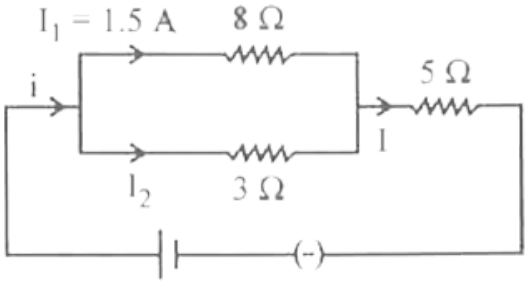
PHYSICS

BOOKS - MARVEL PHYSICS (HINGLISH)

CURRENT ELECTRICITY

Mcq

1.



In the given circuit, the current in the 8Ω resistance is 1.5 A. What is the total current (I) flowing in the circuit ?

A. 3A

B. 4A

C. 5A

D. 5.5A

Answer: D

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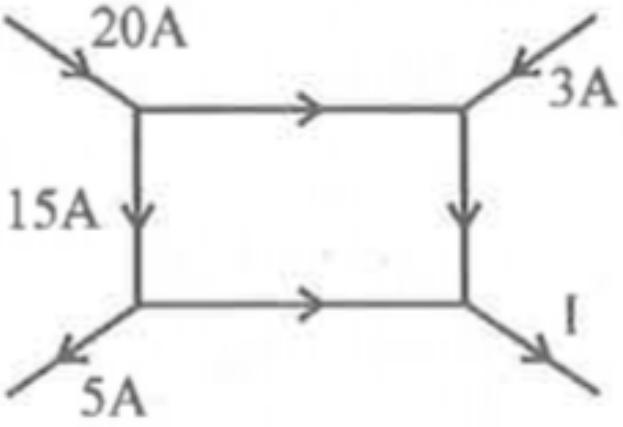
2. The value of the current I in the given circuit is



A. 10A

B. 12A

C. 18A

D. 15A

Answer: C

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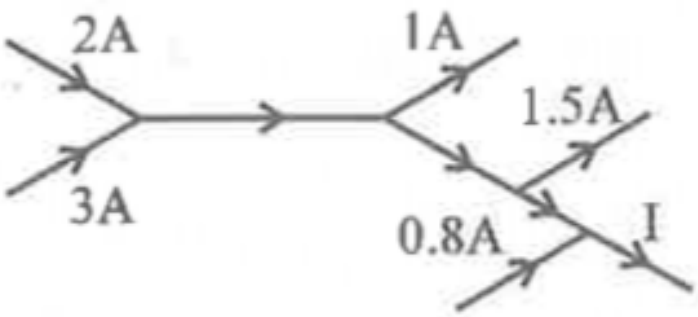
3. What is the value of the current I in the following part of an electrical network ?



A. 1.3A

B. 2.7A

C. 3.3A

D. 4.7A

Answer: C

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4. In an open circuit and in a short circuit we have

A. zero resistance and infinite resistance respectively

B. infinite resistance and zero resistance respectively

C. maximum current and zero resistance respectively

D. zero current and maximum resistance respectively

Answer: B

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5. The Kirchhoff's first law $\left(\sum i = 0\right)$ and second law $\left(\sum IR = \sum E\right)$ are respectively based upon the conservations of

A. Charge, Momentum

B. Energy, Charge

C. Momentum, Charge

D. Charge, Energy

Answer: D

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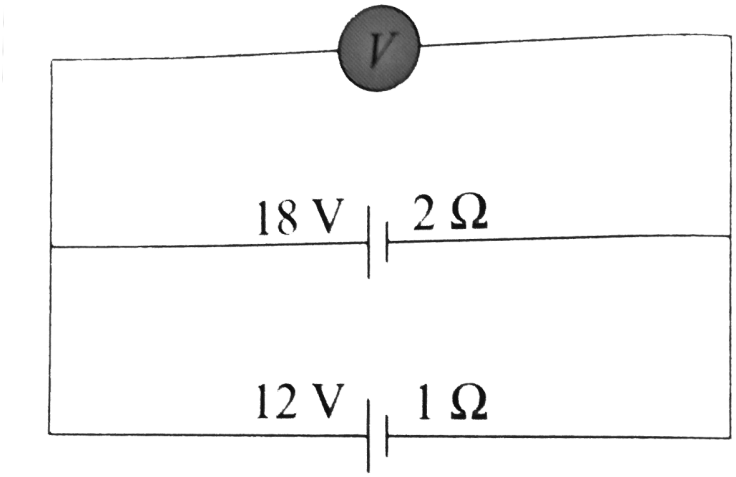
6. Two batteries, one of emf 18 volts and internal resistance 2Ω and the other fo emf 12 volts and internal resistance 1Ω, are connected as shown. The voltmeter V will

record a reading of



A. 18V

B. 16V

C. 14 V

D. 12 V

Answer: C

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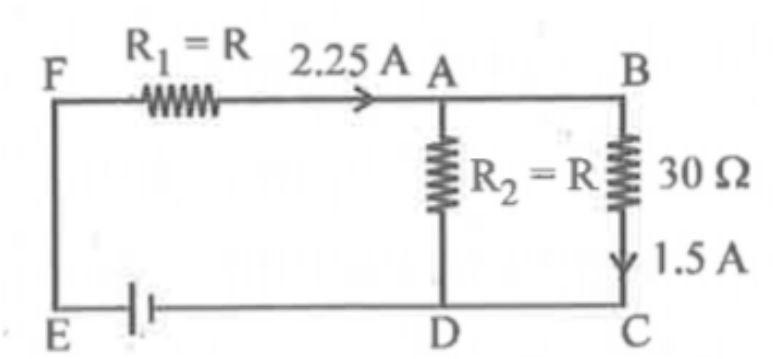
7. What is the value of the resistance R_1 in the following circuit ?



A. 30Ω

B. 45Ω

C. 60Ω

D. 80Ω

Answer: C

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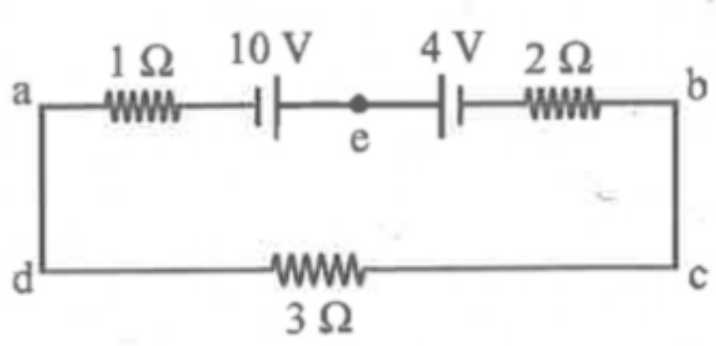
8. What is the magnitude and direction of the current in the following circuit ?



A. 1 A from b to a through c

B. 1 A from a to b through e

C. $\frac{2}{3}$A from a to b through e

D. $\frac{5}{7}A$ from b to a through e

Answer: B

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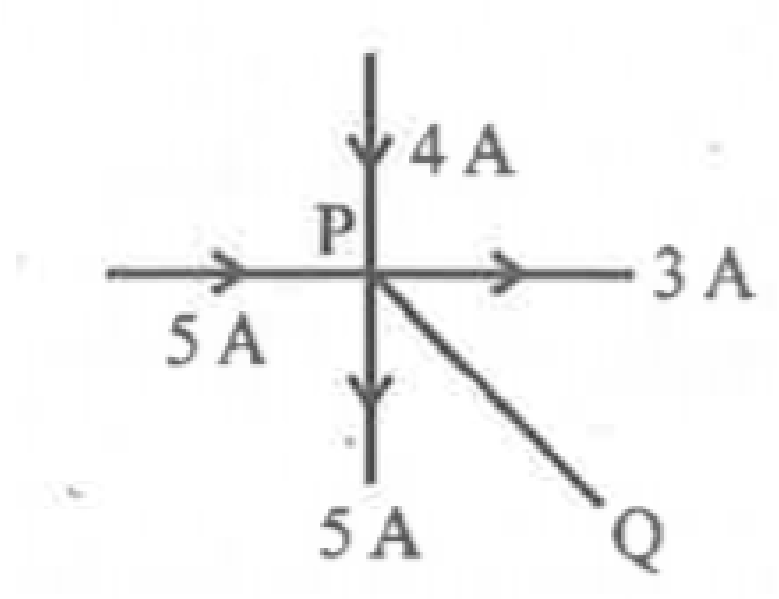
9. Five current carrying conductor meet at a point P. What is the magnitude and direction

of the current in the fifth conductor ?



A. 1A from Q to P

B. 1 A from P to Q

C. 3 A from P to Q

D. 2 A from Q to P

Answer: B

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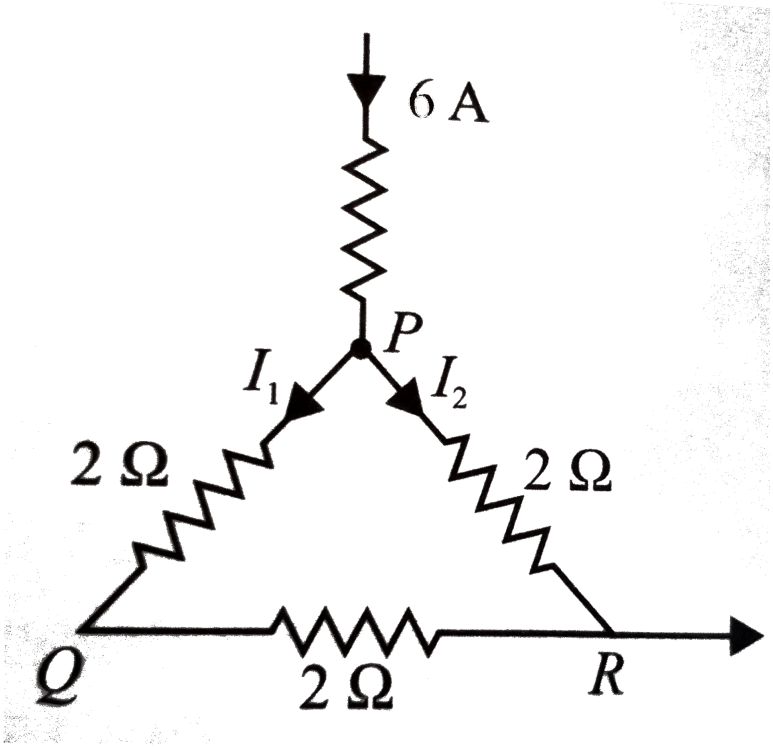
10. A current of 6 A enters one corner P of an equilateral triangle PQR having 3 wires of resistances 2 Q each and leaves by the corner

R. Then the currents I_1 and I_2 are



A. 2A, 4A

B. 4A, 2A

C. 1A , 2A

D. 2A, 3A

Answer: A

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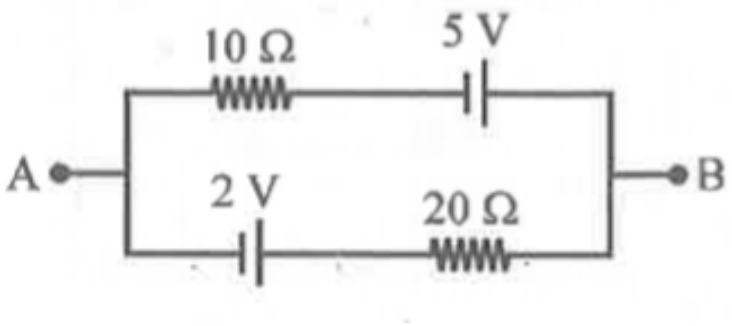
11. What is the current in the given circuit ?



