Ω, the balance point divides the wire in the ratio 3/5. The values of P and Q will be respectively

A. $30\Omega, 10\Omega$

B. $10\Omega, 30\Omega$

C. $20\Omega, 60\Omega$

D. $60\Omega, 40\Omega$

Answer: C

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18. A cell of e.m.f. 2 V and negligible internal resistance is connected in series with a potentiometer wire of length 100 cm. The e.m.f of the Leclanche cell is found to balance on 75

cm of the potentiometer wire. The e.m.f. of the cell is

A. 3.5 V

B. 2.5 V

C. 1.5 V

D. 0.5 V

Answer:

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19. An accumulator of 4 V is connected through a resistance of 30Ω to a potentiometer wire 10 m long and resistance 30Ω. When a cell is connected through a galvanometer to the potentiometer the null point is found at 5.5 m from the common terminal. The potential gradient in the wire is

A. $\frac{1}{15}\mathrm{V/m}$

B. $\frac{1}{10}\mathrm{V/m}$

C. $\frac{1}{5}\mathrm{V/m}$

D. $\frac{1}{3}\mathrm{V}/\mathrm{m}$

Answer:

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20. A potentiometer has uniform potential gradient. The specific resistance of the material of the potentiometer wire is 10^{-7} ohm-metre and the current passing through it is 0.1 ampere, cross-section of the wire is

10^{-6} m^2. The potential gradient along the potentiometer wire is

A. 10^{-4} V/m

B. 10^{-6} V/m

C. 10^{-2} V/m

D. 10^{-8} V/m

Answer:

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21. In a potentionmeter experiment, when three cells A, B and C are connected in series, the balancing length is found to be 740 cm. If A and B are connected in series, balancing length is 440 cm and for B and C connected in series, it is 540 cm. The emf of E_A, E_B and E_C are respectively (in volts)

A. $1, 1.2 \text{ and } 1.5$

B. $1, 2, \text{ and } 3$

C. $1.5, 2 \text{ and } 3$

D. $1.5, 2.5 \text{ and } 3.5$

Answer:

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22. Potentiometer wire of length $1m$ is connected in series with 490Ω resistance and $2V$ battery. If $0.2m\frac{V}{c}m$ is the potential gradient, then resistance of the potentiameter wire is approximately

A. 4.9Ω

B. 7.9Ω

C. 5.9Ω

D. 6.9Ω

Answer:

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23. Assertion: In a metrebridge, length of the wire is 1 metre.

Reason: Greater the length of wire, better is the accuracy.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False

D. Assertion is False but Reason is True.

Answer:

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24. Assertion: A slide wire bridge is also called a metrebridge.

Reason: It is because, the length of wire in a slide wire bridge is one metre.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False

D. Assertion is False Reason is True.

Answer:

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Competitive Thinking

1. Kirchhoff's current law is the law of conservation of

A. energy

B. momentum

C. charge

D. angular momentum

Answer:

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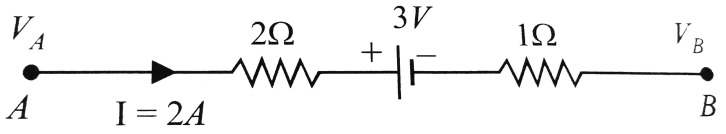
2. The potential difference $(V_A - V_B)$ between the point A and B in the given figure is



A. $+9V$

B. $-3V$

C. $+3V$

D. $+6V$

Answer:

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3. In meter brigde of Wheatstone bridge for measurment of resistance, the known and the unknown resistance are interchanged. The error so removed is

A. minor error

B. observational error

C. error due to thermoelectric effect

D. connection error

Answer:

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4. In a Wheatstone's bridge, three resistances P,Q and R connected in the three arms and the fourth arm is formed by two resistances

S_1 and S_2 connected in parallel. The condition for the bridge to be balanced will be

A. $\frac{R(S_1 + S_2)}{S_1 S_2}$

B. $\frac{S_1 S_2}{R(S_1 + S_2)}$

C. $\frac{RS_1 S_2}{(S_1 + S_2)}$

D. $\frac{(S_1 + S_2)}{RS_1 S_2}$

Answer:

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5. Four resistances arranged to form a Wheatstone network are 8Ω, 12Ω, 6Ω and 27Ω resistance, so that the bridge is balanced, is

A. 13.5Ω

B. 14.5Ω

C. 13Ω

D. 14Ω

Answer:

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6. In a Wheatstone's network, $P = 2\Omega, Q = 2\Omega, R = 2\Omega$ and $S = 3\Omega$. The resistance with which S is to be shunted in order that the bridge may be balanced is

