doubtnut
India's Number 1 Education App

PHYSICS

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

CURRENT ELECTRICITY

Others

1. The resistance of a wire is 'R' ohm. If it is melted and stretched to n times its origianl

length, its new resistance will be

A. nR

B. $\frac{R}{n}$

C. n^2R

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

Answer: C

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2. 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 resistance

Answer: C

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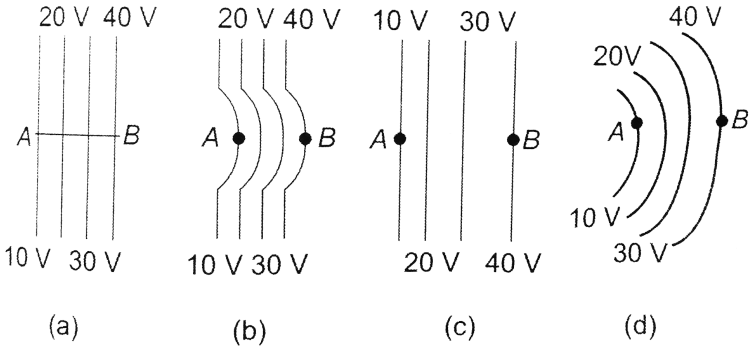
3. The diagram below show regions of equipotential:

A positive chrages is moved from A to B in each diagram.



A. Maximum work is required to move q in figure (ii)

B. In all the four cases, the work done is the same

C. Minimum work is required to move q in figure (i)

D. Maximum work is required to move q in figure (ii)

Answer: B

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4. A potentiometer wire is $100cm$ long and 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 obtained at $50cm$ and $10cm$ from the positive end of the wire in the two cases. The ratio of emfs is:

A. $5:4$

B. $3:4$

C. $3:2$

D. $5:1$

Answer: C

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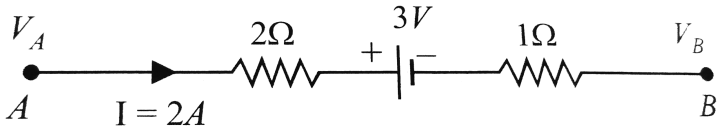
5. The potential difference $(V_A - V_B)$ between the point A and B in the given figure is



A. $-3V$

B. $+3V$

C. $+6V$

D. $+9V$

Answer: D

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6. 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. 44Ω

D. 48Ω

Answer: A

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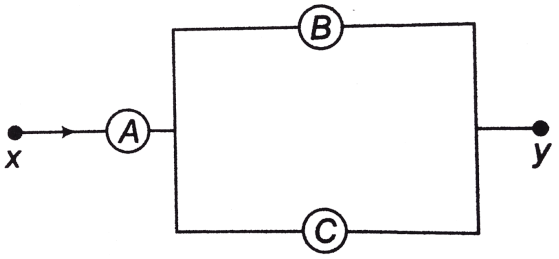
7. A, B and C are voltmeters of resistances $R, 1.5R$ and $3R$ respectively. When some potential difference is applied between x and y the voltmeter readings are V_A, V_B and V_C,` then



A. $V_A = V_B = V_C$

B. $V_A \neq V_B = V_C$

C. $V_A = V_B \neq V_C$

D. $V_A \neq V_B \neq V_C$

Answer: A

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8. Across a metallic conductor of non-uniform cross-section a constant potential difference is applied. The quantity

A. current density

B. current

C. drift velocity

D. electric field

Answer: B

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9. Two metal wires of identical dimesnios are connected in series. If σ_1 and σ_2 are the conducties of the metal wires respectively, the effective conductivity of the combination is

A. $\frac{2\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

B. $\frac{\sigma_1+\sigma_2}{2\sigma_1\sigma_2}$

C. $\frac{\sigma_1+\sigma_2}{\sigma_1\sigma_2}$

D. $\frac{\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

Answer: A

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10. A circuit contains an ammeter, a battery of $30V$ and a resistance $40.8ohm$ all connected in series. If the ammeter has a coil of

resistance $480 ohm$ and a shunt of $20 ohm$, the reading in the ammeter will be

A. 0.5A

B. 0.25A

C. 2A

D. 1A

Answer: A

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11. 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. $\frac{LE_0r}{lir_1}$

B. $\frac{E_0r}{(r+r_1)}.\frac{l}{L}$

C. $\frac{E_0l}{L}$

D. $\frac{LE_0r}{(r+r_1)l}$

Answer: B

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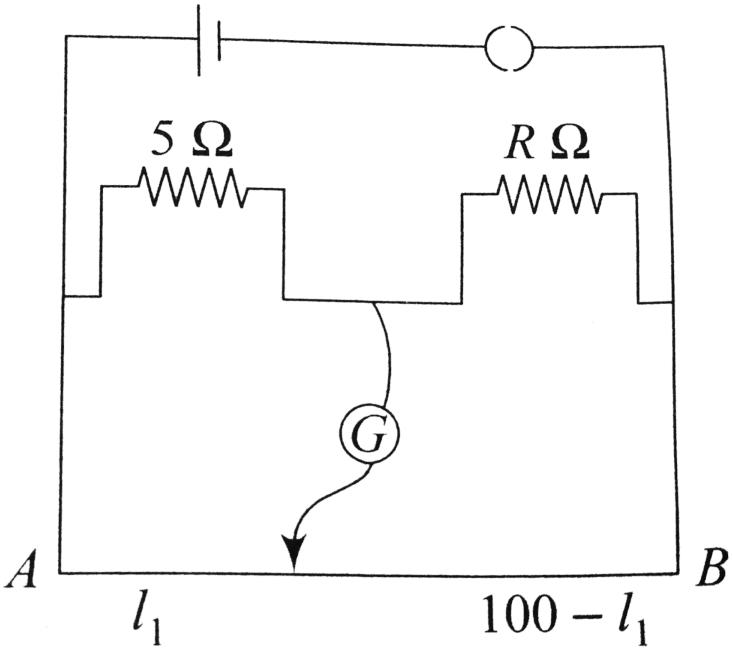
12. The resistance in the two arms of the meter bridge are 5Ω and $R\Omega$, respectively. When the resistance R is shunted with an equal resistance, the new balance point is $1.6l_1$.