A. 0.1 A

B. 0.2 A

C. 0.3 A

D. 0.4 A

Answer: A

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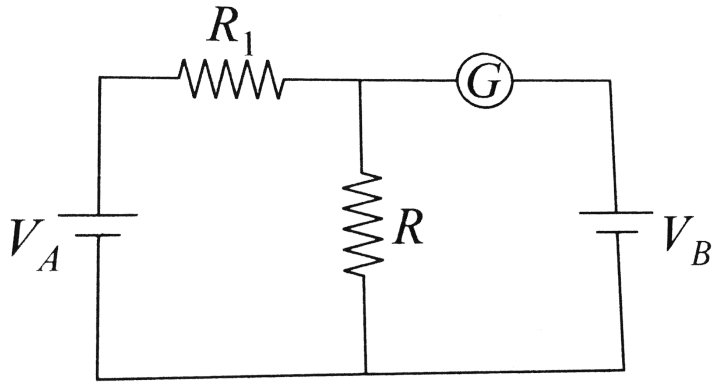
12. In the circuit shown the cells A and B have negligible resistance. For $V_A = 12V, R_1 = 500\Omega$ and $R = 100\Omega$, the galvanometer (G) shows no deflection. The

value of V_B is



A. 4 V

B. 2V

C. 12 V

D. 6V

Answer: B

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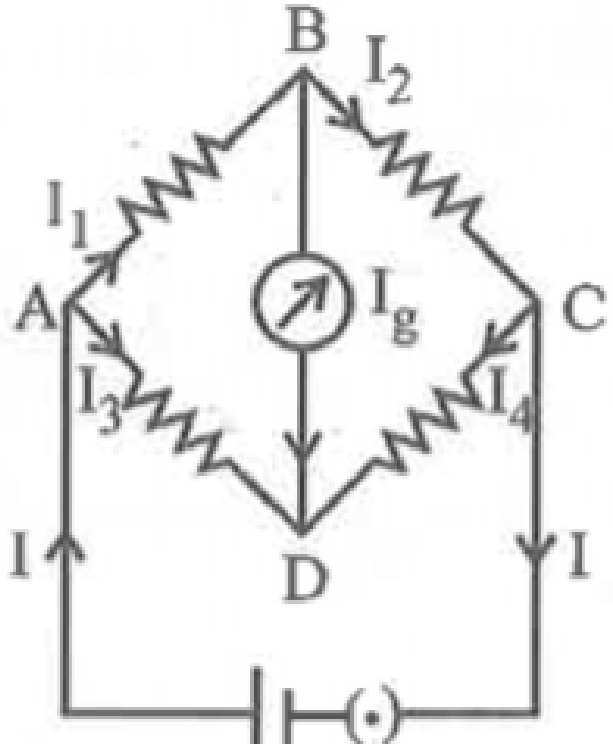
13. A bridge circuit is shown in the diagram. A student wrote the following expressions for currents at the points A, B, C and D by using Kirchhoff's first law. Point out the wrong

equation.



A. at A, $I = I_1 + I_3$

B. at B, $I_1 = I_2 + I_g$

C. at C, $I_2 = I_4 + I$

D. at D, $I_3 + I_g = I_4$

Answer: D

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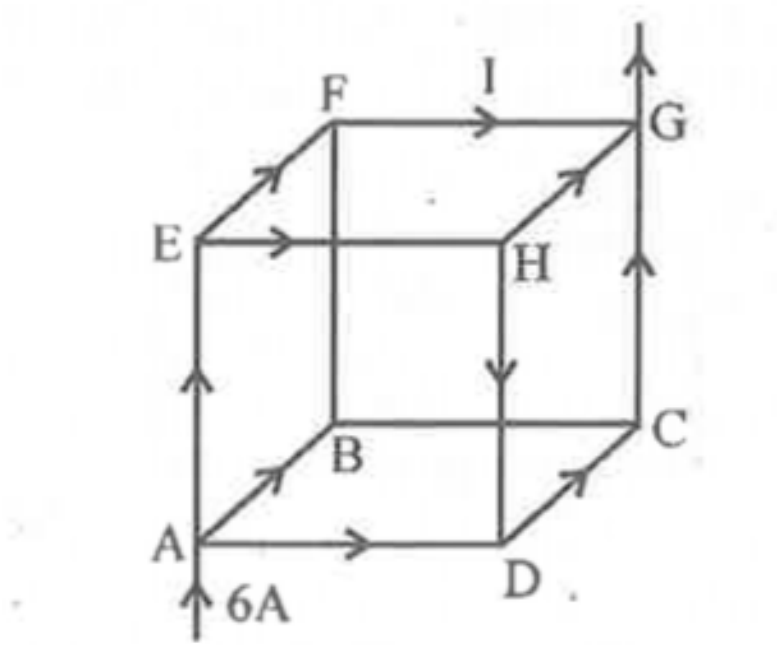
14. Twelve identical wires each of resistance R are joined to form a cube as shown in the figure. A current of 6 ampere enters the cube at A and leaves at G. The current I in the

branch FG is



A. 1A

B. 2A

C. 3A

D. 4A

Answer: B

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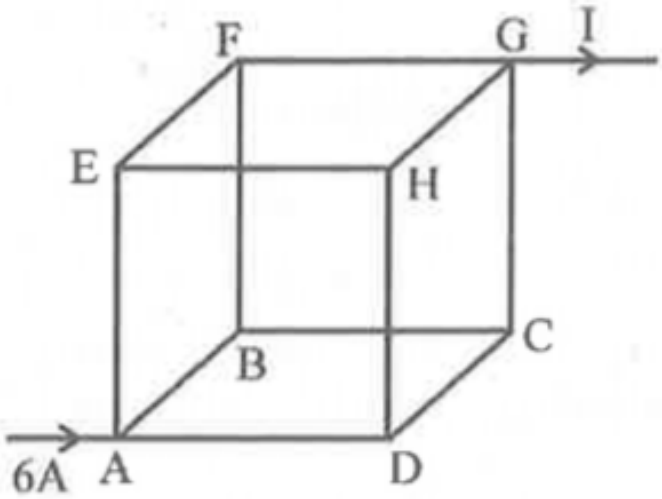
15. 12 identical wires, each of resistance R are joined to form a cube as shown in the figure. A current of 6 Amperes enters the cube at A. If the wire HG is removed, then the current I

leaving the network at G is



A. 3A

B. 4A

C. 6A

D. 0.6A

Answer: C

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16. A 220 volt, 1000 watt bulb is connected across a 110 volt mains supply. What is the power consumed in the circuit ?

A. 1000 watt

B. 250 watt

C. 750 watt

D. 500 watt

Answer: B

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17. What is the potential difference across the 3Ω resistor ?

A. Zero

B. 1V

C. 3.5V

D. 7V

Answer: A

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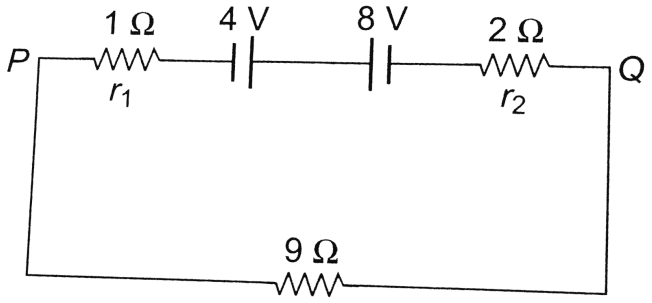
18. Two batteries of e.m.f. $4V$ and $8V$ with internal resistances 1Ω and 2Ω are connected in a circuit with a resistance of 9Ω as shown in figure. The current and potential difference between the points P and Q



A. $\frac{1}{3}A$ and $4V$

B. $\frac{1}{3}A$ and $3V$

C. $\frac{1}{2}A$ and $5V$

D. $\frac{1}{6}A$ and $3V$

Answer: B

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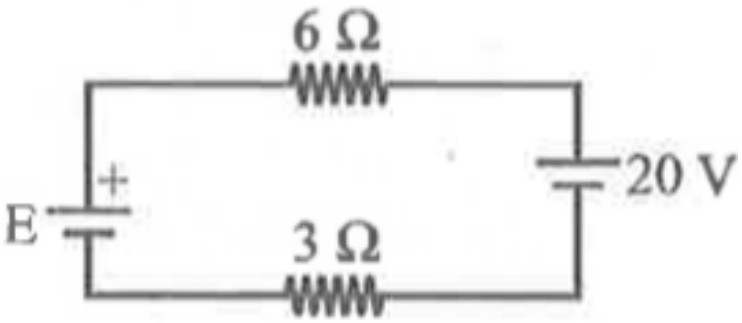
19. What are the values of E in the following circuit, if a current of 2 A flows in the clockwise

as well as in anticlockwise direction ?



A. 3 V, 28 V

B. 38 V, 2V

C. 3V, 30V

D. 3V, 2.8 V

Answer: B

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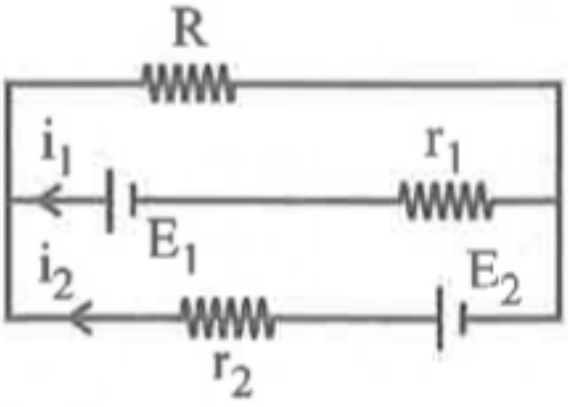
20. Which one of the following equations is the correct equation for the electrical circuit shown in the figure ?



A. $E_1 - (i_1 + i_2)R + i_1 r_1 = 0$

B. $E_1 - (i_1 + i_2)R - i_1 r_1 = 0$

C. $E_2 - i_2 r_2 - E_1 - i_1 r_1 = 0$

D. $E_2 - (i_1 + i_2)R + i_2R_2 = 0$

Answer: B

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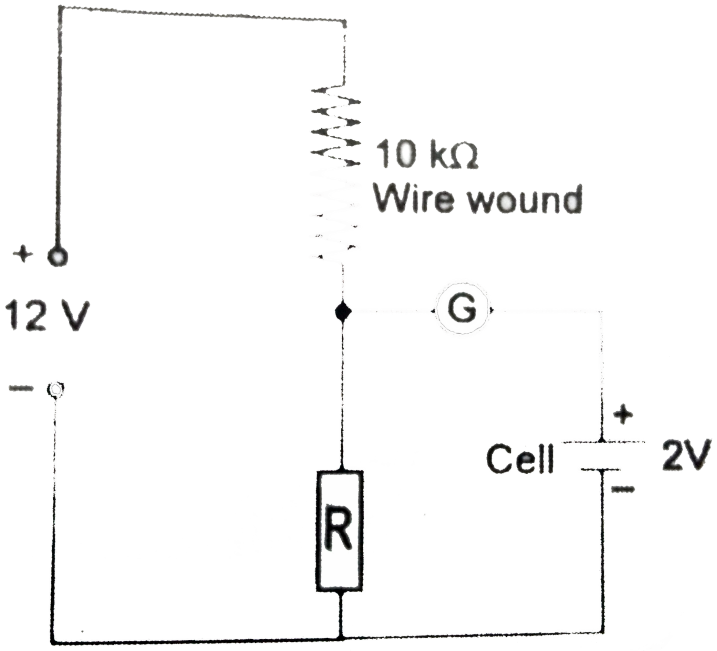
21. If the galvanometer in the circuit of figure reads zero, calculate the value of the resistor R (ion $K\omega$) assuming that the 12 V source has

negligble internal resistance.



A. 1000Ω

B. 2000Ω

C. 1500Ω

D. 3500Ω

Answer: B

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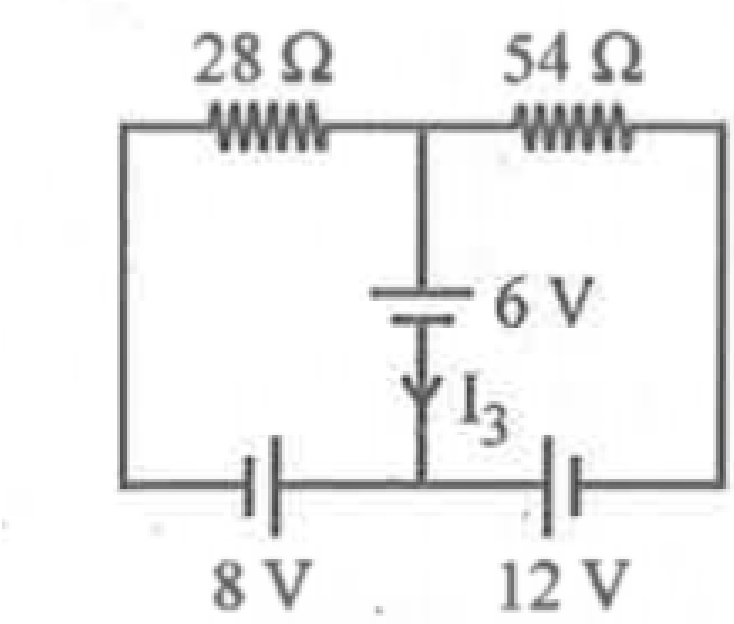
22. Consider the circuit shown in the figure. What is the value of the current I_3 ?



A. 5 amp

B. 3 amp

C. -3 amp

D. $-5/6$ amp

Answer: D

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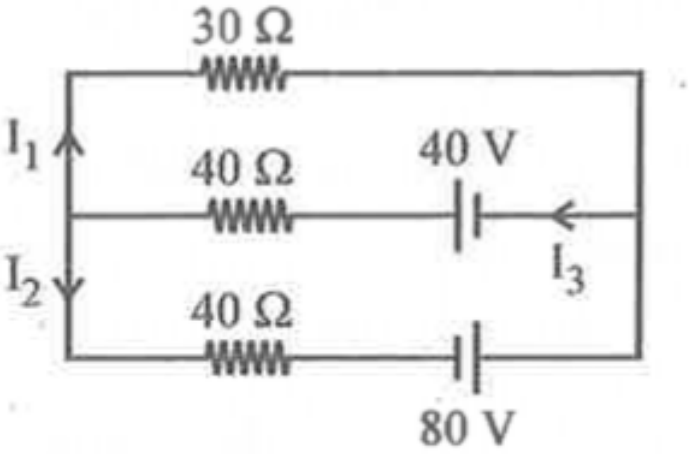
23. What is the value of the current I_1 in the given circuit ?