A. 4Ω

B. 1Ω

C. 6Ω

D. 2Ω

Answer:

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7. In Wheatstone bridge, the resistances in four arms are $10\Omega, 10\Omega, 10\Omega$ and 20Ω. To make the bridge balance, resistance connected across 20Ω is

A. 10Ω

B. 5Ω

C. 20Ω

D. 40Ω

Answer:

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8. A uniform wire of 16Ω is made into the form of a square. Two opposite corners of the square are connected by a wire of resistance 16Ω . The effective resistance between the other two opposite corners is

A. 32Ω

B. 20Ω

C. 8Ω

D. 4Ω

Answer:

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9. In an experiment of meter bridge, a null point is obtaining at the center of the bridge wire. When a resistance of $10ohm$ is connected in one gap, the value of resistance other gap is

A. 10Ω

B. 5Ω

C. $1/5\Omega$

D. 500Ω

Answer:

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10. v20.1

A. 10Ω

B. 20Ω

C. 40Ω

D. None of the above three values

Answer:

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11. Four resistors, 100Ω,200Ω,300Ω, and 400Ω are connected to form four sides of a square. The resistors can be connected in any order.

What is the maximum possible equivalent resistance across the diagonal of the square?

A. 210Ω

B. 240Ω

C. 300Ω

D. 250Ω

Answer:

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12. In meter bridge , the balancing length from left is found to be 20 cm when standard connected of 1Ω is in right gap . The value of unknown resistance is

A. 0.8Ω

B. 0.5Ω

C. 0.4Ω

D. 0.25Ω

Answer:

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13. In metre bridge experiment, with a standard resistance in the right gap and a resistance coil dipped in water (in a beaker) in the left gap, the balancing length obtained is '1'. If the temperature of water is increased, the new balancing

A. < 1

B. > 1

C. $= 0$

D. $= 1$

Answer:

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14. Resistance in the two gaps of a meter bridge are $10ohm$ and $30ohm$ respectively. If the resistances are interchanged he balance point shifts by

A. 33.3

B. 66.67

C. 25

D. 50

Answer:

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15. The resistances in left and right gap of a meter brigdge are 20 ω and 30 ω respecitively when the resistance in the left gap is reduced to half its value then balance point shifts by

A. 15 cm to the right.

B. 15 cm to the left.

C. 20 cm to the right.

D. 20 cm to the left.

Answer:

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16. An unknown resistance R_1 is connected is series with a resistance of 10Ω. This combination is connected to one gap of a

meter bridge, while other gap is connected to another resistance R_2. The balance point is at $50cm$ Now , when the 10Ω resistance is removed, the balanced point shifts to $40cm$ Then the value of R_1 is.

A. 60

B. 40

C. 20

D. 10

Answer:

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17. Two unknown resistances are connected in two gaps of a meter-bridge. The null point is obtained at 40 cm from left end. A 30Ω resistance is connected in series with the smaller of the two resistances, the null point shifts by 20 cm to the right end. The value of smaller resistance in Ω is

A. 12

B. 24

C. 36

D. 48

Answer:

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18. In a meter bridge experiment null point is obtained at 20 cm. from one end of the wire when resistance X is balanced against another resistance Y. If $X < Y$, then where will be the new position of the null point from the same

end, if one deicdes to balance a resistance of 4

X against Y

A. 50 cm

B. 80 cm

C. 40 cm

D. 70 cm

Answer:

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19. In a metre bridge experiment, when a nichrome wire is in the right gap, the balancing length is 60 cm. When the nichrome wire is uniformly stretched to increase its length by $20\,\%$ and again connected in the right gap balancing length is nearly

A. 61 cm

B. 31 cm

C. 51 cm

D. 41 cm

Answer:

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20. On interchanging the resistances, the balance point of a meter bridge shifts to the left by 10 cm. The resistance of their series combination is $1k\Omega$. How much was the resistance on the left slot before interchanging the resistances ?

A. 550Ω

B. 910Ω

C. 990Ω

D. 505Ω

Answer:

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21. In balanced meter bridge, the resistance of bridge wire is $0.1\Omega cm$. Unknown resistance X is connected in left gap and 6Ω in right gap, null point divides the wire in the ratio 2:3 .