The resistance R is



A. 10Ω

B. 15Ω

C. 20Ω

D. 25Ω

Answer: B

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13. 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: C

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14. In a ammeter $0.2\ \%$ of main current passes through the galvanometer. If resistance of galvanometer is G, the resistance of ammeter will be

A. $\frac{1}{499}G$

B. $\frac{499}{500}G$

C. $\frac{1}{500}G$

D. $\frac{500}{499}G$

Answer: C

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15. A wire of resistance 4Ω is stretched to twice its original length. The resistance of stretched wire would be

A. 2Ω

B. 4Ω

C. 8Ω

D. 16Ω

Answer: D

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16. The internal resistance of a $2.1V$ cell which gives a current $0.2A$ through a resistance of 10Ω

A. 0.2Ω

B. 0.5Ω

C. 0.8Ω

D. 1.0Ω

Answer: B

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17. The resistance of the four arms P, Q, R and S in a Wheatstone's bridge are $10ohm30ohm$ and $90ohm$ rerspectively. The e.m.f. and internal resistance of the cell are $7vo <$ and $5ohm$ respectively. If the galvanometer resistance is $50ohm$, the current drawn for the cell will be

A. 1.0A

B. 0.2A

C. 0.1A

D. 2.0A

Answer: B

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18. A milli voltmeter of 25 milli volt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be

A. 0.001

B. 0.01

C. 1

D. 0.05

Answer: A

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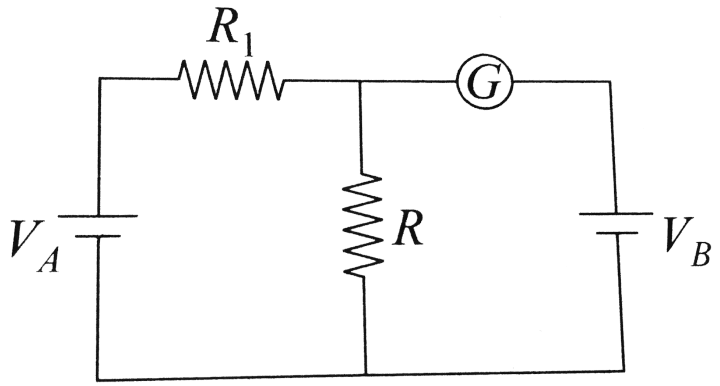
19. In the circuit shown the cells A and B have negligible resistance. For $V_A = 12V, R_1 = 500\Omega$ and $R = 100\Omega$, the

galvanometer (G) shows no deflection. The value of V_B is



A. 4V

B. 2V

C. 12V

D. 6V

Answer: B

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20. A current of $2A$ flows through a 2Ω resistor when connected across a battery. The same battery supplies a current of $0.5A$ when connected across a 9Ω resistor. The internal resistance of the battery is

A. $1/3\Omega$

B. $1/4\Omega$

C. 1Ω

D. 0.5Ω

Answer: A

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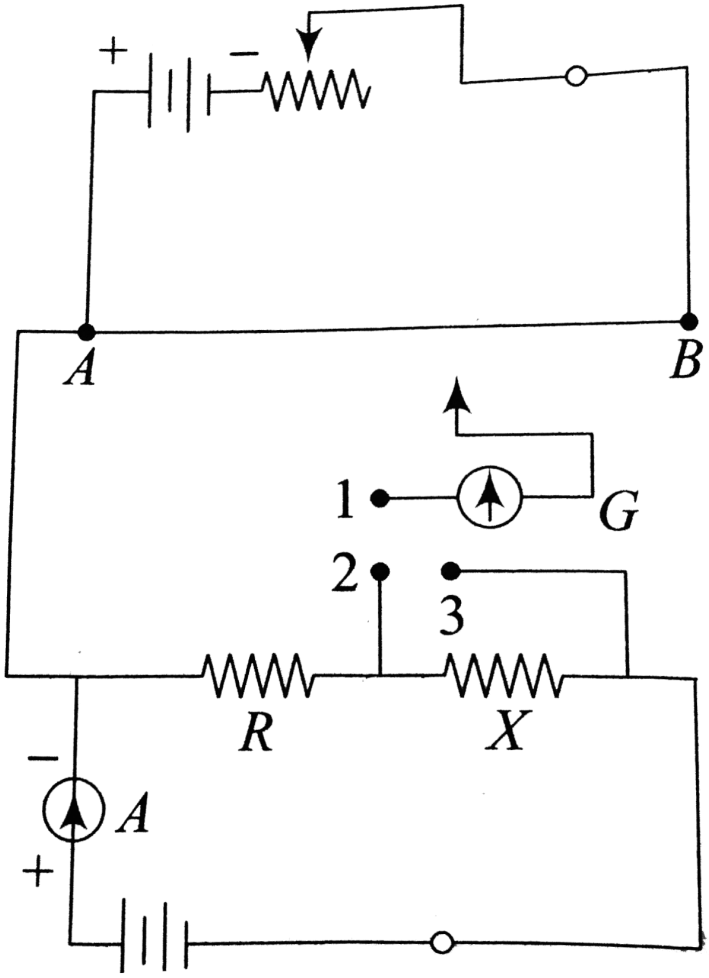
21. A potentiometer circuit is setup as shown. The potential gradient across the potentiometer wire is $k\text{volt}/cm$ and the ammeter present in the circuit reads. $1.0A$ When two-way key is switched off. The balance point, when the key between the terminals (i) 1

and 2 (ii) 1 and 3, is plugged in, are found to be at lengths l_2cm and l_2cm respectively. The magnitudes, of the resistors R and X, in ohm, are then, equal, respectively, to



A. $k(l_2 - l_1)$ and kl_2

B. kl_1 and $k(l_2 - l_1)$

C. $k(l_2 - l_1)$ and kl_1

D. kl_1 and kl_2

Answer: C

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22. A galvanometer has a coil of resistance 100Ω and gives a full-scale deflection for $30mA$ current. If it is to work as a voltmeter of

$30V$ range, the resistance required to be added will be

A. 900Ω

B. 1800Ω

C. 500Ω

D. 1000Ω

Answer: A

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23. Consider the following two statements:

(A)Kirchhoff's junction law follows from conservation of charge.

(B)Kirchhoff's loop law follows from conservative nature of electirc field .

A. Both I and II are wrong

B. I is correct and II is wrong

C. I is wrong and II is correct

D. Both I and II are correct

Answer: D

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24. The mean free path of electrons in a metal is $4 \times 10^{-8} m$ The electric field which can give on an average $2eV$ energy to an electron in the metal will be in the units V/m

A. 8×10^{7}

B. 5×10^{-11}

C. 8×10^{-11}

D. 5×10^{7}

Answer: D

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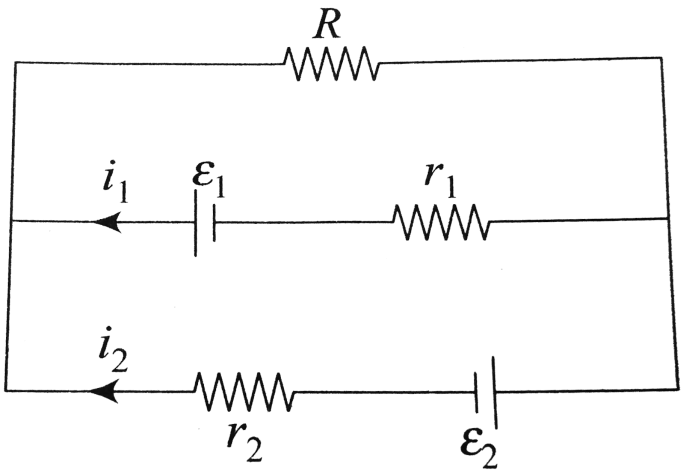
25. See the electrical circuit shown in this figure. Which of the following equations is the correct equation for it ?



A. $\varepsilon_1(i_1 + i_2)R - i_1 r_1 = 0$

B. $\varepsilon_2 - i_2 r_2 - \varepsilon_1 - i_1 r_1 = 0$

C. $\varepsilon_2(i_1 + i_2)R + i_2 r_2 = 0$

D. $\varepsilon_1(i_1 + i_2)R - i_1 r_1 = 0$

Answer: A

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26. A student measures the terminal potential difference (V) of a cell (of emf ε and internal resistance r) as a function of the current (I)

flowing through it. The slope and intercept of the graph between V and I, then respectively, equal

A. ε and $-r$

B. $-r$ and ε

C. r and $-\varepsilon$

D. $-\varepsilon$ and r

Answer: B

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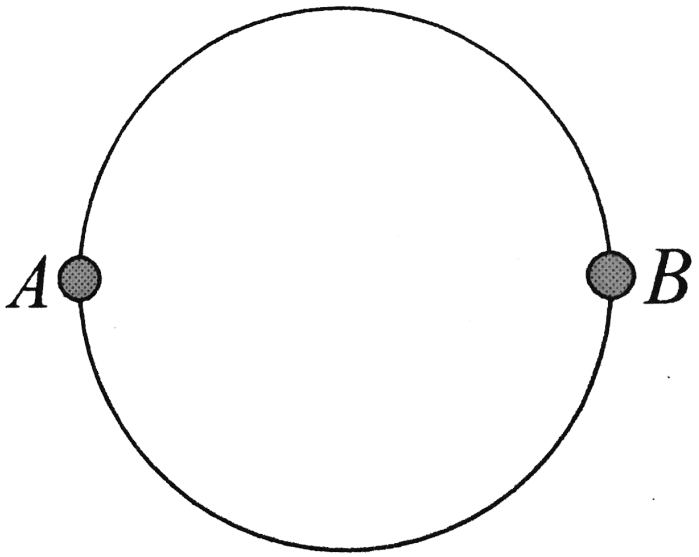
27. A wire of resistance $12\Omega m^{-1}$ is bent to from a complete circle of radius $10cm$. The resistance between its two diametrically opposite points, A and B as shown in the figure, is



A. $0.6\pi\Omega$

B. 3Ω

C. $6\pi\Omega$

D. 6Ω

Answer: A

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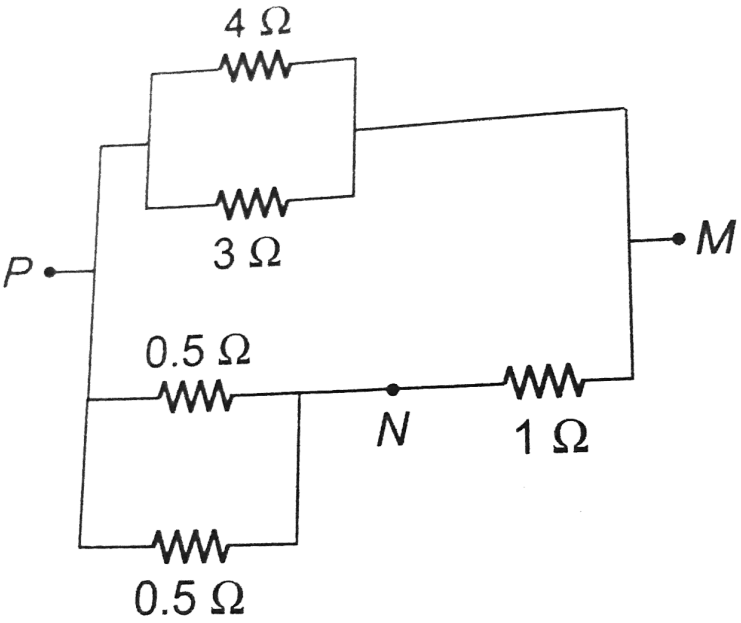
28. In the circuit shown, the current through the 4Ω resistors is $1amp$ when the points P and M are connected to a dc voltage source. The potential difference between the points

M and N is.



A. 1.5V

B. 1.0V

C. 0.5V

D. 3.2V

Answer: D

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29. 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. 1.0Ω

B. 0.5Ω

C. 2.0Ω

D. zero

Answer: A

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30. A wire of a certain material is stretched slowly by ten percent. Its new resistance and specific resistance become respectively.

A. 1.2 times,1.1 times

B. 1.21times, same

C. Both remain the same

D. 1.1times,1.1times

Answer: B

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31. Three resistance P, Q, R each of 2Ω and an unknown resistance S from the four amrs of a Wheatstone's bridge circuit. When a resistance of 6Ω is connected in parallel to S

the bridge gets balanced. What is the value of S ?

A. 2Ω

B. 3Ω

C. 6Ω

D. 1Ω

Answer: B

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32. The resistance of an ammeter is 13Ω and its scale is graduated for a current upto $100A$. After an additional shunt has been connected to this ammeter it becomes possible to measure currents upto $750A$ by this meter. The value of shunt resistance is

A. 20Ω

B. 2Ω

C. 0.2Ω

D. $2k\Omega$

Answer: B

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33. Two cells, having the same emf, are connected in series through an external resistance R. Cells have internal resistance r_1 and $r_2(r_1 > r_2)$ respectively. When the circuit is closed, the potentail difference across the first cell is zero the value of R is

A. $r_1 - r_2$

B. $\frac{r_1 + r_2}{2}$

C. $\frac{r_1 - r_2}{2}$

D. $r_1 + r_2$

Answer: A

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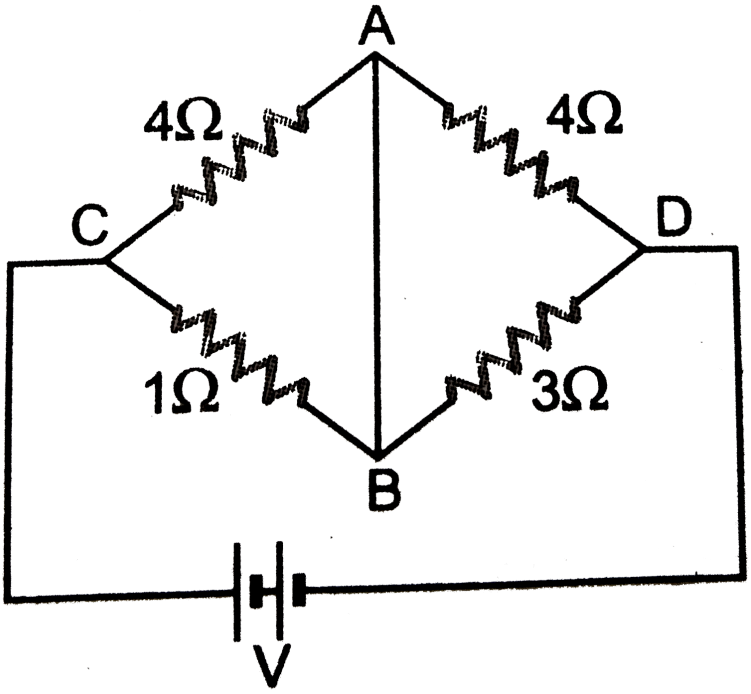
34. In the circuit of a condacting wire is connected between point A and B the current

is this wire will



A. flow from A to B

B. flow in the direction which will be decided by the value of V

C. be zero

D. flow from B to A

Answer: D

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35. When a wire of uniform cross-section a, length I and resistance R is bent into a complete circle, resistance between two of diametrically opposite points will be

A. $\frac{R}{4}$

B. $\frac{R}{8}$

C. $4R$

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

Answer: A

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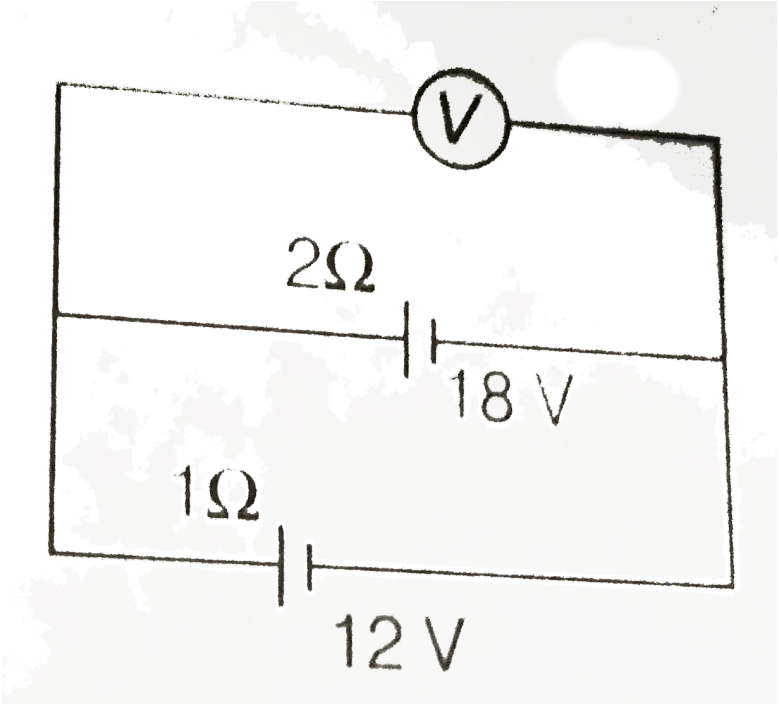
36. Two batteries, one of emf 18V and internal resistance 2Ω and the other of emf 12 and internal resistance 1Ω , are connected as shown. The voltmeter V will record a reading

of



A. 15V

B. 30V

C. 14V

D. 18V

Answer: C

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37. A battery of 6 volts is connected ot the termainals of a three meter long wire of uniform thickness and resistance of the order of 100Ω. The difference of potential between two points separated by $50cm$ on the wire will

A. 2V

B. 3V

C. 1V

D. 1.5V

Answer: C

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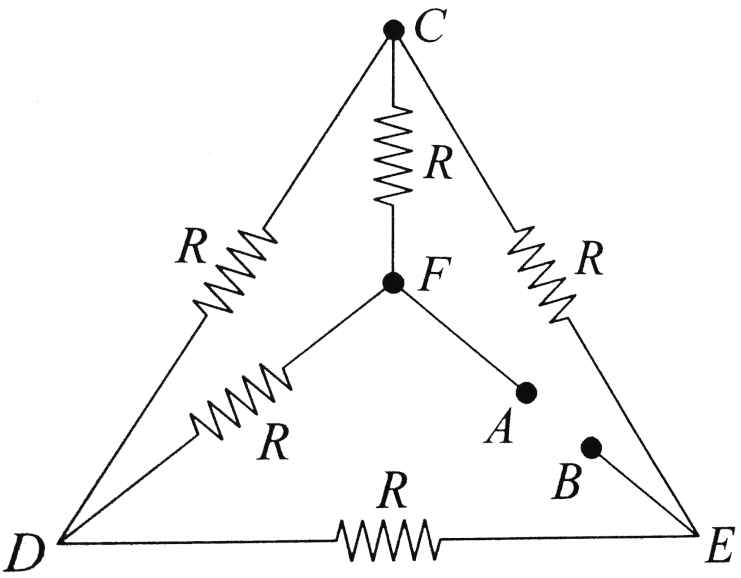
38. Five equal resistances each of resistance R are connected as shown in the figure. A battery of V volts is connected between A

and B. The current flowing in $AFCEB$ will be



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

B. $\frac{V}{R}$

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

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

Answer: C

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39. Resistance n, each of $rohm$, when connected in parallel give an equivalent resistance of $Rohm$. If these resistances were connected series, the combination would have a resistance in ohm, equal to

A. n^2R

B. $\frac{R}{n^2}$

C. $\frac{R}{n}$

D. nR

Answer: A

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40. The electric resistance of a certain wire of iron is R. If its length and radius are both doubled, then

A. the resistance will be doubled and the specific resistance will be halved

B. the resistance will be halved and the specific resistance will remain unchanged

C. the resistance will be halved and the specific resistance will be doubled

D. the resistance and the specific resistance will both remain unchanged

Answer: B

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41. A battery is charged at a potential fo 15 V for 8 h when the current folwing is 10A. The battery on discharge supplies a current of 5A fo 15h . The mean terminal voltage during discharge is 14V. The watt-hour efficiency of the battery is

A. 0.825

B. 0.8

C. 0.9

D. 0.875

Answer: D

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42. In a Wheatstone's bridge all the four arms have equal resistance R. If the resistance of the galvanometer arm is also R, the equivalent resistance of the combination as seen by the battery is

A. R

B. 2R

C. $\frac{R}{4}$

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

Answer: A

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43. For a cell, the terminal potential difference is $2.2V$, when circuit is open and reduces to $1.8V$. When cell is connected to a resistance $R = 5\Omega$, the internal resistance of cell (R) is

A. $\frac{10}{9}\Omega$

B. $\frac{9}{10\Omega}$

C. $\frac{11}{9\Omega}$

D. $\frac{5}{9\Omega}$

Answer: A

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44. The specific resistance of a conductor increases with:

A. increase in temperature

B. increase in cross-sectional area

C. decrease in length

D. decrease in cross-sectional area

Answer: A

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45. Resistivity of potentiometer wire is 10^{-7} ohm metre and its area of cross-section is

$10^{-6}m^2$. When a current $l = 0.1A$ flows through the wire, its potential gradient is:

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

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

C. 0.1V/m

D. 10V/m

Answer: A

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46. In a wheatstone bridge resistance of each of the four sides is 10Ω. If the resistance of the galvanometer is also 10Ω , then effective resistance of the bridge will be

A. 10Ω

B. 5Ω

C. 20Ω

D. 40Ω

Answer: A

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47. A cell has an emf 1.5V. When connected across an external resistance of 2Ω, the terminal potential difference falls to 1.0V. The internal resistance of the cell is:

A. 2Ω

B. 1.5Ω

C. 1.0Ω

D. 0.5Ω

Answer: C

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48. Potentiometer measures the potential difference more accurately than a voltmeter, because

A. it has a wire of high resistance

B. it has a wire of low resistance

C. it does not draw current from external circuit

D. it draws a heavy current from external circuit

Answer: C

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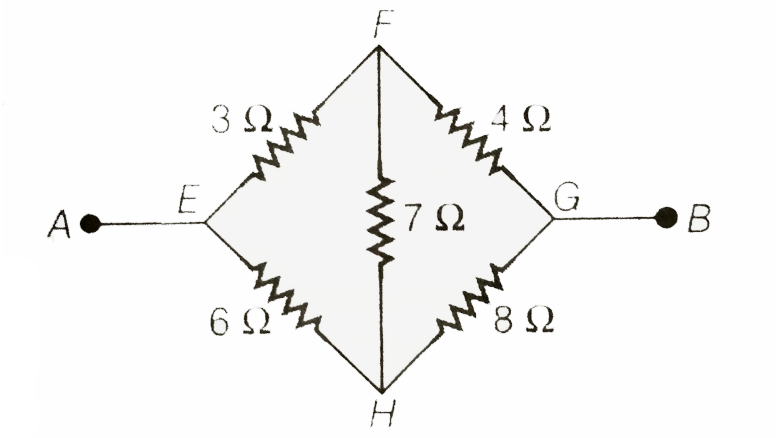
49. A bridge circuit is shown in figure. The equivalent resistance between A and B will be



A. 21Ω

B. 7Ω

C. $\frac{252}{85}\Omega$

D. $\frac{14}{3}\Omega$

Answer: D

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50. A potentiometer consists of a wire of length 4 m and resistance 10Ω. It is connected to a cell of emf 2V.The potential gradient of the wire is

A. 0.5 V/m

B. 2 V/m

C. 5V/m

D. 10V/m

Answer: A

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51. 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. 0.25Ω

B. 0.4Ω

C. 0.5Ω

D. 4Ω

Answer: A

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52. The resistance of a discharge tube is

A. zero

B. ohmic

C. non-ohmic

D. infinity

Answer: C

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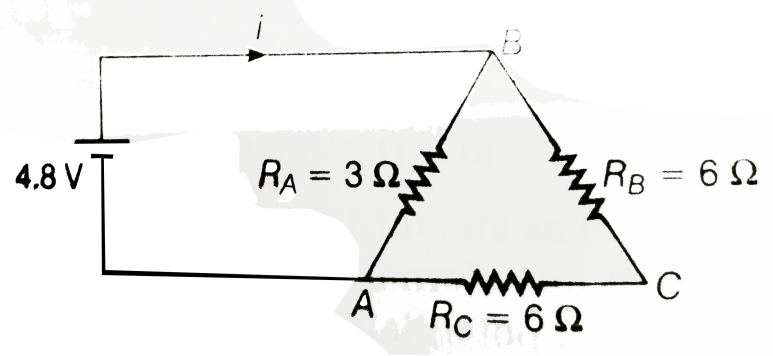
53. The current (i) in the given circuit is



A. 1.6 A

B. $2A$

C. 0.32A

D. 3.2 A

Answer: B

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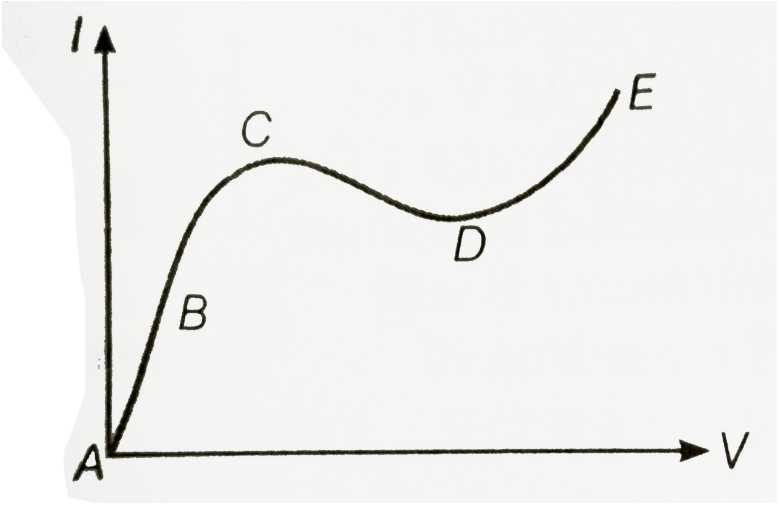
54. From the given between current I and voltage V shown in figure , indentify the portion corresponding to negative resistance



A. DE

B. CD

C. BC

D. AB

Answer: B

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55. There are three copper wires of length and cross-sectional area (L,A),(2L,A/2)(L/2,2A). In which case in the resistance minimum?

A. it is the same in all three cases

B. Wire of cross-sectional are 2A

C. Wire of cross-sectional area A

D. Wire of cross-sectional are $\frac{1}{2}$A

Answer: B

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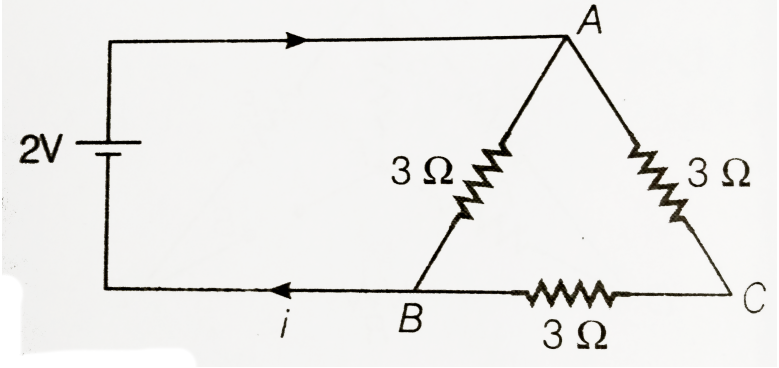
56. The current in the following circuit is



A. $1A$

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

C. $\frac{2}{9}A$

D. $\frac{1}{8}A$

Answer: A

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57. Kirchhoff's first law i.e., $\sum I = 0$ at a junction is based on the law of conservation of

A. angular momentum

B. linear momentum

C. energy

D. charge

Answer: D

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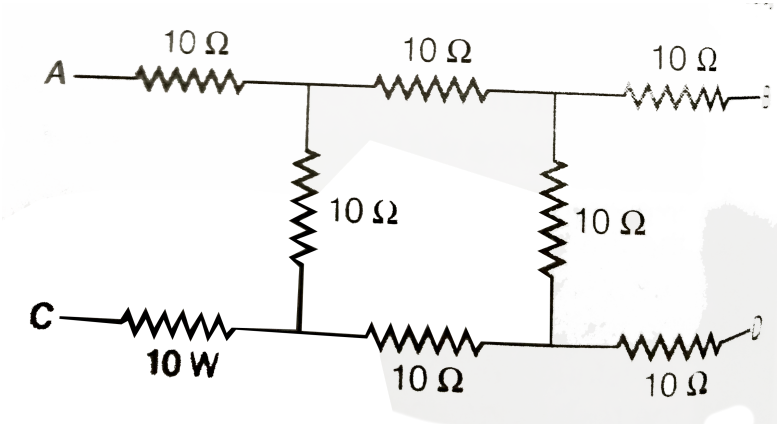
58. What will be the equivalent resistance fo circuit shown in figure between two points A and D?



A. 10Ω

B. 20Ω

C. 30Ω

D. 40Ω

Answer: C

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59. A negligibly small current is passed through a wire of length 15 m and uniform cross-section $6.0 \times 10^{-7}\Omega m^2$, and its resistance is measured to be 5.0Ω. What is the resistivity of the material at the temperature of the experiment ?

A. $1 \times 10^{-7} \Omega - m$

B. $2 \times 10^{-7} \Omega - m$

C. $3 \times 10^{-7} \Omega - m$

D. $4 \times 10^{-7} \Omega - m$

Answer: B

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60. If the resistance of a conductor is 5Ω at $50^{\circ} C$ and 7Ω at $100^{\circ} C$ then the mean

temperature coefficient of resistance of the material is

A. $0.01/^{\circ}\mathrm{C}$

B. $0.04/^{\circ}\mathrm{C}$

C. $0.06/^{\circ}\mathrm{C}$

D. $0.08/^{\circ}\mathrm{C}$

Answer: A

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61. If a wire of resistance R is melted and recasted in to half of its length, then the new resistance of the wire will be

A. $\frac{R}{4}$

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

C. R

D. 2R

Answer: A

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62. Two wire of the same meta have same length, but their cross-sections are in the rati $3:1$. They are joined in series. The resistance of thicker wire is 10Ω . The total resistance of the combination will be

A. 10Ω

B. 20Ω

C. 40Ω

D. 100Ω

Answer: C

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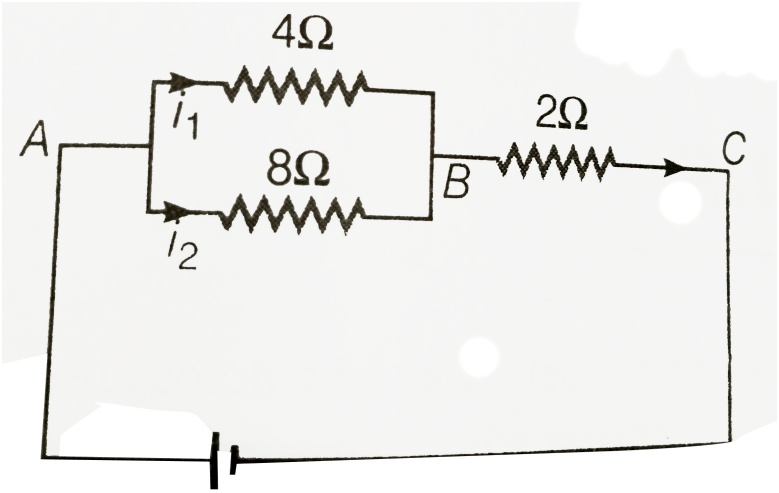
63. In the circuit of figure, the current in 4Ω resistance is 1.2A , what is the potential difference between B and C?



A. 3.6V

B. 6.3V

C. 1.8V

D. 2.4V

Answer: A

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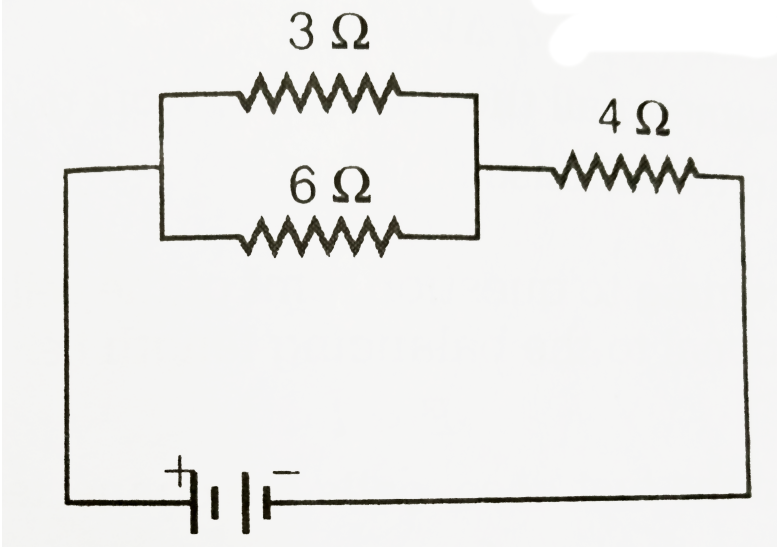
64. Current through 3Ω resistor is 0.8A, then potential drop through 4Ω resistor is



A. 9.6V

B. 2.6V

C. 4.8V

D. 1.2V

Answer: C

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65. Three resistance each of 4Ω are connected to form a triangle. The resistance between any two terminals is

A. 12Ω

B. 2Ω

C. 6Ω

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

Answer: D

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66. Kirchhoff's first law of electricity follows.

A. only law of conservation of energy

B. only law of conservation of charge

C. law of conservation of both energy and charge

D. sometimes law of conservation of energy and some other times law of conservation of charge

Answer: B

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67. The velocity of charge carries of current (about 1 A) in a metal under normal conditions is of the order of

A. a fraction of mm/s

B. velocity of light

C. several thousands m/s

D. a few hundred m/s

Answer: A

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68. You are given several identical resistors each of value 10Ω and each capable of carrying a maximum current of 1 A. It is required to make a suitable combination of these to resistances to produce a resistance of 5Ω which can carry a current of 4 A. The minimum number of resistors required for this job is

A. 4

B. 10

C. 8

D. 20

Answer: C

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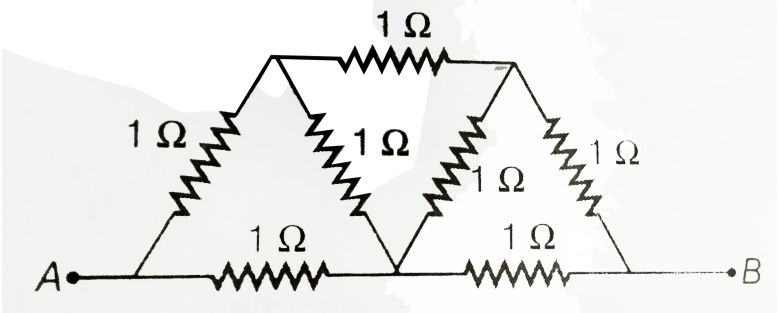
69. In the network shown in figure each resistance is 1Ω . The effective resistance

between A and B is



A. $\frac{4}{3}\Omega$

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

C. 7Ω

D. $\frac{8}{7}\Omega$

Answer: D

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70. n equal resistors are first connected in series and then connected in parallel. What is the ratio of the maximum to the minimum resistance ?

A. n

B. $1/n^2$

C. n^2

D. $1/n$

Answer: C

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71. The massses of the three wires of copper are in the ratio 1 : 3 : 5. And their lengths are in th ratio 5 : 3 : 1. the ratio of their electrical resistance is

A. $1:3:5$

B. $5:3:1$

C. $1:25:125$

D. $125:15:1$

Answer: D

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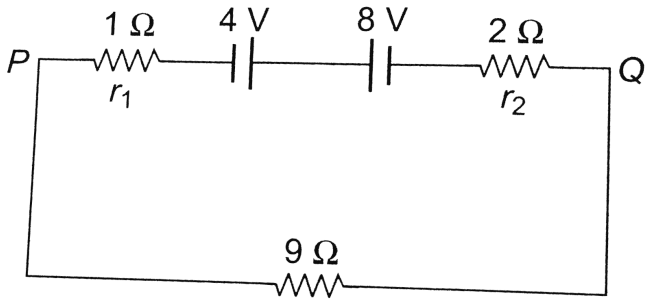
72. Two batteries of e.m.f. $4V$ and $8V$ with internal resistances 1Ω and 2Ω are connected in a circuit with a resistance of 9Ω as shown in figure. The current and potential difference between the points P and Q



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

B. $\frac{1}{6}A$ and $4V$

C. $\frac{1}{9}A$ and $9V$

D. $\frac{1}{12}A$ and $12V$

Answer: A

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