A. 0.4A

B. $-0.4A$

C. 0.8A

D. $-0.8A$

Answer: B

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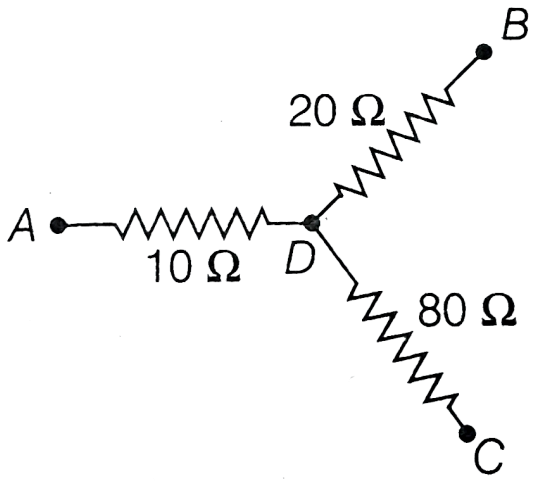
24. In the circuit given here, the points A,B and C are 70 V, zero, 10 V respectively . Then,



A. The point D will be at a potential of 60 V

B. The point D will be at a potential of 20 V

C. Currents in the path AD, DB and DC are in the ratio of 1 : 2 : 3

D. Currents in the paths AD,DB and DC are in the ratio of 3 : 2 : 1

Answer: D

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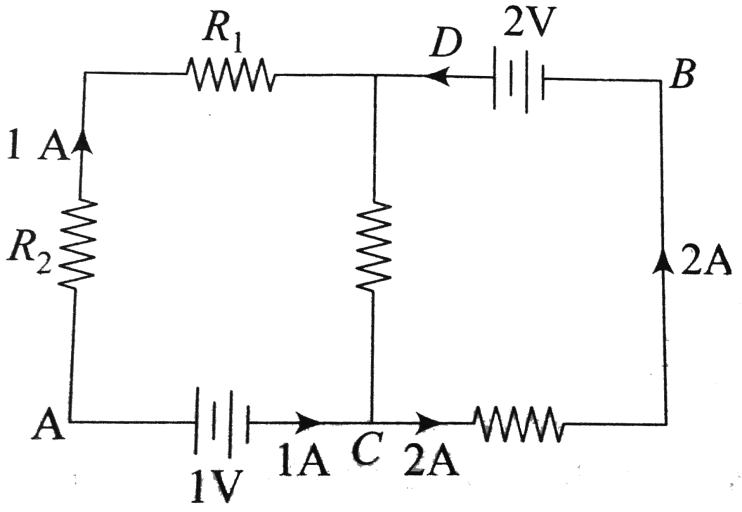
25. In the circuit shown in the figure, if potentail at point A is taken to be zero, the

potential at point B is



A. $-2V$

B. $+1V$

C. $-1V$

D. $+2V$

Answer: B

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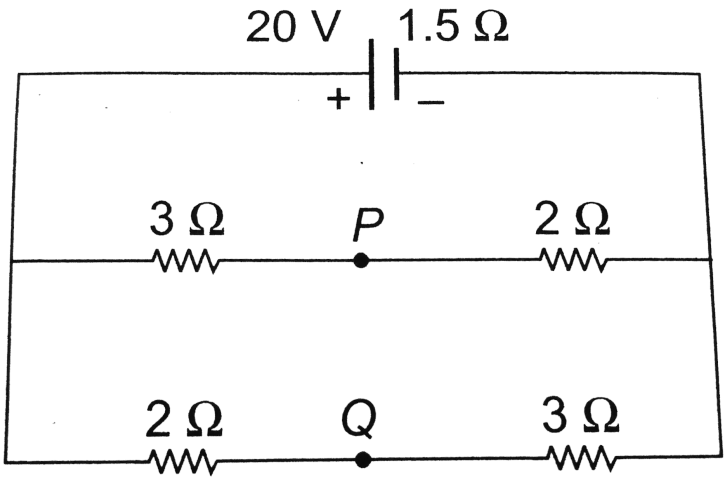
26. If in the circuit shown below, the internal resistance of the battery is 1.5Ω and V_P and V_Q are the potential at P and Q respectively, what is the potential difference between the point P and Q?



A. Zero

B. $4V\left(V_P > V_Q\right)$

C. $4V\left(V_Q > V_P\right)$

D. $2.5V\left(V_Q > V_P\right)$

Answer: D

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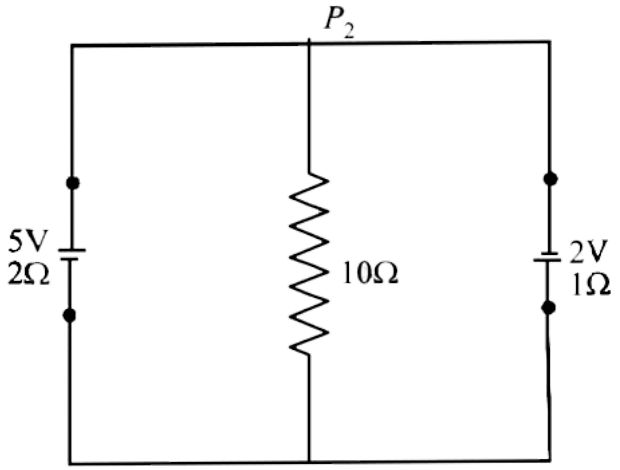
27. A 5V battery with internal resistance 2Ω and a 2V battery with internal resistance1Ω are connected to a 10Ω resistor as shown in

the figure.



The current in the 10Ω resistor is

A. 0.03 A from P_1 to P_2

B. 0.03 A from P_2 to P_1

C. 0.28 A from P_1 to P_2

D. 0.28 A from P_2 to P_1

Answer: D

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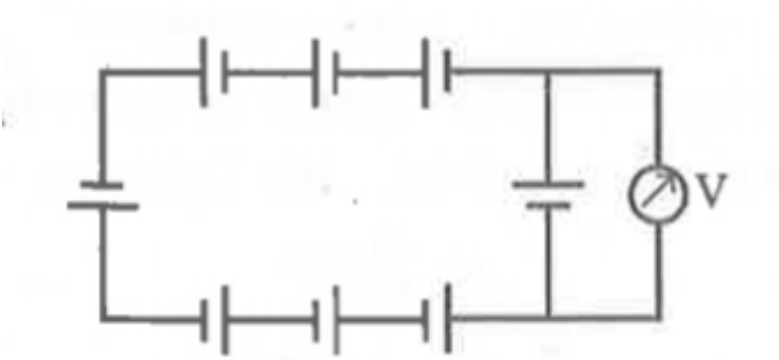
28. In the following circuit, each cell has an e.m.f. of 5 V and an internal resistance of 0.2Ω. What is the reading of the ideal voltmeter V in volts ?



A. 5V

B. 40V

C. 0 V

D. 35 V

Answer: C

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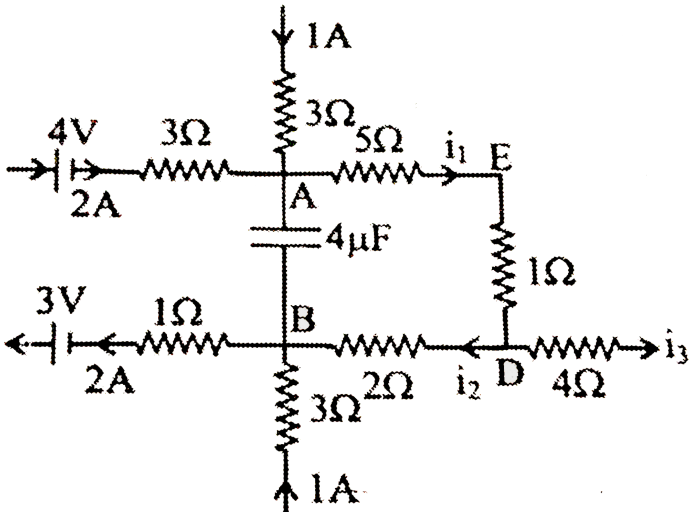
29. The figure shows a part of the circuit in the steady state. The currents, the valuces of resistances and emfs of the cells are shown in

the figure. The circuit also contains a capacitor of capacitance $C = \mu F$. The value of i_1 is-



A. 1A, 2A, 3A

B. 3A, 2A, 1A

C. 2A, 1A,3A

D. 3A, 1A, 2A

Answer: D

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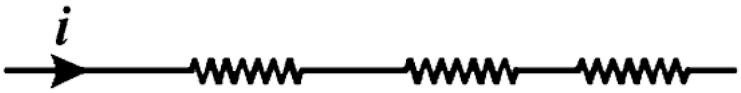
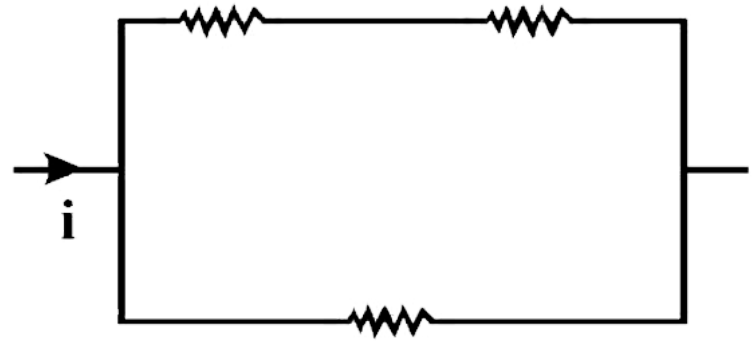
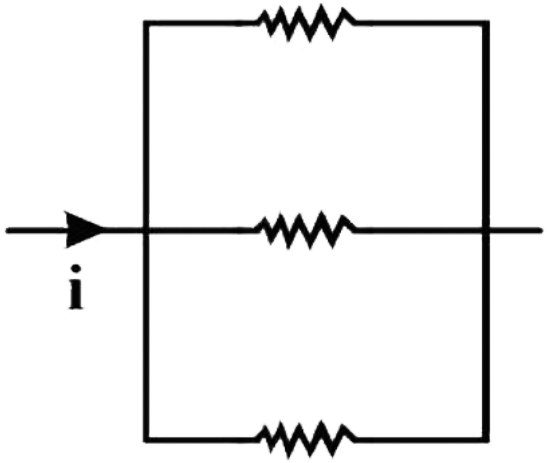
30. The three resistance of equal value are arranged in the different combination shown below. Arrange them in increasing order of power dissipation.

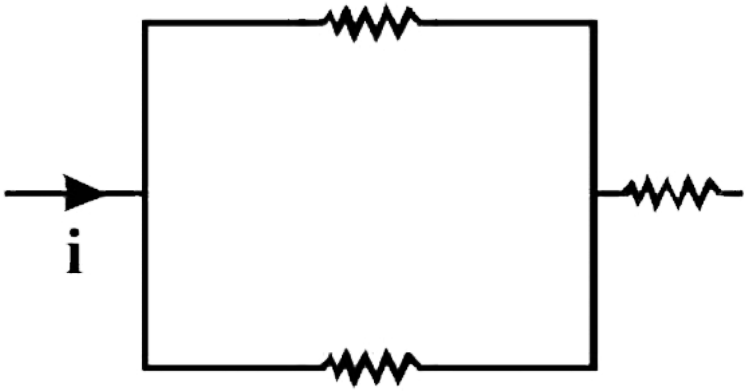


(I) (II)





(IV)



A. $I < III < II < IV$

B. $II < III < IV < I$

C. $III < II < IV < I$

D. $I < IV < III < II$

Answer: D

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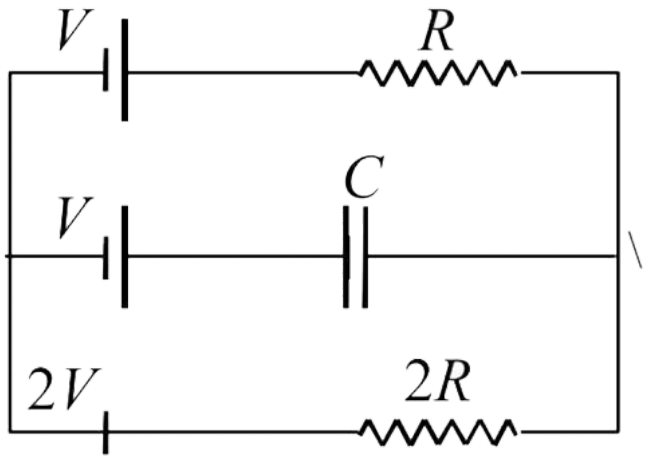
31. In the given circuit, with steady current, the potential drop across the capacitor must be



A. V

B. $V/2$

C. $V/3$

D. $2V/3$

Answer: C

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32. Incandescent bulbs are designed by keeping in mind that the resistance of their filament increases with the increase in temperature. If at room temperature, $100W, 60W$ and $40W$ bulbs have filament resistances R_{100}, R_{60} and R_{40}, respectively, the relation between these resistances is

A. $\frac{1}{R_{100}} = \frac{1}{R_{40}} + \frac{1}{R_{60}}$

B. $R_{100} = R_{40} + R_{60}$

C. $R_{100} > R_{60} > R_{40}$

D. $\frac{1}{R_{100}} > \frac{1}{R_{60}} > \frac{1}{R_{40}}$

Answer: D

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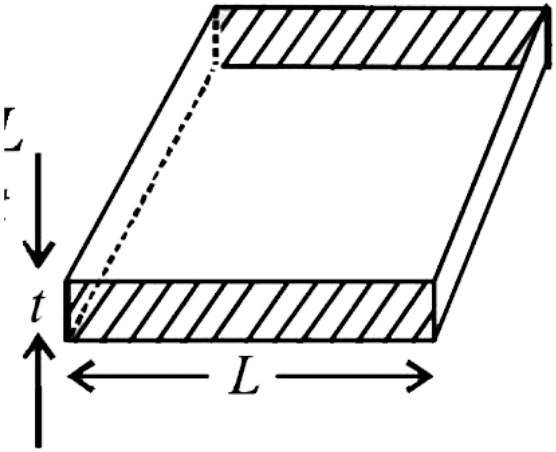
33. Consider a thin square sheet of side L and thickness t, made of a material of resistivity ρ. The resistance between two opposite faces,

shown by the shaded areas in the figure is



A. directly proportional to L

B. directly proportional to t

C. independent of L

D. independent of t

Answer: C

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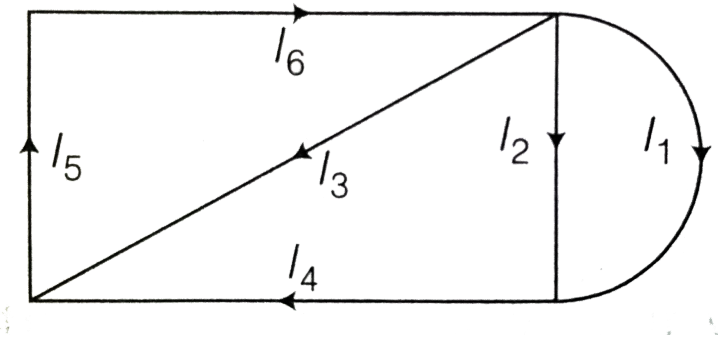
34. In the following network of 5 branches, the respective current are l_1, l_2, l_3 etc. given that $l_1 = -0.5A, l_4 = 1A$ and $l_5 = 0.5A$, the remaining currents are



A. $I_2 = -1.5A, I_3 = 0.5A, I_6 = 0.5A$

B. $I_2 = 1.5A, I_3 = -0.5A, I_6 = 0.5A$

C. $I_2 = 1.5A, I_3 = 0.5A, I_6 = -0.5A$

D. $I_2 = 1.5A, I_3 = 0.5A, I_6 = 0.5A$

Answer: B

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35. Time taken by a 836 W heater to heat one litre of water from $10^\circ C \rightarrow 40^\circ C$ is

A. 100 s

B. 150 s

C. 200 s

D. 50 s

Answer: B

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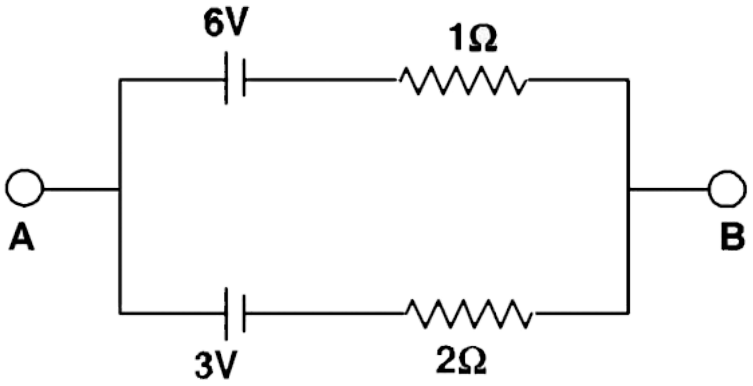
36. Two batteries of different emfs and different internal resistances are connected as

shown. The voltage across AB in volts is.



A. 3V

B. 4V

C. 5V

D. 6V

Answer: C

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37. For resistances $10\Omega, 10\Omega, 10\Omega$ and 15Ω form a Wheatstone's network. What shunt is required across 15Ω resistor to balance the bridge ?

A. 10Ω

B. 15Ω

C. 20Ω

D. 30Ω

Answer: D

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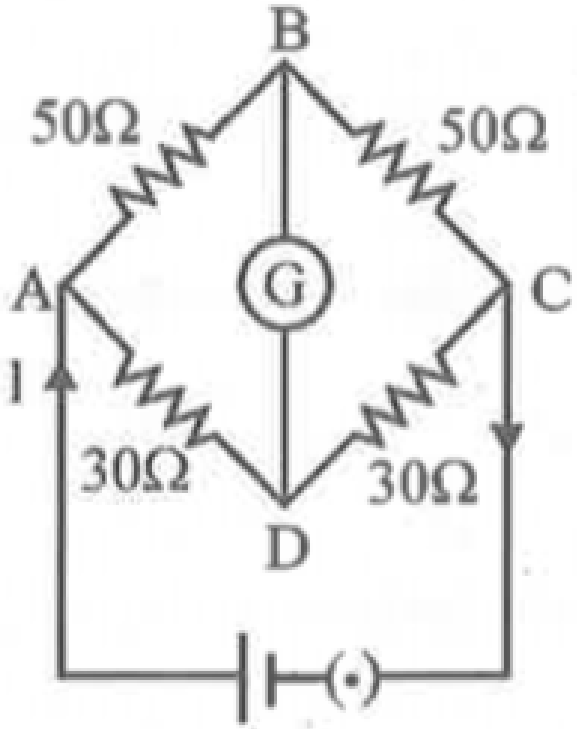
38. In the given circuit, the current in the arm BD is



A. $I/2$

B. zero

C. 2I

D. $I/3$

Answer: B

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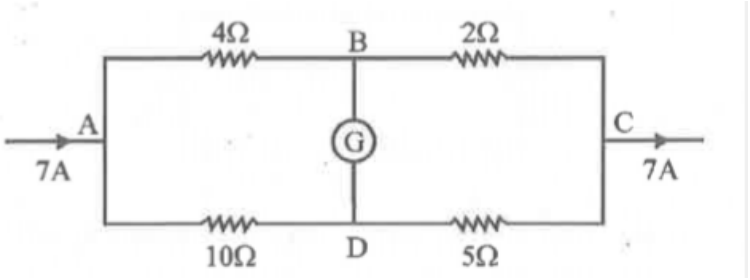
39. In the given circuit, the potential difference between the points A and B is



A. 10 V

B. 15 V

C. 20 V

D. 5V

Answer: C

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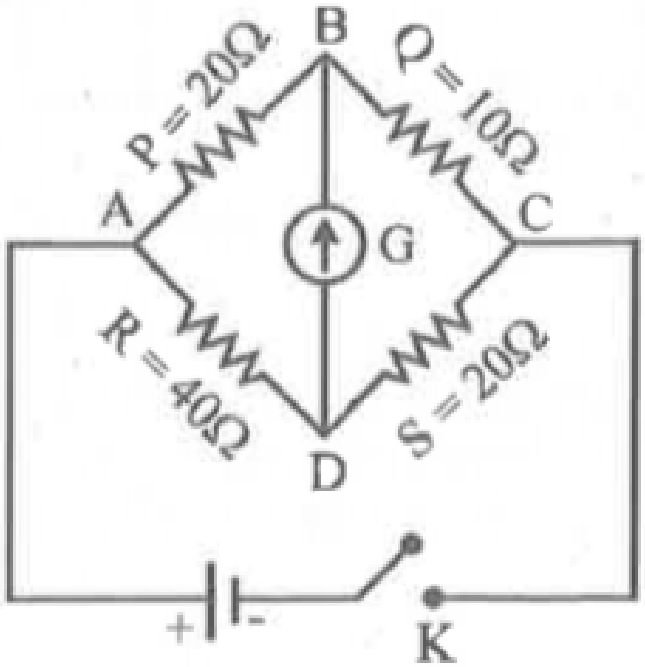
40. The Wheatstone's network is shown in the figure. If the key K is closed, then the

galvanometer will



A. deflect on the left side

B. deflect on the right side

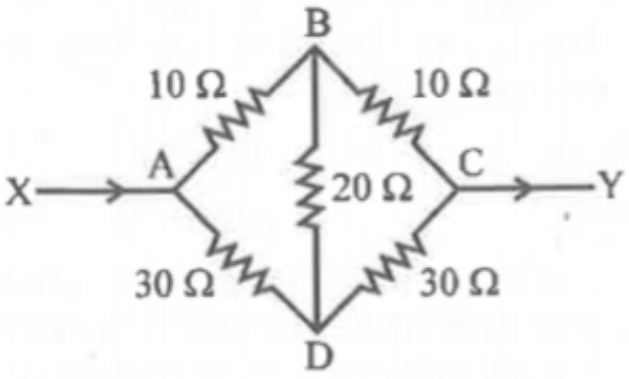
C. deflect on either side

D. not show any delfection

Answer: D

Watch Video Solution

41. Five resistances are joined as shown in the figure.



The equivalent resistance between the points X and Y is

A. 10Ω

B. 15Ω

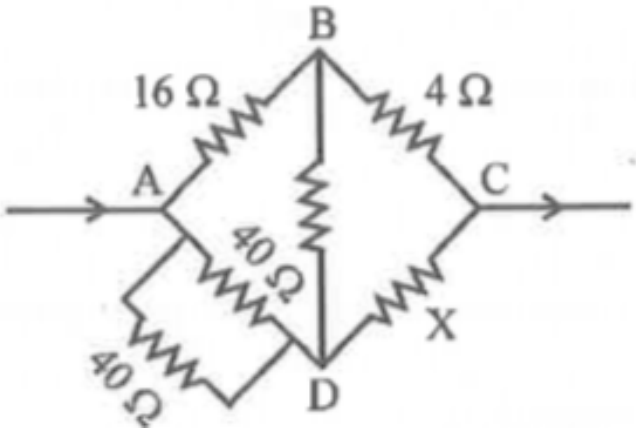
C. 20Ω

D. 30Ω

Answer: B

Watch Video Solution

42. In the given circuit, the potential difference between the points B and D is zero



The unknown resistance (X) is

A. 4Ω

B. 20Ω

C. 10Ω

D. 5Ω

Answer: D

Watch Video Solution

43. The resistances in the left and right gaps of a metre bridge are 10Ω and 30Ω respectively. If the bridge is balanced, then the distance of the null point from the centre of the wire is

A. 20 cm

B. 30 cm

C. 40 cm

D. 25 cm

Answer: D

Watch Video Solution

44. A circular coil has a resistance of 40Ω. Two points P and Q of the coil, which are one quarter of the circumference apart are connected to a 16 V battery, having an internal resistance of 0.5Ω ? What is the main current flowing in the circuit ?

A. 0.5 A

B. 1A

C. 2A

D. 3A

Answer: C

 Watch Video Solution

45. In a metre bridge experiment, the balancing length from the left end is found to be 20 cm. If a standard resistance of 20 ohm is

kept in the right gap, then the value of the unknown resistance in the left gap is

A. 5Ω

B. 10Ω

C. 15Ω

D. 7.5Ω

Answer: A

Watch Video Solution

46. To find the resistance of a gold bangle, two diametrically opposite points of the bangle are connected to the two terminals of the left gap of a metre bridge. A resistance of 4Ω is introduced in the right gap. What is the resistance of the bangle if the null point is at 20 cm from the left end ?

A. 2Ω

B. 4Ω

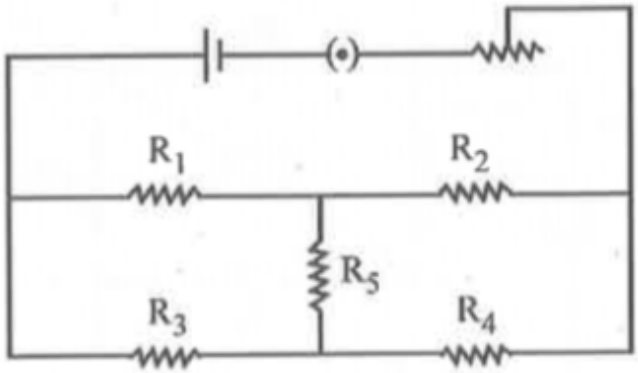
C. 8Ω

D. 16Ω

Answer: B

Watch Video Solution

47. 5 resistances R_1, R_2, R_3, R_4, R_5 are joined as shown in the figure.



The values of R_1, R_2, R_3 and R_4 are so

adjusted that the current in the circuit does not change for any value of the resistance R_5. This is possible for the following relation

A. $R_1 + R_2 = R_3 + R_4$

B. $\frac{R_1}{R_4} = \frac{R_2}{R_3}$

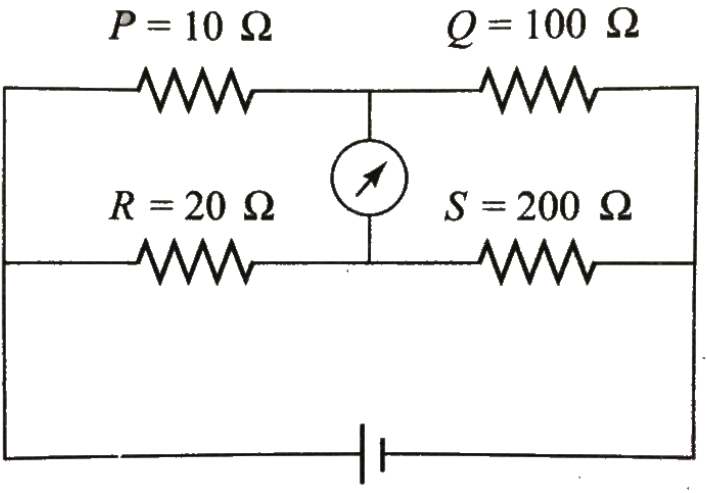
C. $R_1 R_4 = R_3 R_2$

D. $\frac{1}{R_1} + \frac{1}{R_3} = \frac{1}{R_2} + \frac{1}{R_4}$

Answer: C

Watch Video Solution

48. Figure6.52 shows a balanced wheatstone network. Now, it is disturbed by changing P to 11Ω. Which of the following steps will not bring the bridge to balance again?



A. increasing R by 2Ω

B. increasing Q by 10Ω

C. increasing S by 20Ω

D. making the product $QR = 2200\Omega$

Answer: C

Watch Video Solution

49. If $P = Q = R = 10\Omega$ and $S = 20\Omega$, then what resistance should be joined with S to balance the wheatstone's network ?

A. Join a resistance of 10Ω in series with S

B. Join a resistance of 10Ω in parallel with S

C. Join a resistance of 20Ω in parallel with S

D. Join a resistance of 20Ω in series with S

Answer: C

Watch Video Solution

50. The wheatstone's network is most sensitive when the ratio of its arms is

A. $1:1$

B. zero

C. $10:1$

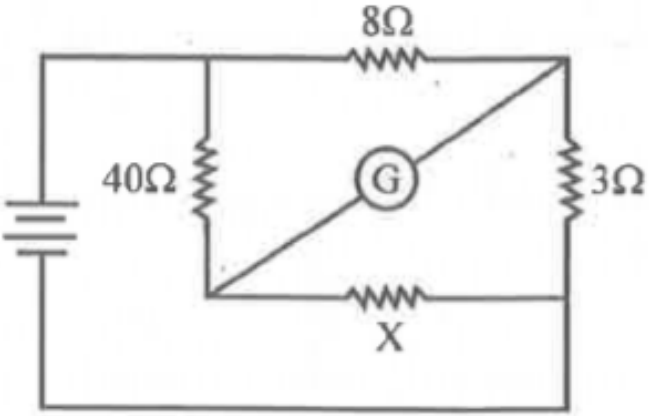
D. $1:100$

Answer: A

Watch Video Solution

51. In the given circuit, the galvanometer G gives zero deflection. What is the value of

resistance X ?



A. 10Ω

B. 12Ω

C. 15Ω

D. 20Ω

Answer: C

Watch Video Solution

52. 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. 5Ω

B. 7Ω

C. 9Ω

D. 12Ω

Answer: C

Watch Video Solution

53. For resistances arranged to form a wheatstone's network are $10\Omega, 15\Omega, 6\Omega$ and 36Ω. What resistance should be connected across the 36Ω resistance to balance the bridge ?

A. 9Ω

B. 12Ω

C. 15Ω

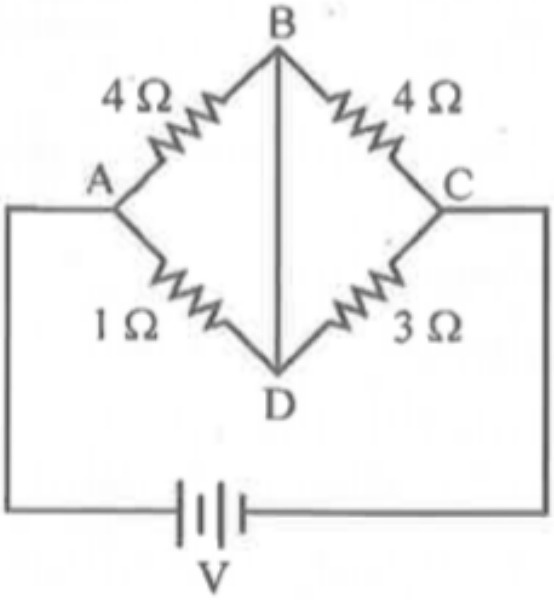
D. 18Ω

Answer: B

Watch Video Solution

54. In the given network, if the points B and D are connected by a copper wire, then the

current in the wire will



A. be zero

B. will flow from B to D

C. will flow from D to B

D. flow in that direction which will be decided by the total resistance and voltage V

Answer: C

Watch Video Solution

55. 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. 40Ω

B. 30Ω

C. 20Ω

D. 10Ω

Answer: C

Watch Video Solution

56. The resistance of each arm of the wheat stone bridge is 10Ω. A resistance of 10Ω is connected in series with galvanometer then the equivalent resistance across the battery will be:-

A. 40Ω

B. 30Ω

C. 20Ω

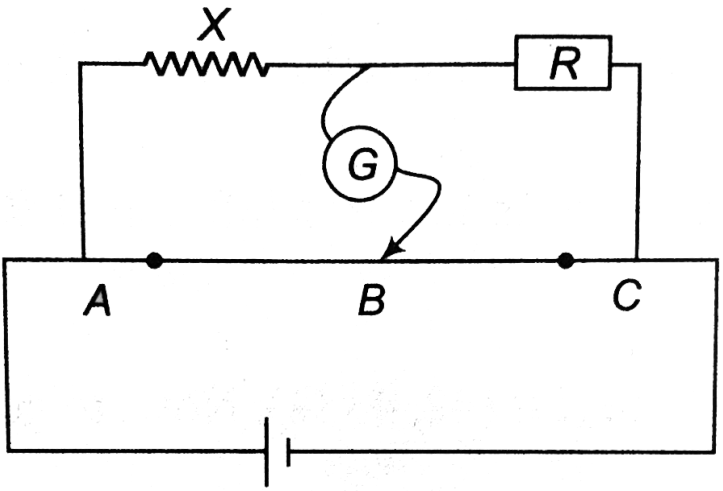
D. 10Ω

Answer: D

Watch Video Solution

57. R_1, R_2, R_3 are different values R. A, B and C are the null points obtained corresponding to R_1, R_2 and R_3 respectively. For which resistor, the value of R will be the

most accurate and why?



A. Resistance R_1

B. Resistance R_2

C. Resistance R_3

D. All the three (R_1, R_2, R_3) will give the same accuracy

Answer: B

Watch Video Solution

58. Two resistances of values 20Ω and 20Ω are introduced in the left and right gaps of a metre bridge. What is the shift in the null point if a resistance of 40Ω is connected in series with the resistance in the left gap ?

A. 25 cm towards left of the centre

B. 25 cm towards right of the centre

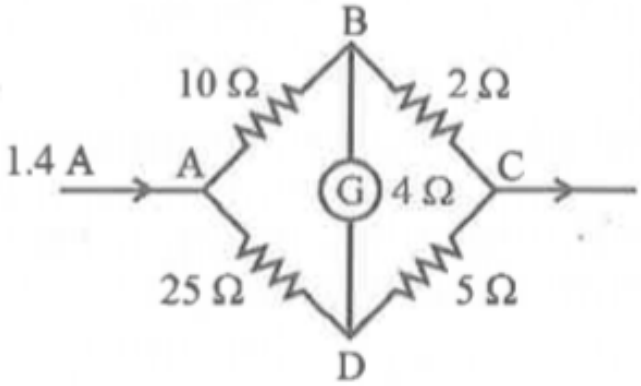
C. 15 cm towards right of the centre

D. 15 cm towards left of the centre

Answer: B

Watch Video Solution

59. What is the current in 10Ω resistance in the following network ?



A. 1A

B. 1.2A

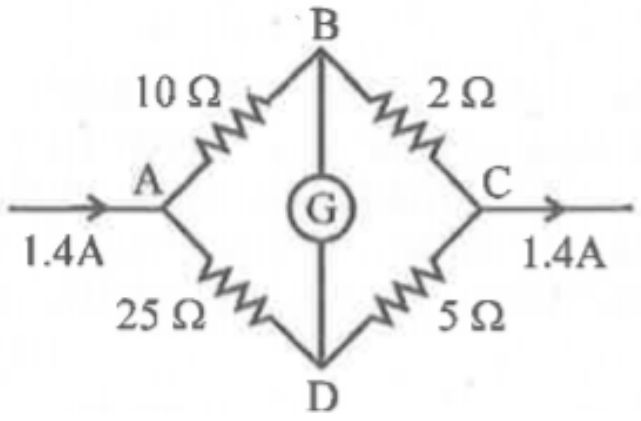
C. 0.8A

D. 2A

Answer: A

Watch Video Solution

60. In the given circuit, when the galvanometer G shows no deflection, the current in the 5Ω resistance is ,



A. 0.4A

B. 0.6A

C. 0.8A

D. 1.0A

Answer: A

Watch Video Solution

61. In a typical Wheatstone's network, the resistances in the cyclic order are $P = 10\Omega, Q = 5\Omega, S = 4\Omega$ and $R = 4\Omega$.

For balancing the bridge, a resistance of

A. 10Ω should be connected in series with

P

B. 10Ω should be connected in parallel with

P

C. 10Ω should be connected in series with

Q

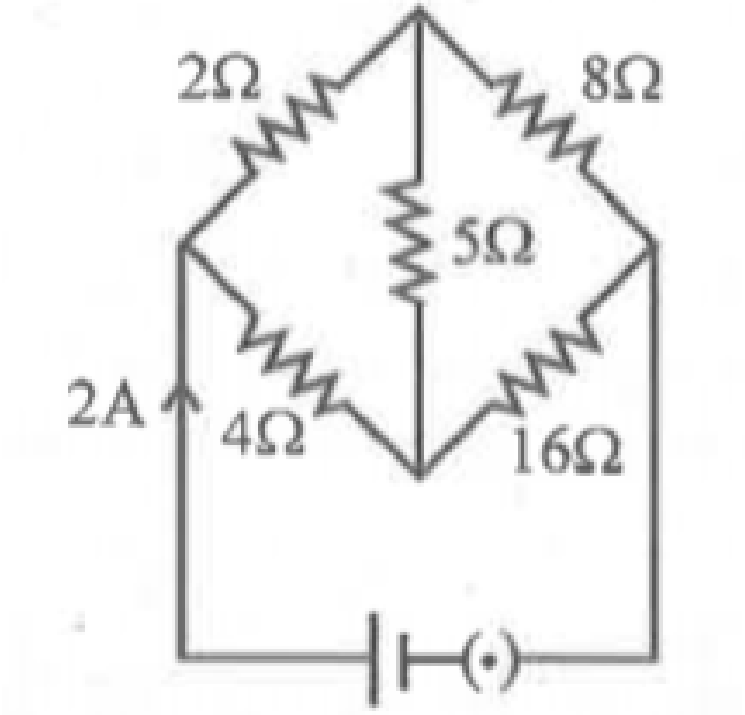
D. 10Ω should be connected in parallel with

Q

Answer: B

Watch Video Solution

62. In the following circuit, the current drawn from the battery is 2A. If the 5Ω resistance is replaced by a 20Ω resistor, then the current drawn from the battery will be



A. 0.5A

B. 1A

C. 8A

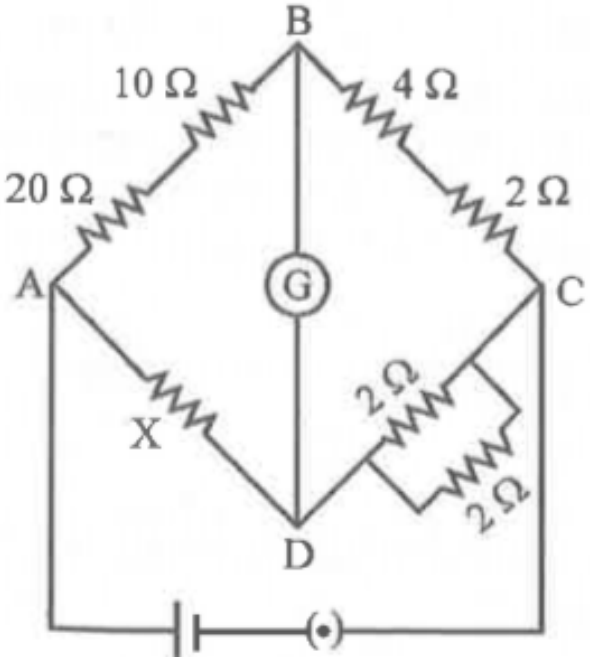
D. 2A

Answer: D

Watch Video Solution

63. In the given circuit, the galvanometer will not show any deflection if the value of the

resistance X is



A. 3Ω

B. 4Ω

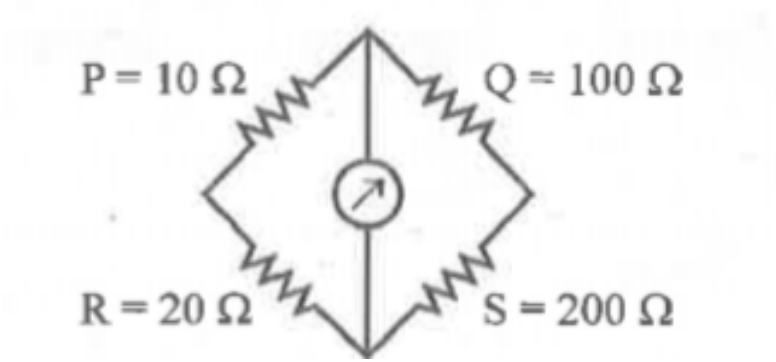
C. 5Ω

D. 6Ω

Answer: C

Watch Video Solution

64. A balanced Wheatstone's network is shown in the figure. If the balance is disturbed by changing P to 15Ω, then which one of the following steps will not bring the bridge to balance again ?



A. increase R by 10Ω

B. increase S by 20Ω

C. increase Q by 50Ω

D. make $RQ = 3000\Omega$

Answer: B

Watch Video Solution

65. 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 cm

B. 66.67 cm

C. 25 cm

D. 50 cm

Answer: D

Watch Video Solution

66. A wire of length 3 m connected in the left gap of a metre bridge balances a 8Ω resistance in the right gap at a point, which divides the bridge wire in the ratio of $3:2$. What is the length of the wire corresponding to a resistance of the length of the wire corresponding to a resistance of 1Ω ?

A. 1m

B. 0.75 m

C. 0.5 m

D. 0.25 m

Answer: D

Watch Video Solution

67. 6 resistances, each of 4Ω are joined as shown in the figure. What is the equivalent resistance between A and B ?

A. 4Ω

B. 8Ω

C. 6Ω

D. 2Ω

Answer: D

View Text Solution

68. In the given figure, when the galvanometer shows no deflection, the current (in amperes) flowing through the 5Ω resistance will be

A. 0.2 A

B. 0.6A

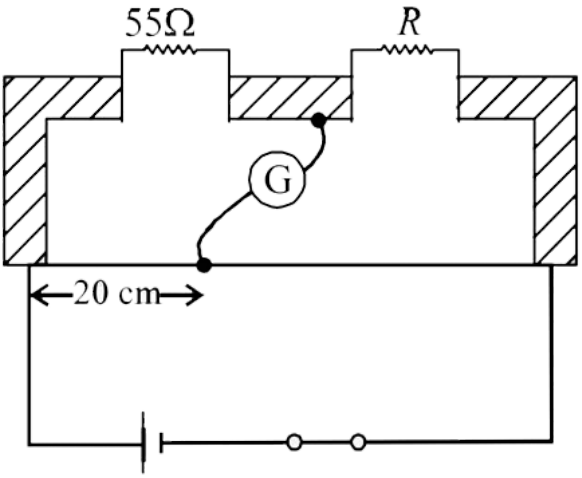
C. 0.9A

D. 1.5A

Answer: B

View Text Solution

69. Shown in the figure below is a meter-bridge set up will null deflection in the galvanometer.



The value of the unknown resistor R is

A. 55Ω

B. 110Ω

C. 220Ω

D. 13.75Ω

Answer: C

Watch Video Solution

70. If in the experiment of Wheatstone's bridge, the positions of cells and galvanometer are interchanged, then balance point will

A. remains unaltered

B. alters

C. may or may not altered depending on the resistance of the galvanometer and

the battery

D. none of these

Answer: A

Watch Video Solution

71. 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. $\frac{P}{Q} = \frac{R(S_1 + S_2)}{S_1 + S_2}$

B. $\frac{P}{Q} = \frac{R}{S_1 + S_2}$

C. $\frac{P}{Q} = \frac{R(S_1 + S_2)}{S_1 S_2}$

D. $\frac{P}{Q} = \frac{R(S_1 + S_2)}{2S_1 S_2}$

Answer: C

Watch Video Solution

72. In the given arrangement of the metre bridge, the null point is obtained at a distance x from the end A. What will be the distance of

the null point from A, if the radius of the wire AB is doubled ?

A. 2x

B. $\frac{x}{2}$

C. x

D. 3x

Answer: C

View Text Solution

73. In a meter bridge experiment, the null point is obtained at $20cm$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 decides to balanced a resistance of $4X$ against Y?

A. 30 cm

B. 40 cm

C. 50 cm

D. 60 cm

Answer: C

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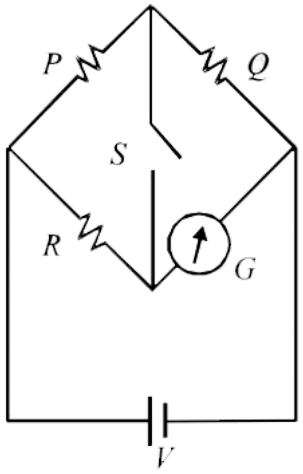
74. In the circuit $P \neq R$, the reading of the galvanometer is same with switch S open or closed. Then



A. $I_R = I_G$

B. $I_P = I_G$

C. $I_Q = I_G$

D. $I_Q = I_R$

Answer: A

Watch Video Solution

75. A post office box is shown in figure. In order to calculate the value of an external

resistance, it should be connected between

A. B and C

B. C and D

C. A and D

D. B_1 and C_1

Answer: C

View Text Solution

76. In the circuit shown, a metre bridge is in its balanced state. The metre bridge wire has a resistance 0.1 ohm/cm. What are the values of the unknown resistance X and the current drawn from the battery of negligible resistance ?

A. $6\Omega, 5amp$

B. $10\Omega, 0.1amp$

C. 4Ω 1.0 amp

D. 12Ω, 0.5 amp

Answer: C

View Text Solution

77. Each of the resistance in the network shown in the figure is equal to R. The resistance between the terminals A and B is

A. 3R

B. R

C. 5R

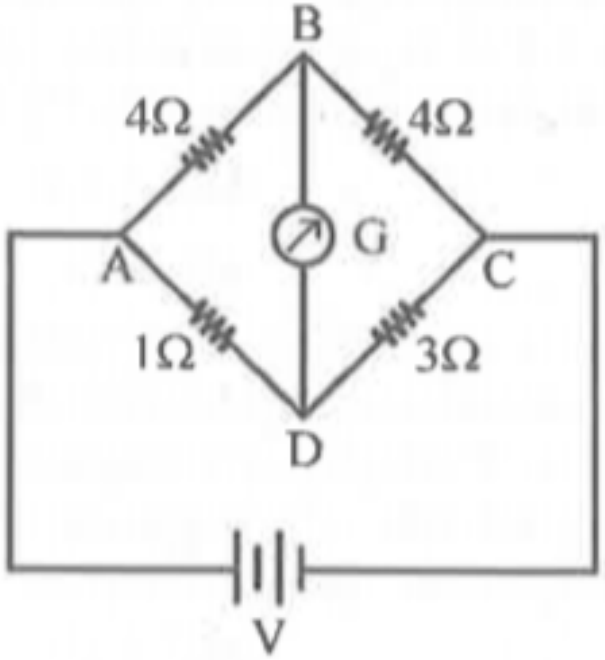
D. 6R

Answer: B

View Text Solution

78. In the following circuit, a conducing wire is connected between the terminals B and D, the

current in the wire will



A. flow from B to D

B. flow from D to B

C. the zero

D. flow in the direction which will be decided by the voltage V

Answer: B

Watch Video Solution

79. In the Wheatstone bridge shown below, in order to balance the bridge, we must have

A. $R_1 = 3\Omega, R_2 = 3\Omega$

B. $R_1 = 6\Omega$, $R_2 = 15\Omega$

C. $R_1 = 1.5\Omega$, R_2= any finite value

D. $R_1 = 3\Omega$, R_2= any finite value

Answer: D

View Text Solution

80. A metre bridge is set-up as shown in the figure to determine an unknown resistance 'X' using a standard 10 ohm resistor. The galvanometer shows null point when the

tapping-key is at 52 cm mark. The end-correction are 1 cm and 2 cm respectively for the ends A and B. What is the value of 'X' ?

A. 10.2Ω

B. 10.6Ω

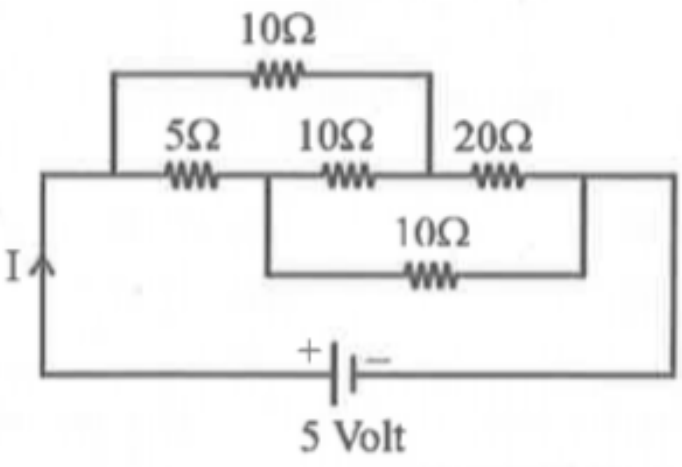
C. 10.8Ω

D. 11.1Ω

Answer: B

View Text Solution

81. In the adjoining circuit, the current I drawn from the 5 volt source will be



A. 0.67 A

B. 0.17A

C. 0.33A

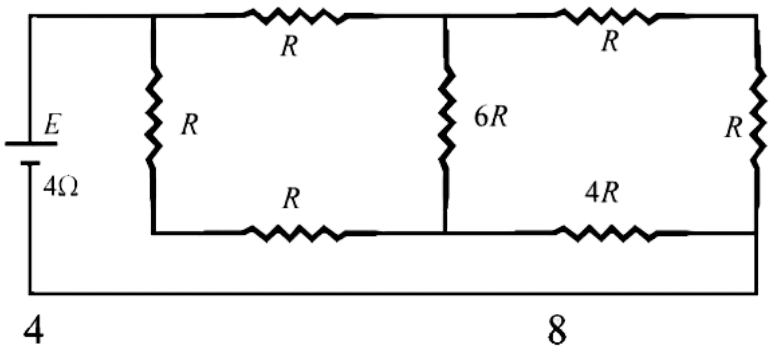
D. 0.5A

Answer: D

Watch Video Solution

82. A battery of internal resistance 4Ω is connected to the network of resistance as shown . In order that the maximum power can be delivered to the network, the value of R in

Ω should be



A. 2Ω

B. $\frac{8}{3}\Omega$

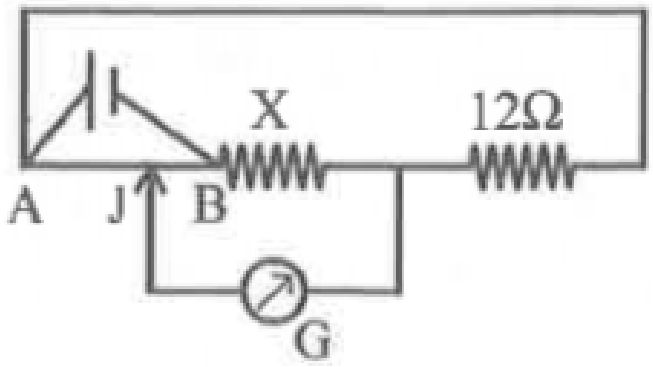
C. 18Ω

D. $\frac{4}{9}\Omega$

Answer: A

Watch Video Solution

83. A uniform wire AB of length 1 m, an unknown resistance X and a resistance of 12Ω are connected to a battery and a galvanometer G as shown in the figure. The galvanometer shows no deflection when AJ=60 cm. What is the value of X (in ohm) ?



A. 6Ω

B. 8Ω

C. 10Ω

D. 4Ω

Answer: B

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84. 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: B

Watch Video Solution

85. The resistance in the two arms of the metre bridge are 5Ω and $R\Omega$, respectively. When the resistance R is shunted with an equal resistance, the new balance point is at $1.6l_1$. The resistance R is

A. 20Ω

B. 25Ω

C. 10Ω

D. 15Ω

Answer: D

View Text Solution

86. In a typical wheatstone network, the resistances in cyclic order are $A = 10\Omega, B = 5\Omega, D = 4\Omega$ and $C = 4\Omega$.

For the bridge to be balanced

A. 10Ω should be connected in series with

A

B. 5Ω should be connected in series with B

C. 5Ω should be connected in parallel with B

D. 10Ω should be connected in parallel with A

Answer: D

View Text Solution

87. What is the equivalent resistance between the points P and Q in the network shown in the figure ?

A. 7.5Ω

B. 12.5Ω

C. 2.5Ω

D. 10Ω

Answer: A

View Text Solution

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88. A cell of e.m.f. of 1.08 V is balanced by a 216 cm length of a potentiometer. What is the length of the wire that would balance a cell of e.m.f. 1.5 V ?

A. 250 cm

B. 290 cm

C. 300 cm

D. 310 cm

Answer: C

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89. In a potentiometer experiment, the null point is obtained at 140 cm for a cell of e.m.f. 1.2 V. With another cell of unknown e.m.f., the null point is obtained at 210 cm. The unknown e.m.f. is

A. 1.5 V

B. 1.6 V

C. 1.8 V

D. 2 V

Answer: C

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90. In a potentiometer experiment, the balancing length is found to be 1.8 m for a cell of e.m.f. 1.5 V. What is the balancing length for a cell of e.m.f. 1 V ?

A. 1 m

B. 1.5 m

C. 1.2 m

D. 2 m

Answer: C

Watch Video Solution

91. Two cells of e.m.f.'s E_1 and E_2 where $E_1 > E_2$, are connected in series so as to assist each other, the balancing length is 2.7m

. When the cells are connected in series so as to oppose each other, the balancing length is found to be 0.3m . What is the ratio of their e.m.f.'s ?

A. 1.1

B. 1.25

C. 1.5

D. 1.6

Answer: B

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92. A cell of e.m.f. 1.2 V is balanced by 150 cm of potentiometer wire. When the cell is shunted by a resistance of 4Ω, the balancing length is reduced by 30 cm. What is the internal resistance of the cell ?

A. 1Ω

B. 2Ω

C. 0.5Ω

D. 0.75Ω

Answer: A

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93. A potentiometer wire of length 400 cm has a resistance of 8Ω. If a potential gradient of 0.5 V/m is maintained throughout the length of the wire, then the current flowing through the wire is

A. 0.5 A

B. 0.25 A

C. $1A$

D. 0.75 A

Answer: B

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94. A potentiometer wire is 10 m long and a P.D. of 6 V is maintained between its ends. The e.m.f. of the cell which balances against a length of 200 cm of the potentiometer wire is

A. 1 V

B. 1.2 V

C. 2.4 V

D. 1.5V

Answer: B

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95. A potentiometer wire has a length 2 m and resistance of 10Ω. It is coonnected in series

with a resistance of 990Ω and a cell of e.m.f. 2 V. The potential gradient along the wire is

A. $0.01V/m$

B. $0.02V/m$

C. $0.03V/m$

D. $0.025V/m$

Answer: A

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96. A cell of e.m.f. 2 V and negligible internal resistance is connected to a potentiometer wire of resistance 10Ω and length 4 m. The potential difference per unit length (potential gradient) of the wire is

A. 5 volt / metre

B. 10 volt / metre

C. 0.5 volt / metre

D. 1.5 volt / metre

Answer: C

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97. As is the cross sectional area and ρ is the specific resistance of a potentiometer wire. If I is the current passing through the potentiometer wire, then the potential gradient along the length of the wire is given by

A. $\frac{IA}{\rho}$

B. $IA\rho$

C. $\frac{I\rho}{A}$

D. $\frac{I}{\rho A}$

Answer: C

Watch Video Solution

98. A potentiometer experiment is set up to compare the e.m.f.'s E_1 and E_2 of two cells. When the null point is obtained, the current is drawn from

A. only the driver cell

B. only the cell of e.m.f. E_1

C. only the cell of e.m.f. E_2

D. both the driver cell and the cells of e.m.f.s E_1 and E_2

Answer: A

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99. A cell of e.m.f. 4 V and of negligible internal resistance is connected in series with a potentiometer wire of length 400 cm. The

e.m.f. of a Leelanche cell is found to be balacned at 150 cm from the positive end of the potentiometer wire. What is the e.m.f. of the Leclanche cell ?

A. 1 V

B. 1.5 V

C. 2 V

D. 2.5 V

Answer: B

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100. A 10 m long wire ofresistance 20Ω is connected in series with battery of EMF $3V$ and negligible internal resistance and a resistance of 10Ω. The potential gradient along the wire is :

A. $1V/m$

B. $0.5V/m$

C. $0.2V/m$

D. $0.1V/m$

Answer: C

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101. In a potentiometer experiment of measuring the e.m.f. of a cell, the null point is at 300 cm, when we have a resistance of 200Ω in series with the cell and the galvanometer. If the resistance is increased to 300Ω, the null point will be shifted through

A. 100 cm

B. 50 cm

C. 25 cm

D. zero cm

Answer: D

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102. In a potentiometer experiment, to measure the e.m.f. of a cell, the potentiometer consists of six wires each of length 100 cm. The null point is obtained on the third wire. If

we want to shift the null point to the 5th wire, then we should

A. increase the resistance in the main circuit

B. decrease the resistance in the main circuit

C. increase the resistance in series with the cell, whose e.m.f. is to be measured

D. decrease the resistacne in series with the cell, whose e.m.f. is to be measured

Answer: A

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103. The specific resistance of a potentiometer wire is $10^{-7}\Omega$m and the cross sectional area of the wire is $10^{-6}m^2$. If a current of 0.1 A flows through the wire, then the potential gradient will be

A. $10^{-4}V/m$

B. $10^{-3}V/m$

C. $10^{-2}V/m$

D. $10^{-5}V/m$

Answer: C

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104. In an experiment to find the internal resistance of a cell by a potentiometer, a balance was obtained for 50 cm length of the potentiometer wire, with a cell of e.m.f. 2V. When the cell was shunted by a resistance of

2Ω, the balancing length of the potentiometer wire was 40 cm. What was the internal resistance of the cell ?

A. 0.25Ω

B. 0.75Ω

C. 0.5Ω

D. 1Ω

Answer: C

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105. 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. $1:2$

B. $3:1$

C. $2:1$

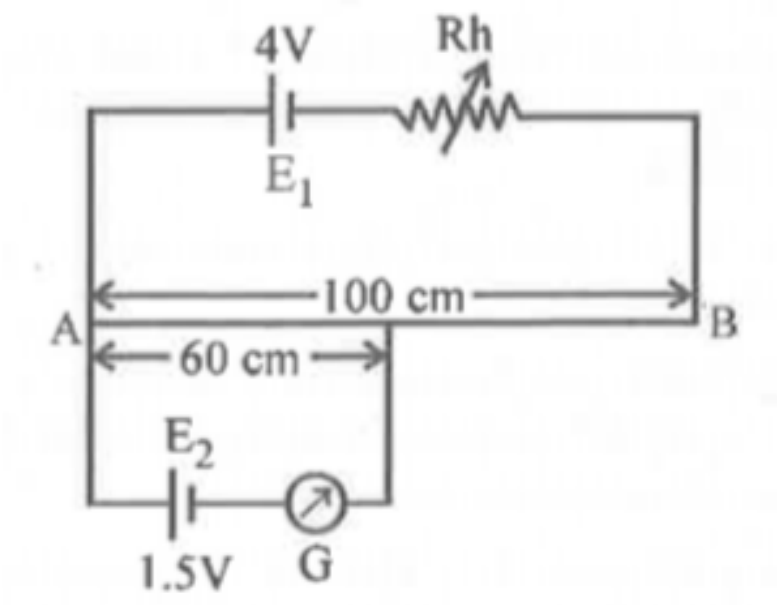
D. $4:1$

Answer: B

Watch Video Solution

106. What is the potential difference between the ends A and B of the given potentiometer wire, in the following circuit ? The

galvanometer G shows no deflection.



A. 1.5 V

B. 2 V

C. 2.5 V

D. 3 V

Answer: C

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107. A cell can be balanced against $110cm$ and $100cm$ of potentiometer wire, respectively with and without being short circuited through a resistance of 10Ω. Its internal resistance is

A. zero

B. $6.5Omga$

C. 0.7Ω

D. 1Ω

Answer: D

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108. The potential gradient along the length of a uniform wire is 10 volt / metre. B and C are the two points at 30 cm and 70 cm point on a metre scale fitted along the wire. What is the potential difference between B and C ?

A. 3 V

B. 4 V

C. 5 V

D. 6 V

Answer: B

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109. In an experiment to measure the internal resistance of a cell by a potentiometer, it is found that the balance point is at a length of

$2m$ when the cell is shunted by a 5Ω resistance and is at a length of $3m$ when the cell is shunted by a 10Ω resistance, the internal resistance of the cell is then

A. 5Ω

B. 10Ω

C. 15Ω

D. 7.5Ω

Answer: B

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110. The resistivity of a potentiometer wire is 40×10^{-8} ohm-m and its area of cross-section is $8 \times 10^{-6} m^2$. If a current of 0.4 A is flowing through the wire, then the potential gradient will be

A. $10^{-2} V/m$

B. $10^{-1} V/m$

C. $2 \times 10^{-2} V/m$

D. $1 V/m$

Answer: C

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111. A potentiometer having the potential gradient of $2mV/cm$ is used to measure the difference of potential across a resistance of $10ohm$. If a length of $50cm$ of the potentiometer wire is required to get null point, the current passing through the $10ohm$ resistor is (in mA)

A. 1 mA

B. 2 mA

C. 5 mA

D. 10 mA

Answer: D

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112. If the length of a potentiometer wire is increased by keeping constant potential difference across the wire, then

A. the null point is obtained at larger distance

B. there is no change in the null point

C. the potential gradient is increased

D. the null point is obtained at shorter distance

Answer: A

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113. Two cells of emfs approximately 5V and 10V are to be accurately compared using a poteniometer of length 400 cm.

A. The battery that runs the potentiometer should have voltage of 8 V

B. The battery of potentiometer can have a voltage of 15 V and R adjusted so that the potential drop across the wire slightly exceeds 10 V

C. The first portion of 50 cm of wire itself should have a potential drop of 10 V

D. Potentiometer is usually used for comparing resistances and not voltages

Answer: B

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114. 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. 0.5Ω

B. 0.75Ω

C. 0.25Ω

D. 0.95Ω

Answer: A

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115. Sensitivity of potentiometer can be increased by

A. increasing the length

B. increasing the P.D.

C. decreasing the series resistance

D. increasing the current in the potentiometer wire

Answer: A

116. What is the potential gradient along a wire having an area of cross-section $4 \times 10^{-4} m^2$, if the current flowing through the wire is 0.2 A and its specific resistance is $80 \times 10^{-6} ohm/m$?

A. $0.1V/m$

B. $0.5V/m$

C. $0.04V/m$

D. $0.2V/m$

Answer: C

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117. A potentiometer wire has a length of 4 and a resistance of 8 ohm. It is connected in series with a cell of e.m.f. 2 V and internal

resistance 2 ohm. The potential drop per unit length of the wire is

A. $0.5V/m$

B. $0.4V/m$

C. $0.1V/m$

D. $0.2V/m$

Answer: B

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118. A cell in the secondary circuit gives null deflection for 2.5 m length of a potentiometer having 10m length of wire. If the length of the potentiometer wire is increased by 1m without changing the cell in the primary, the position of the null point wil be

A. 3.5 m

B. 3 m

C. 2.75 m

D. 2.0 m

Answer: C

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119. A potentiometer wire 10 long has a resistance of 40Ω. It is connected in series with a resistances box and a 2 v storage cell. If the potential gradient along the wire is $0.01\frac{V}{m}$ the resistance unplugged in the box is

A. 560Ω

B. 760Ω

C. 960Ω

D. 660Ω

Answer: B

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

A. 12 V

B. 9 V

C. 6 V

D. 3 V

Answer: B

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121. AB is a potentiometer wire (see the figure).

If the value of R is increased, in which direction

will be the balance point J shift ?

A. the balance point will shift towards A

B. the balance point will shift towards B

C. the balance point will remain at J

D. the balance may shift towards A or B

Answer: B

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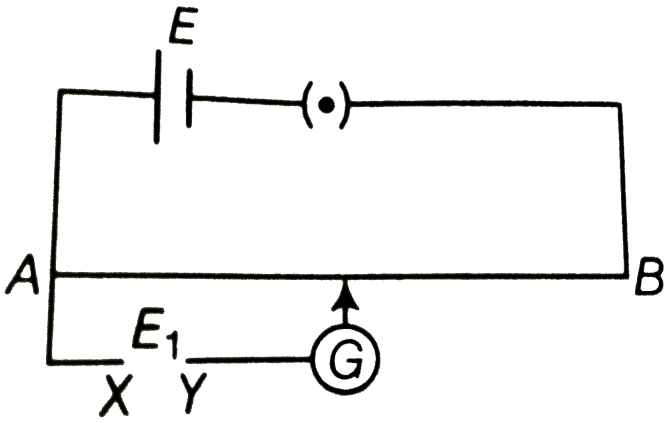

122.

While doing an experiment with potentiometer (figure) it was found that the deflection is one sided and (i) the deflection decreased while moving from one and A of the wire, to the end R, (ii) the deflection increased, while the jockey was moved towards the end D. (i). Which terminal positive or negative of the cell E_1 is connected at X in case (i) and how is

E_1, related to E?

(ii). Which terminal of the cell E_1 is connected at X in case (1 in 1)?

A. $E > E_1$ and $+ve$ terminal of E_1 is connected to X

B. $E < E_1$ and $-ve$ terminal of E_1 is connected to X

C. $E > E_1$ and $-ve$ terminal of E_1 connected to X

D. $E < E_1$ and $+ve$ terminal of E_1 is connected to X

Answer: B

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123. A cll balances against a length of 150 cm on a potentiometer wire when it is shunted by a resistance of 5Ω. But when it is shunted by a resistance of 10Ω, the balancing length

increases by 25 cm. What is the balancing length when the cell is in an open circuit ?

A. 200 cm

B. 210 cm

C. 225 cm

D. 250 cm

Answer: B

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124. 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. 40Ω

B. 44Ω

C. 48Ω

D. 32Ω

Answer: D

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125. The voltage current variation of two metallic wires X and Y at constant temperature are as shown in figure. Assume that the wires have the same length and same diameter. If R_X and R_Y are the resistances of wires X and Y , then

A. $R_X = R_Y$

B. $R_X > R_Y$

C. $R_X < R_Y$

D. $R_X \geq R_Y$

Answer: C

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126. The voltage V and current I graph for a conductor at two different temperature T_1 and T_2 is shown in the figure. The relation between T_1 and T_2 is

A. $T_1 = T_2$

B. $T_1 \approx T_2$

C. $T_1 < T_2$

D. $T_1 > T_2$

Answer: D

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127. Kirchhoffs voltage law and current law are respectively in accordance with the conservation of

A. Charge and momentum

B. Charge and energy

C. Energy and charge

D. Energy and momentum

Answer: C

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128. The accuracy of a potentiometer can be easily increased by

A. increasing the resistance of the wire

B. decreasing the resistance of the wire

C. increasing the length of the wire

D. decreasing the length of the wire

Answer: C

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129. Instrument which can measure terminal potential difference as well as electromotive force (e.m.f.) is

A. Wheatstone's metre bridge

B. Voltmeter

C. Potentiometer

D. Galvanometer

Answer: C

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130. Kirchhoffs junction law is equivalent to

A. Conservation of energy

B. Conservation of charge

C. Conservation of electric potential

D. Conservation of electric flux

Answer: B

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131. Two resistances X and Y in the left and right gaps of a metre bridge give a null point dividing the wire I the ratio of $2:3$. When each resistance is increased by 30Ω, the new null

point divides the wire in the ratio of 5 : 6. What are the values of X and Y ?

A. $X = 20\Omega, Y = 30\Omega$

B. $X = 30\Omega, Y = 20\Omega$

C. $X = 10\Omega, Y = 30\Omega$

D. $X = 30\Omega, Y = 10\Omega$

Answer: A

Watch Video Solution

132. In potentiometer experiment, if l_1 is the balancing length for e.m.f. of the cell of internal resistance r and l_2 is the balancing length for its terminal potential difference when shunted with resistance R then :

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. $l_1 = l_2\left(\frac{R-r}{R}\right)$

Answer: A

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133. 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: A

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134. 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. $1A$

B. $1.5A$

C. $2A$

D. $5A$

Answer: A

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135. 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: B

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136. The resistivity of potentiometer wire is 40×10^{-8} ohm-metre and its area of cross-section is $8 \times 10^{-6} m^2$. If 0.2 ampere current is flowing through the wire, the potential gradient of the wire is

A. $10^{-1} V/m$

B. $10^{-2} V/m$

C. $10^{-3} V/m$

D. $10^{-4} V/m$

Answer: B

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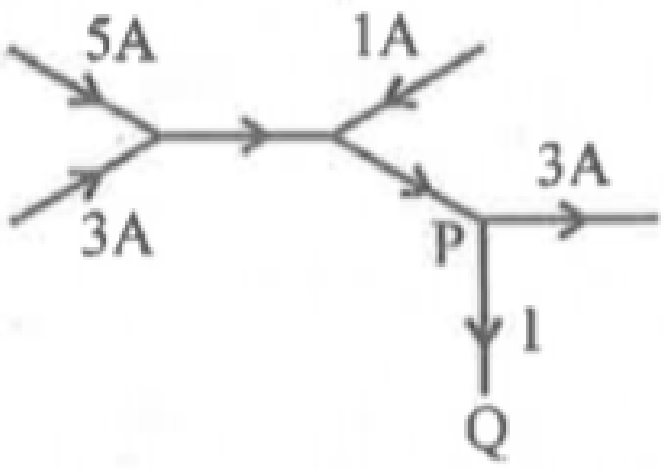
137. The currents in various parts of an electrical network are as shown in the figure.



The current I in the branch PQ is

A. $3A$

B. $4A$

C. $5A$

D. $6A$

Answer: D

Watch Video Solution

138. The current in the arm CD of the circuit will be

A. $I_1 + I_2$

B. $I_1 + I_3$

C. $I_2 + I_3$

D. $I_1 - I_2 - I_3$

Answer: C

View Text Solution

139. In the section XY of the circuit, a power of 100 Watt is absorbed. What is the resistance

of the device D ?

A. 10Ω

B. 15Ω

C. 20Ω

D. 25Ω

Answer: C

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140. When the switch S is closed in the following circuit, the current passing through the branch BD is

A. 4.5 A

B. 6.0 A

C. 3.0 A

D. Zero

Answer: A

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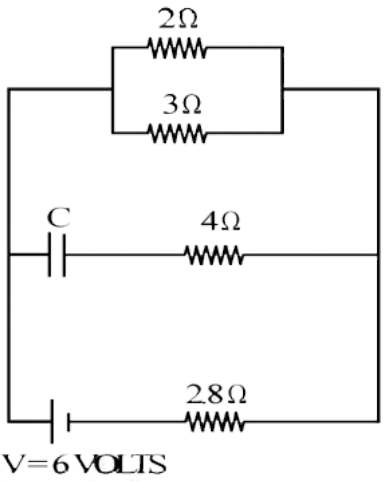
141. Calculate the steady state current in the 2-ohm resistor shown in the circuit in the figure. The intermal resistance of the battery is negligible and the capacitance of the condenser C is 0.2 microfarad.



A. 0.6A

B. 0.7A

C. 0.8A

D. 0.9A

Answer: D

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142. With resistances P and Q in the left and right gaps of a metre bridge respectively, the null point divides the wire in the ratio 1 : 2 . If P

and Q are increased by 20Ω each, the null point divides the wire in the ratio 3 : 4, then the resistances P and Q are given as :

A. $P = 10\Omega, Q = 10\Omega$

B. $P = 10\Omega, Q = 20\Omega$

C. $P = 40\Omega, Q = 10\Omega$

D. $P = 20\Omega, Q = 40\Omega$

Answer: B

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143. In the given circuit, no current flows in the 2Ω resistance.

The equivalent resistance of the given circuit is

A. $\frac{30}{15}\Omega$

B. 10Ω

C. $\frac{20}{5}\Omega$

D. 1Ω

Answer: B

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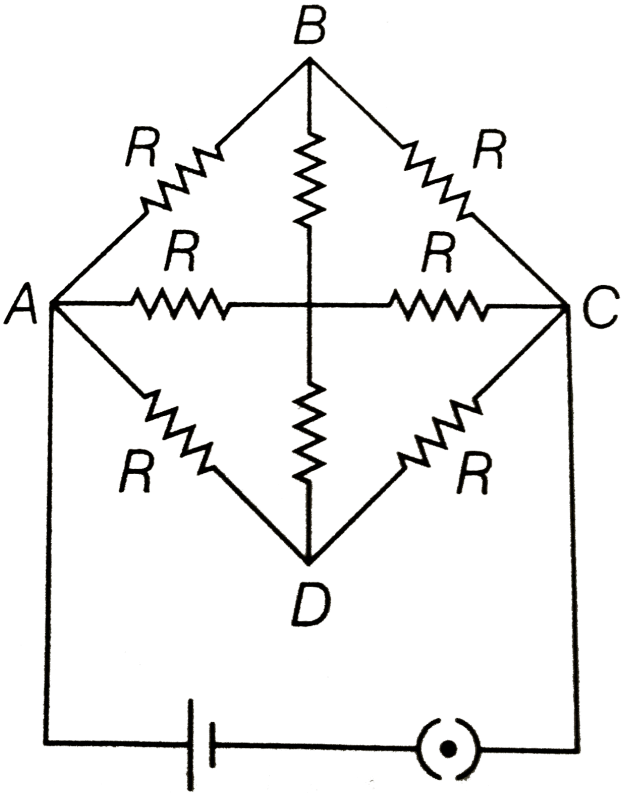
144. What is the effective resistance between the points A and C in the following network?



A. $\frac{R}{3}$

B. $\frac{2R}{3}$

C. $\frac{3R}{2}$

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

Answer: B

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145. In the given circuit it is observed that the current I is independent of the value of the resistance R_6. Then the resistance values must

satisfy

A. $R_1R_4 = R_2R_3$

B. $R_1R_3 = R_2R_4 = R_5R_6$

C. $R_1R_2R_5 = R_3R_4R_6$

D. $\frac{1}{R_5} + \frac{1}{R_6} = \frac{1}{R_1 + R_2} + \frac{1}{R_3 + R_4}$

Answer: A

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146. A resistance R is to be measured using a meter bridge. Student chooses the standared resistance S to be 100Ω. He finds the null point at $l_1 = 2.9cm$. He is told to attempt to improve the accuracy. Which of the folllowing is a useful way?

A. He should measure L_1 more accurately

B. He should change S to 1000Ω and repeat the experiment

C. He should change S to 3Ω and repeat the experiment

D. He should give up hope of a more accurate measurement with a metre bridge

Answer: C

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147. For a cell of e.m.f. 2 V , a balance is obtained for 50 cm of the potentiometer wire. If the cell is shunted by a 2Ω resistor and the balance is obtained across 40 cm of the wire, then the internal resistance of the cell is

A. 0.25Ω

B. 0.5Ω

C. 0.75Ω

D. 1.00Ω

Answer: B

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148. A current of 0.01 A flows through a potentiometer wire of cross section area $10^{-6}m^2$. If the specific resistance of the potentiometer wire is 10^{-7} ohm-m, then the potential gradient will be

A. $10^{-1}V/m$

B. $10^{-3}V/m$

C. $10^{-2}V/m$

D. $0.5 \times 10^{-2} V/m$

Answer: B

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149. With a certain cell, the balance point is obtained at 65 cm from the zero end of a potentiometer wire. With another cell, whose e.m.f. is less than that of the first by 0.1 V, the balance point is obtained at 60 cm. What is the e.m.f. of the first cell ?

A. $1.0V$

B. 1.2 V

C. 1.3 V

D. 1.5 V

Answer: C

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150. A P.D. of 2 volts exists across a potentiometer wire of length 4 m. When the P.D. across a 2Ω resistance of a second circuit

is measured by this potentiometer, the balancing length is found to be 4 cm, the current in the second circuit is

A. 1 mA

B. 10 mA

C. 100 mA

D. 50 mA

Answer: B

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151. The length of a potentiometer wire is 200 cm and the e.m.f. of the battery connected to it is E. It is used to measure the e.m.f. of a cell whose internal resistance is 0.5Ω . If the balance point is obtained at l=40 cm from the positive end, then the e.m.f. of the cell is

A. $\frac{40E}{200}$

B. $\frac{40E}{200+0.5}$

C. $\frac{40(E-0.5)}{200}$

D. $\frac{40E}{200-0.5}$

Answer: A

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