Find the current drawn the battery of 5V having negligible resistance

A. $1 \ A$

B. $1.5 \ A$

C. $2 \ A$

D. $5 \ A$

Answer:

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22. A potentiometer is an accurate and versatile device to make electrical measurements of $E.M.F.$ because the method involves

A. cells.

B. potential gradients.

C. a condition of no current flow through the galvanometer.

D. a combination of cells, galvanometer and resistances.

Answer:

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23. In potentiometer experiment, null point isobtained at a particular point for a cell on potentiometer wire x cm long. If the lengthof the potentiometer wire is increasedwithout changing the cell, the balancing length will (Driving source is not changed)

A. increase

B. decrease

C. not change

D. becomes zero

Answer:

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24. A potentiometer consists of a wire of length 4 m and resistance 10Ω. If is connected of cell of emf $2V$. The potential difference per unit length of the wire will be

A. $0.5 \ \mathrm{V/m}$

B. $10 \ \mathrm{V/m}$

C. $2 \ \mathrm{V/m}$

D. $5 \ \mathrm{V/m}$

Answer:

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25. A potentiometer wire of length 10 m is connected in series with a battery the emf of a cell balances against 250 cm length of wire if

length of potentiometer wire is increased by 1 m then new balancing length of wire will be

A. $2.00 \quad \mathrm{m}$

B. $2.25 \quad \mathrm{m}$

C. $2.50 \quad \mathrm{m}$

D. $2.75 \quad \mathrm{m}$

Answer:

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26. A 2 volt battery, a 15Ω resistor and a potentiometer of $100cm$ length, all are connected in series. If the resistance resistance of potentiometer wire is 5Ω, then the potential gradient of the potentiometer wire is

A. $0.005 \ \mathrm{V/cm}$

B. $0.05\mathrm{V/cm}$

C. $0.02 \ \mathrm{V/cm}$

D. $0.2 \ \mathrm{V/cm}$

Answer:

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27. The resistivity of a potentiometer wire is $40 \times 10^{-8} \Omega - m$ and its area of cross section is $8 \times 10^{-6} m^2$. If 0.2 A current is flowing through the wire the potential gradient will be

A. 10^{-1} V/m

B. 10^{-2} V/m

C. 10^{-3} V/m

D. 10^{-4} V/m

Answer:

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28. A potentiometer wire has length $4m$ and resistance 8Ω. The resistance that must be connected in series with the wire and an accumulator of e.m.f. $2V$, so as the get a potential gradient $1mV$ per cm` on the wire is

A. 32Ω

B. 40Ω

C. 57Ω

D. 35Ω

Answer:

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29. A wire of length 100 cm is connected to a cell of emf 2 V and negligible internal resistance. The resistance of the wire is 3Ω.

The additional resistance required to produce a potential drop of 1 milli volt per cm is

A. 60Ω

B. 47Ω

C. 57Ω

D. 35Ω

Answer:

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30. A potentiometer wire of length 1m and resistance 10Ω is connected in series with a cell of emf 2V with internal resistance 1Ω and a resistance box including a resistance R. If potential difference between the ends of the wire is 1 mV, the value of R is

A. 20000Ω

B. 19989Ω

C. 10000Ω

D. 9989Ω

Answer:

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31. Tow cells with the same emf E and different internal resistances r_1 and r_2 are connected in series to an external resistances R . The value of R so that the potential difference across the first cell be zero is

A. $R = 2(r_1 + r_2)$

B. $R = r_2 - r_1$

C. $R = r_1 - r_2$

D. $R = 2(r_1 - r_2)$

Answer:

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32. A set of $'n'$ equal resistor, of value of $'R'$ each are connected in series to a battery of emf $'E'$ and internal resistance $'R'$. The current drawn is I. Now, the $'n'$ resistors are connected in parallel to the same battery.

Then the current drawn from battery becomes

10.1. The value of $'n'$ is

A. 10

B. 11

C. 20

D. 9

Answer:

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33. A potentiometer circuit has been setup for finding. The internal resistance of a given cell. The main battery used a negligible internal resistance. The potentiometer wire itsefl is $4m$ long. When the resistance, R, connected across the given cell, has value of

(i) Infinity 9.5Ω,

(ii) the 'balancing length' , on the potentiometer wire are found to be $3m$ and $2.85m$, respectively.

The value of internal resistance of the cell is

A. 0.25Ω

B. 0.95Ω

C. 0.5Ω

D. 0.75Ω

Answer:

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34. A Daniel cell is balanced on $125cm$ length of a potentiometer wire. Now the cells is short-circuited by a resistance $2ohm$ and the

balance is obtained at $100cm$. The internal resistance of the Dainel cell is

A. 0.5 ohm

B. 1.5 ohm

C. 1.25 ohm

D. $4/5$ ohm

Answer:

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35. In a potentiometer experiment it is found that no current passes through the galvanometer when the terminals of the cell are connected across $0.52m$ of the potentiometer wire. If the cell is shunted by a resistance of 5Ω balance is obtained when the cell connected across$0.4m$ of the wire. Find the internal resistance of the cell.

A. 2Ω

B. 2.5Ω

C. 1Ω

D. 1.5Ω

Answer:

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36. In potentiometer experiment, a cell of emf $1.25V$ gives balancing length of 30 cm. If the cell is replaced by another cell, then balancing length is found to be 40 cm. What is the emf of second cell ?

A. $= 1.57 \text{ V}$

B. $= 1.67 \ \text{V}$

C. $= 1.47 \ \text{V}$

D. $= 1.37 \ \text{V}$

Answer:

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37. In a potentiometer experiment two cells of e.m.f. E and E are used in series and in conjunction and the balancing length is found to be 58 cm of the wire. If the olarity of E is

reversed, then the balancing length becomes 29 cm . The ratio $\frac{E_1}{E_2}$ of the e.m.f. of the two cells is

A. $1:1$

B. $2:1$

C. $3:1$

D. $4:1$

Answer:

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38. A potentiometer has uniform potential gradient across it. Two cells connected in series (i) to support each other and (ii) to oppose each other are balanced over 6 m and 2 m respectively on the potentiometer wire. The e.m.f.'s of the cells are in the ratio of

A. $1:2$

B. $1:1$

C. $3:1$

D. $2:1$

Answer:

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39. A potentiometer wire is $100cm$ long hand a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obatined at $50cm$ and $10cm$ from the positive end of the wire in the two cases. The ratio of emfs is:

A. $3:4$

B. $3:2$

C. $5:1$

D. $5:4$

Answer:

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40. A potentiometer wire of Length L and a resistance r are connected in series with a battery of e.m.f. E_0 and a resistance r_1. An

unknown e.m.f. E is balanced at a length l of the potentiometer wire. The e.m.f. E will be given by :

A. $\frac{\mathrm{LE}_0 r}{(r+r_1)l}$

B. $\frac{\mathrm{LE}_0 r}{lr_1}$q

C. $\frac{E_0 r}{(r+r_1)}\frac{l}{L}$

D. $\frac{E_0 l}{L}$

Answer:

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41. A conducting wire has length L_1 and diameter d_1. After stretching the same wire length becomes L_2 and diameter d_2, The ratio of resistances before and after stretching is

A. $d_2^4 : d_1^4$

B. $d_1^4 : d_2^4$

C. $d_2^2 : d_1^2$

D. $d_1^2 : d_2^2$

Answer:

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42. Which of the following statements is false ?

A. A rheostat can be used as a potential divider.

B. Kirchhoff's second law represents energy conservation.

C. Wheatstone bridge is the most sensitive when all the four resistances are of the same order of magnitude.

D. In a balanced Wheatstone bridge if the cell and the galvanometer are exchanged, the null point is disturbed.

Answer: D

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43. You are given 10 resistors each of resistance 2Ω. First they are connected to obtain possible minimum resistance. Then they are connected to obtain possible

maximum resistance. The ratio of maximum and minimum resistance is _____ .

A. 100

B. 10

C. 2.5

D. 25

Answer:

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44. A filament bulb $(500W, 100V)$ is to be used in a $230V$ main supply. When a resistance R is connected in series, it works perfectly and the bulb consumers $500W$. The value of R is

A. 13Ω

B. 230Ω

C. 46Ω

D. 26Ω

Answer:

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45. An electron in potentiometer experiences a force $2.4 \times 10^{-19} N$. The length of potentiometer wire is 6m. The emf of the battery connected across the wire is (electronic charge $= 1.6 \times 10^{-19} C$)

A. 6 V

B. 9 V

C. 12 V

D. 15 V

Answer:

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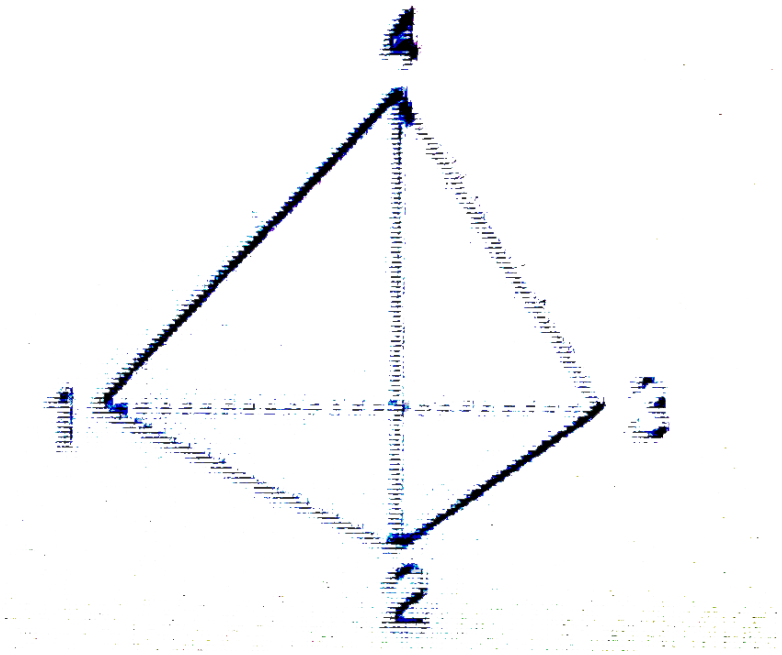
46. Six wires each of resistance r form a tetrahedron. The equivalent resistance

between corners 1-2 and 1-3 are respectively



A. r

B. 2r

C. $\frac{r}{3}$

D. $\frac{r}{2}$

Answer:

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47. Two batteries with e.m.f 12 V and 13 V are connected in parallel across a load resistor of 10Ω. The internal resistances of the two batteries are 1Ω and 2Ω respectively. The voltage across the load lies between :

A. 11.4 V and 11.5 V

B. 11.7 V and 11.8 V

C. 11.6 V and 11.7 V

D. 11.5 V and 11.6 V

Answer:

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48. Statement-1 : In a Meter Bridge experiment, null point for an unknown resistance is measured. Now, the unknown resistance is put inside an enclosure maintained at a higher temperature. The null point can be obtained

at the same point as before by decreasing the value of the standard resistance.

Statement-2 : Resistance of metal increases with increase in temperature.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False

D. Assertion is False, Reason is True.

Answer:

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Evaluation Test

1. A circuit consists of two cells, each of e.m.f. E and internal resistances r_1 and r_2 are connected in series through an external resistance X. If the potential difference between the ends of the first cell is zero, the value of X in terms of r_1 and r_2 will be

A. $r_1 + r_2$

B. $r_1 - r_2$

C. $r_1 r_2$

D. zero

Answer:

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2. An ammeter and a voltmeter are j oined in series to a cell. Their readings are A and V

respectively. If a resistance is now joined in parallel with the voltmeter

A. both X and Y will increase

B. both X and Y will decrease

C. X will decrease, Y will increase

D. X will increase, Y will decrease

Answer:

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3. A perosn decides to use his bath tub water to generate electric power to run a 40W bulb. The bath tub is located at a height of 10m from the ground and it holds 200 litres of water. He instals a water driven wheel generator on the ground. At what rate should the water drain from the bath tub to light the bulb? How long can he keep the bulb on , if bath tub was full initially ? Efficiency of generator is $90\,\%$. Take $g = 9.8m/s^2$

A. 0.21, 15.9 s

B. 0.63, 159 s

C. 0.84, 0.159 s

D. 1.05, 1.59 s

Answer:

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4. A cell has an emf of 3 volt and internal resistance 2Ω. It is connected to an ammeter having resistance 2Ω and to an external resistance of 100Ω. When a voltmeter is

connected across the 100Ω. Resistance, the ammeter reading is 40 mA. The resistance of the voltmeter is

A. 49Ω

B. 98Ω

C. 147Ω

D. 245Ω

Answer:

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5. A certain wire is made up into two squares with a common side of length 5 cm. A current enters the rectangular network at one of the corners and leaves at the diagonally opposite corner. The current in the common side in terms of the entering current is

A. $I/2$

B. $I/3$

C. $I/4$

D. $I/5$

Answer:

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6. Assertion : A wire of uniform cross-section and uniform resistivity is connected across an ideal cell. Now the length or wire is doubled keeping volume of wire constant. The drift velocity of electrons after stretching the wire becomes one fourth of what it was before streching the wire.

Reason: If a wire (or uniform resistivity and

uniform cross-section) of length l_0 is stretched by a factor n, then its resistance becomes n^2 times the one before stretching the wire (the volume of wire is kept constant in stretching process.) Fruther at constant potential difference, current is inversely proportional to resistance. Drift velocity of free electron is directly proportional to current and inversely proportional to cross-sectional area of current carrying wire.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reason is False

D. Assertion is False but Reason is True.

Answer: