PHYSICS

BOOKS - NCERT FINGERTIPS PHYSICS (HINGLISH)

CURRENT ELECTRICITY

Electric Current

1. Ten million electrons pass from point P to point Q m one micro second.

The current and its direction is

A. $1.6 \times 10^{-14} A$, from point P to point Q

B. $3.2 \times 10^{-14} A$ from point P to point Q

C. $1.6 \times 10^{-6} A$ From point Q to P

D. $3.2 \times 10^{-12} A$ from point Q to point P

Answer: C

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2. 1 ampere current is equivalent to

A. 6.25×10^{-18} electrons s^{-1}

B. 2.25×10^{-18} electrons s^{-1}

C. 6.25×10^{14} electrons s^{-1}

D. 2.25×10^{14} electrons s^{-1}

Answer: A

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3. A current in a wire is given by the equation, . $I = 2t^2 - 3t + 1$, the charge through cross section of : wire in time interval t=3s to t=5s is

A. 32.33C

B. 43.34C

C. 45.5C

D. 42C

Answer: B

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4. The current in a wire varies with time according to the equation l=4+2t, where l is in ampere and t is in sec. the quantity of charge which has passed through a cross-section of the wire during the time t=2 sec to t=6 sec will be

A. 40C

B. 48C

C. 38C

D. 43C

Answer: B

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5. In an atom electrons revolves around the nucleus along a path of radius 0.72Ã... making 9.4×10^{18} revolution per second. The equivalent current is $\left(e = 1.6 \times 10^{-19} C\right)$

A. 1.2A

B. 1.5A

C. 1.4A

D. 1.8A

Answer: B

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Electric Current In Conductors

1. A charge is moving across a junction, then

A. momentum will be conserved

B. momentum will not be conserved

C. at some places momentum be conserved and at other places momentum will not be conserved

D. none of these.

Answer: D

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2. The direction of the flow of current through electric circuit is

A. from low potential to high potential.

B. from high potential to low potential.

C. does not depend upon potential value

D. current cannot flow through circuit.

Answer: B

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Drift Of Electrons And The Origin Of Resistivity

1. For which of the following depndences of drift velocity, v_d on electric field E, Ohm's law obeyed?

A. $v_d \alpha E$

B. $v_d \alpha E^2$

C. $v_d \alpha \sqrt{E}$

D. $v_d \alpha \frac{1}{\sqrt{E}}$

Answer: A

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2. A charged particle having drift velocity of $7.5 \times 10^{-4} ms^{-1}$ in electric field of $3 \times 10^{-10} Vm^{-1}$ mobility is

A. $6.5 \times 10^{6} m^{2} V^{-1} s^{-1}$

B. $2.5 \times 10^{6} m^{2} V^{-1} s^{-1}$

C. $2.5 \times 10^{4} m^{2} V^{-1} s^{-1}$

D. $6.5 \times 10^{4} m^{2} V^{-1} s^{-1}$

Answer: B

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Resistivity Of Various Materials

1. Range of resistivity for metals is

A. $10^{-6}\Omega\text{m to}10^{-4}\Omega m$

B. $10^{-7}\Omega\text{m to}10^{-5}\Omega m$

C. $10^{-8}\Omega\text{m to}10^{-6}\Omega m$

D. $10^{-9}\Omega\text{m to}10^{-7}\Omega m$

Answer: C

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2. Wire bond resistors are made by

A. winding the wires of an alloy viz, Cu,Al,Ag

B. winding the wires of an alloy viz, Si,Tu,Fe

C. winding the wires of an alloy viz, Ge,Au,Gr

D. winding the wires of an alloy viz,magnesium, constantan, nichrome

Answer: D

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3. The resistivity of alloy manganin is

A. Nearly independent of temperature

B. Increases rapidly with increase in temperature

C. Decrease with increase in temperature

D. Increase rapidly with decrease in temperature

Answer: A

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4. Arrange the following materials in increasing order of their resistivity,

Nichrome, Copper, Germanium,Silicon

A. Copper $<$ Nichrome $<$ Germanium $<$ Silicon

B. Germanium $<$ Copper $<$ Nichrome $<$ Silicon

C. Nichrome $<$ Copper $<$ Germanium $<$ Silicon

D. Silicon $<$ Nichrome $<$ Germanium $<$ Copper

Answer: A

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5. What is the order of magnitude of the resistnace of a (dry) human body?

A. 10Ω

B. $10k\Omega$

C. $10M\Omega$

D. $10\mu\Omega$

Answer: B

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6. Two copper wire of length l and 2l have radii, r and 2r respectively. What si the ratio of their specific resistance.?

A. $1:2$

B. $2:1$

C. $1:1$

D. $1:3$

Answer: C

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7. A resistor is marked with the rings coloured brown, balck, green, and gold. The resitance in ohm is

A. $\left(3.5 \times 10^5 \pm 5\,\%\right)$

B. $\left(1.10 \times 10^{5} \pm 10\,\%\right)$

C. $\left(8 \times 10^{6} \pm 5\,\%\right)$

D. $\left(1 \times 10^{6} \pm 5\,\%\right)$

Answer: D

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Temperature Dependence Of Resistivity

1. The resistance of a heating is 99Ω at room temperature. What is the temperature of the element if the resistance is found to be 11Ω (Temperature coefficient of the material of the resistor is $1.7 \times 10^{-4}\ \hat{}\ (2).\, C^{-1}$)

A. $999.9^{\circ} C$

B. $1005.3^{\circ} C$

C. $1020.2^{\circ} C$

D. $1037.1^\circ C$

Answer: D

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2. The resistance of the wire in the platinum resistance thermometer at ice point is 5Ω and at steam point is 5.25Ω. When the thermometer is inserted in an unknown hot bath its resistance is found to be 5.5Ω. The temperature of the hot bath is

A. $100^\circ C$

B. $200^\circ C$

C. $300^\circ C$

D. $350^\circ C$

Answer: B

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3. The resistance of wire in a heater at roo temeperature is $65Oemga.$ When the heater is connected to a $220V$ supply the current settles after a few seconds to 2.8A. What is the steady temperature of the wire. (Temperature coefficient of resistance $\alpha = 1.70 \times 10^{-4}$ ^ $(\circ).C^{-}$)

A. $955^{\circ}C$

B. $1055^{\circ}C$

C. $1155^{\circ}C$

D. $1258^{\circ}C$

Answer: D

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4. A wire has a resistance of $2.5\Omega at 28^{\circ}C$ and a resistance of $2.9\Omega at 100^{\circ}C$. The temperature coefficient of resistivity of material of the wire is

A. $1.06 \times 10^{-3}.^{\circ} C^{-1}$

B. $3.5 \times 10^{-2}.^{\circ} C^{-1}$

C. $2.22 \times 10^{-3}.^{\circ} C^{-1}$

D. $9.95 \times 10^{-2}.^{\circ} C^{-1}$

Answer: C

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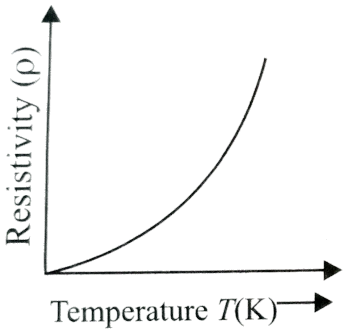
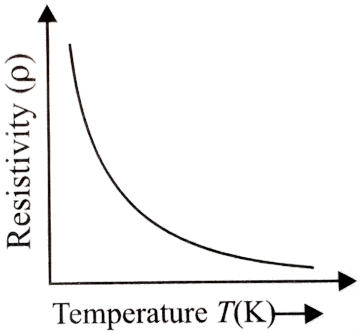
5. Figure (a) and figure (b) both are showing the variation of resistivity (p) with temperature (T) for some materials. Identify the types of these materials.





A. Conductor and semiconductor

B. Conductor and Insulator

C. Insulator and semiconductor

D. Both are conductor

Answer: A

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6. Why are constantan and manganin used for making standard resistances ?

A. temperature independent resistivity

B. very weak temperature dependent resistivity

C. strong dependence of resistivity with temperature

D. mechanical strength

Answer: B

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7. With increase in temperature of the conductivity of

A. metals increases and of semiconductor decreases.

B. semiconductors increases and of metals decreases.

C. in both metals and semiconductors increases

D. in both metals and semiconductor decreases

Answer: B

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Electrical Energy Power

1. A boy has two spare light bulbs in his drawer. One is market 220V and 100W and the other is market 240V and 60W. He tries to decide which of the following assertions are correct?

A. The 60W light bulb has more resistance and therefore burns less brightly

B. The 60W light bulb has less resistance and therefore burns less brightly

C. The 100W light bulb has more resistance and therefore burns more brightly

D. The 100W light bulb has less resistance and therefore burns more brightly

Answer: A

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2. An electric heater is connected to the voltage supply. After few seconds Current gets its steady value then its initial current will be

A. equal to its steady current

B. slightly higher than its steady current

C. slightly less than its steady current

D. zero

Answer: B

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3. If voltage across a bulb rated 220 volt-100 watt drops by 2.5% of its value, the percentage of the rated value by which the power would decrease is

A. 10%

B. 20%

C. 2.5%

D. 5%

Answer: D

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4. Four wires of the same diameter are connected, in turn, between two points maintained at a constant potential difference, Their resistivities and lengths are, ρ and $L(\text{wire } 1) 1.2\rho$ and $1.2L(\text{wire } 2), 0.9\rho$ and $0.9L(\text{wire } 3)$ and ρ and . Rank the wires according to hte rates at which energy is dissipated as heat, greatest first,

A. $4 > 3 > 1 > 2$

B. $4 > 2 > 1 > 3$

C. $1 > 2 > 3 > 4$

D. $3 > 1 > 2 > 4$

Answer: D

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5. A heater coil is rated 100W,200V. It is cut into two identical parts. Both parts are connected together in parallel, to the same sources of 200V. Calculate the energy liberated per second in the new combination.

A. 100J

B. 200J

C. 300J

D. 400J

Answer: D

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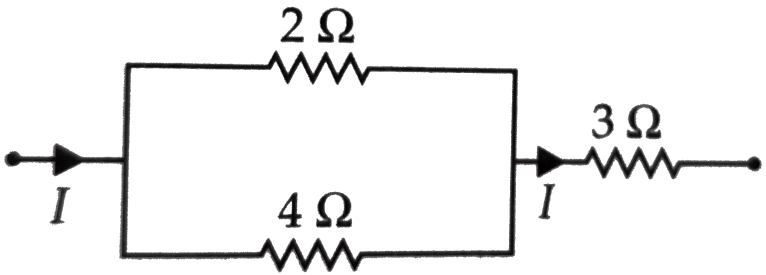
6. In the circuit shown in figure heat developed across $2\Omega, 4\Omega \text{ and } 3\Omega$ resistances are in the ratio



A. $2:4:3$

B. $1:4:27$

C. $4:8:27$

D. $8:4:27$

Answer: D

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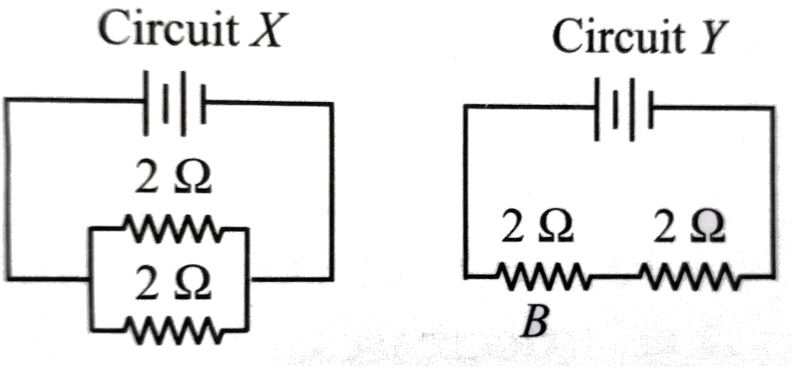
7. Two 2Ω resistances are connected in parallel in the circuit X and in series in circuit Y. The batteries in the two circuits are identical and have zero internal resistance. Assume that the energy transferred to resistor A in circuit X within a certain time is W. The energy transferred to resistor B

in circuit Y in the same time will be



A. $\frac{1}{4}W$

B. $\frac{1}{2}W$

C. 2W

D. 4W

Answer: A

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Combination Of Resistors Series And Parallel

1. In the series combination of two or more than two resistances

A. the current through each resistance is same

B. the voltage through each resistance is same

C. neither current nor voltage through each resistance is same

D. both current and voltage through each resistance are same

Answer: A

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2. Match the Column I with Column II.

Column I		Column II	
(A)	Smallertheresistance greater the current in a circuit	(p)	If the same voltage is applied across a resistance
(B)	Greater or smaller the resistance the current is same	(q)	If the same current is passed
(C)	Greatertheresistance smaller the power	(r)	When resistances are connected in series
(D)	Greatertheresistance greater the power	(s)	When resistances are connected in parallel

A. A -r, B -p, C -q, D -s

B. A -p, B -r, C -q, D -s

C. A -p, B -r, C -q, D -s

D. A -p, B -r, C -q, D -s

Answer: D

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3. Combine three resistors $5\Omega, 4.5\Omega \text{ and } 3\Omega$ in such a way that the total resistance of this combination is maximum

A. 12.5Ω

B. 13.5Ω

C. 14.5Ω

D. 16.5Ω

Answer: A

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4. The total resistance in the parallel combination of three resistances $9\Omega, 7\Omega \text{ and } 5\Omega$

A. 1.22Ω

B. 2.29Ω

C. 4.22Ω

D. 2.02Ω

Answer: D

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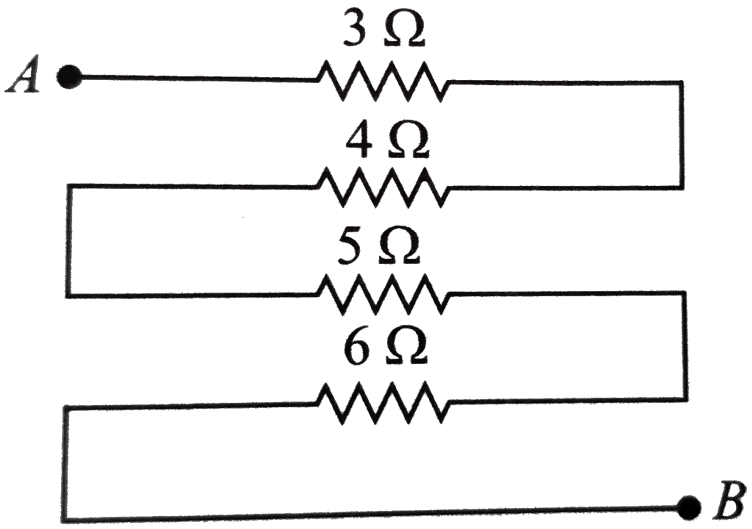
5. Equivalent resistance (in ohm) of the given network is



A. 28

B. 18

C. 26

D. 25

Answer: B

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6. Which arrangement of 3Ω resistors will give a total resistance of 7Ω?

A. (a) 

B. 

C. 

D. 

Answer: D

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7. The equivalent resistance of series combination of four equal resistors is S. If they are joined in parallel, the total resistance is P. The relation between S and P is given by S = nP. Then the minimum possible value of n is

A. 12

B. 14

C. 16

D. 10

Answer: C

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8. Five equal resistances of 10Ω are connected between A and B as shown in figure. The resultant resistance

A. 10Ω

B. 5Ω

C. 15Ω

D. 6Ω

Answer: B

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9. The correct combination of three resistances $1\Omega, 2\Omega \text{ and } 3\Omega$ to get equivalent resistance $\frac{11}{5}\Omega$ is

A. All three are combines in paralle

B. All three are combines in paralle

C. $1\Omega \text{ and } 2\Omega$ in parallel and 3Ω is in series to both

D. $2\Omega \text{ and } 3\Omega$ in parallel and 1Ω is in series to both

Answer: D

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10. Equivalent resistance of the given network between points A and B is

A. $31/5\Omega$

B. $41/5\Omega$

C. $36/5\Omega$

D. $49/5\Omega$

Answer: C

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11. n resistors each of resistance R first combine to give maximum effective resistgance and then combine to give minimum. The ratio of the maximum resistance is

A. n

B. n^2

C. $n^2 - 1$

D. n^3

Answer: B

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12. The equivalent resistance between A and B for . the circuit shown in this figure is

A. 13.1Ω

B. 15.1Ω

C. 17.1Ω

D. 19.1Ω

Answer: A

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13. A copper cylindrical tube has inner radius a and outer radius b. The resistivity is ρ. The resistance of the cylinder between the two ends is

A. $\frac{\rho l}{b^2 - a^2}$

B. $\frac{\rho l}{2\pi(b - a)}$

C. $\frac{\rho l}{\pi(b^2 - a^2)}$

D. $\frac{\pi\left(b^2 - a^2\right)}{\rho l}$

Answer: C

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14. 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. 3Ω

B. $6\pi\Omega$

C. 6Ω

D. $0.6\pi\Omega$

Answer: D

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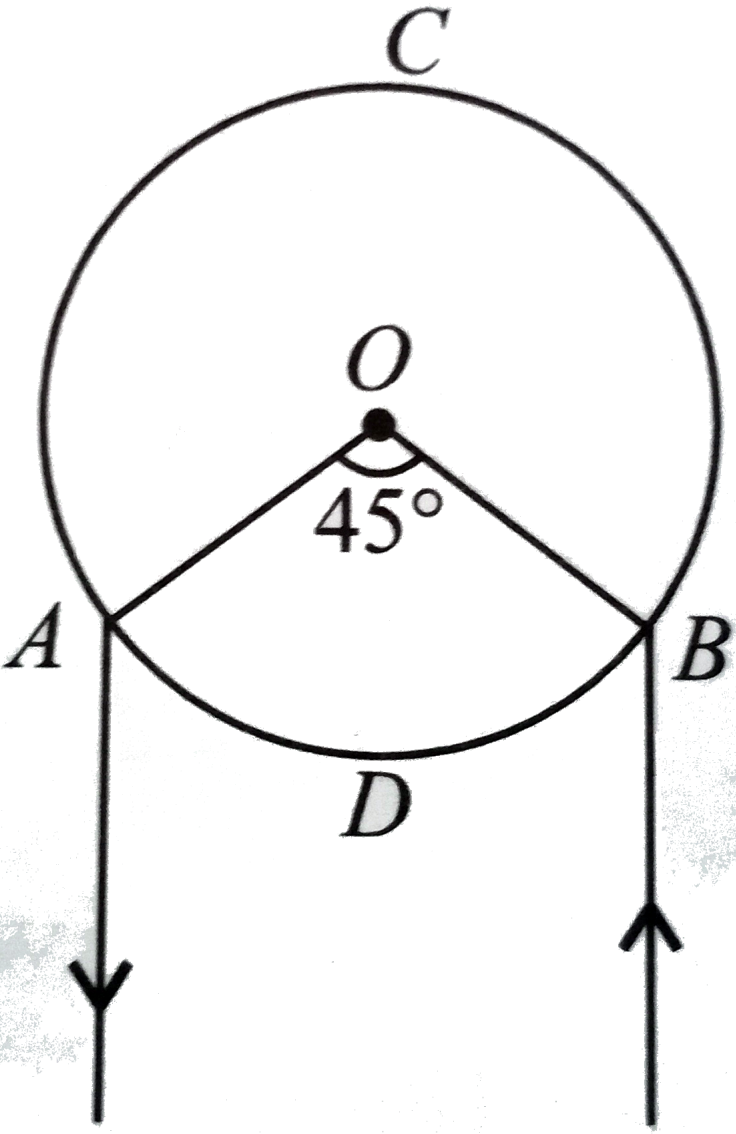
15. A and B are two points on a uniform ring of resistance 15Ω. The $< AOB = 45^\circ$ The equivalent resistance between A and B is



A. 1.64Ω

B. 2.84Ω

C. 4.57Ω

D. 2.64Ω

Answer: A

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16. 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. $\sigma_1 + \sigma_2$

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

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

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

Answer: D

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17. Three resistors $2\Omega, 4\Omega \text{ and } 5\Omega$ are combined in parallel. This combination is connected to a battery of emf 20V and negligible internal Resistance. The total current drawn from the battery is

A. 10A

B. 15A

C. 19A

D. 23A

Answer: C

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18. Three resistors of resistances $3\Omega, 4\Omega \text{ and } 5\Omega$ are combined in parallel. This combination is connected to a battery of emf 12V and negligible internal resistance, current through each resistor in ampere is

A. 4, 3, 2.4

B. 8, 7, 3.4

C. 2, 5, 1.8

D. 5, 5, 8.2

Answer: A

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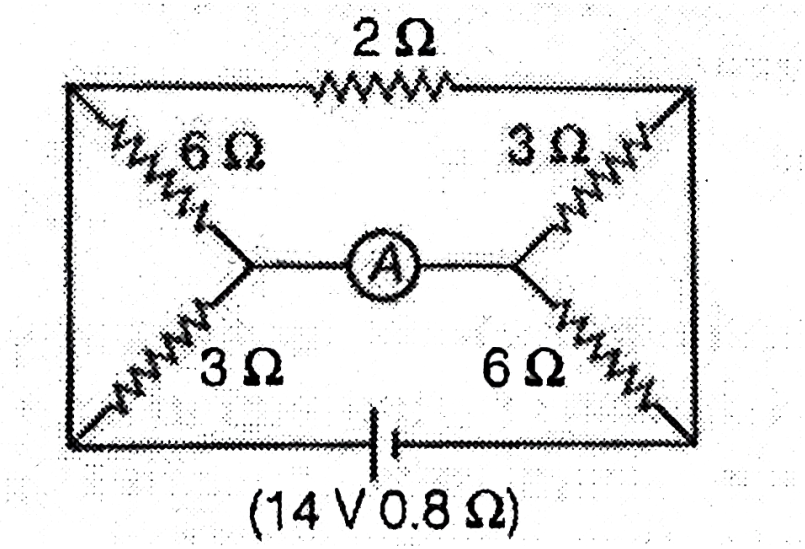
19. The reading of ammeter shown in figure is



A. $6.56A$

B. $3.28A$

C. $2.18A$

D. $1.09A$

Answer: C

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20. Three resistances $2\Omega, 4\Omega, 5\Omega$ are combined in series and this combination is connected to a battery of 12 V emf and negligible internal resistance. The potential drop across these resistances are

A. $(5, 45, 4.36, 2.18)V$

B. $(2, 18, 5.45, 4.36)V$

C. $(4.36, 2.18, 5.45)V$

D. $(2.18, 4.36, 5.45)V$

Answer: D

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21. In the circuit shown in the given figure, the resistances R_1 and R_2 are respectively

A. 14Ω and 40Ω

B. 40Ω and 44Ω

C. 40Ω and 30Ω

D. 14Ω and 30Ω

Answer: A

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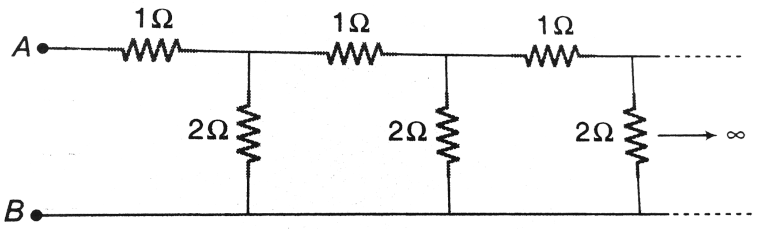
22. An infinite ladder network is constructed with $1\Omega$and 2Ω resistors as shown. Find the equivalent resistance points A and B.



A. 1Ω

B. 2Ω

C. 3Ω

D. 4Ω

Answer: B

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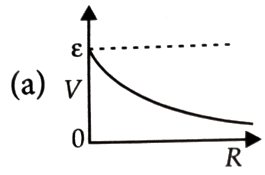
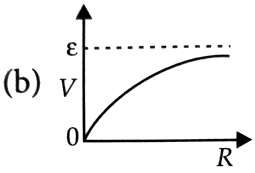
Cells Emf Internal Resistance

1. A cell having an emf E and internal resistance r is connected across a variable external resistance R. As the resistance R is increased, the plot of potential difference V across R is given by

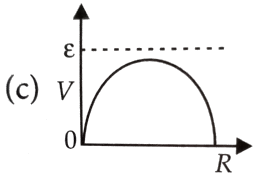
A.



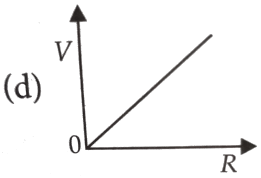
B.



C.



D.



Answer: B

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2. A battery of emf 15 V and internal resistance of 4Ω is connected to a resistor. If the current in the circuit is 2A and the circuit is closed. Resistance of the resistor and terminal voltage of the battery will be

A. $2.5\Omega, 6V$

B. $3.5\Omega, 6V$

C. $2.5\Omega, 7V$

D. $3.5\Omega, 7V$

Answer: D

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3. The battery of a trunk has an emf of 24 V. If the internal resistance of the battery is 0.8Ω. What is the maximum current that can be drawn from the battery?

A. 30A

B. 32A

C. 33A

D. 34A

Answer: A

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4. A battery having 12V emf and internal resistance 3Ω is connected to a resistor. If the current in the circuit is 1A, then the resistance of resistor and lost voltage of the battery when circuit is closed will be

A. $7\Omega, 7V$

B. $8\Omega, 8V$

C. $9\Omega, 9V$

D. $9\Omega, 10V$

Answer: C

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5. When a current of 2 A flows in a battery from negative to positive terminal, the potential difference across it is 12 V. If a current of 3 A flowing in the opposite direction produces a potential difference of 15 V, the emf of the battery is

A. $12.6V$

B. $13.2V$

C. $13.5V$

D. $14.0V$

Answer: B

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6. In a circuit a cell with internal resistance r is connected to an external resistance R. The condition for the maximum current that drawn from the cell is

A. $R = r$

B. $R < r$

C. $R > r$

D. $R = 0$

Answer: D

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Cell In Series And In Parallel

1. In parallel combination of n cells, we obtain

A. more voltage

B. more current

C. less voltage

D. less current

Answer: B

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2. If n cells each of emf E and internal resistance are connected in parallel, then the total emf and internal resistances will be

A. $\varepsilon, \frac{r}{n}$

B. ε, nr

C. $\mathrm{n}\varepsilon, \frac{r}{n}$

D. $\mathrm{n}\varepsilon, nr$

Answer: A

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3. In the series combination of n cells each cell having emf ε and internal resistance r. If three cells are wrongly connected, then total emf and

internal resistance of this combination will be

A. $\mathrm{n}\varepsilon, (nr - 3r)$

B. $(\mathrm{n}\varepsilon - 2r), nr$

C. $(\mathrm{n}\varepsilon - 4\varepsilon), nr$

D. $(\mathrm{n}\varepsilon - 6\varepsilon), nr$

Answer: D

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Wheatstone Bridge

1. In a wheatstone bridge if the battery and galvanometer are interchanged then the deflection in galvanometer will

A. change in previous direction

B. not change

C. change in opposite direction

D. none of these.

Answer: B

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2. 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. 1Ω

B. 2Ω

C. 4Ω

D. 6Ω

Answer: D

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3. Four resistances of $3\Omega, 3\Omega, 3\Omega$ and 4Ω respectively are used to form a Wheatstone bridge. The 4Ω resistance is short circuited with a resistance R in order to get bridge balanced. The value of R will be

A. 10Ω

B. 11Ω

C. 12Ω

D. 13Ω

Answer: C

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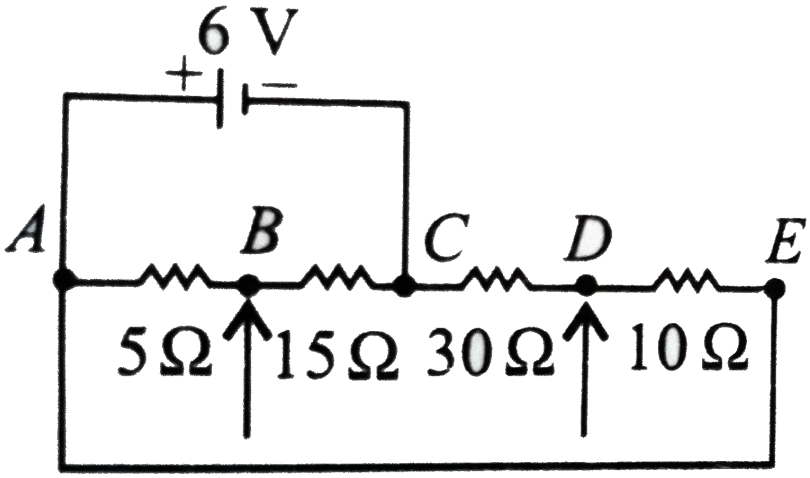
4. Four resistors are connected as shown in the figure. A 6 V battery of negligible resistance is connected across terminal battery of negligible resistance A and C. The potential difference across terminal B and D will

be



A. zero

B. 1.5V

C. 2V

D. 3V

Answer: A

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5. Resistances P, Q, S and R are arranged in a cyclic order to form a balanced Wheatstone's network. The ratio of power consumed in the branches (P+Q) and (R+S) is

A. $1:1$

B. $R:P$

C. $P^2:Q^2$

D. $P^2:R^2$

Answer: B

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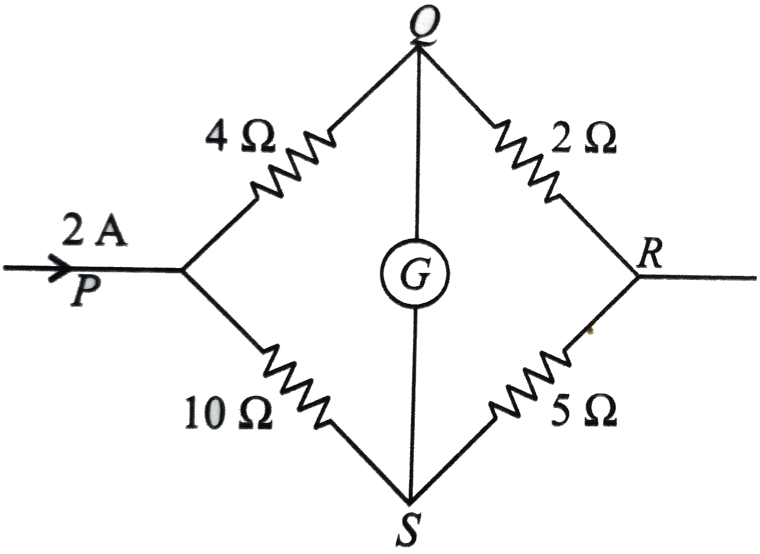
6. In the shown figure, bridge is balanced, the current flowing through 2Ω resistance is



A. $\frac{10}{7}A$

B. $\frac{11}{7}A$

C. $\frac{13}{7}A$

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

Answer: A

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Meter Bridge

1. When a metal conductor connected to left gap of a meter bridge is heated, the balancing point

A. shifts towards right

B. shifts towards left

C. remains unchanged

D. remains at zero

Answer: A

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2. In a meter bridge experiment the ratio of left gap resistance to right gap resistance is $2:3$ the balance point from is

A. 60cm

B. 50cm

C. 40cm

D. 20cm

Answer: C

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3. A wire connected in the left gap of a meter bridge balance a 10Ω resistance in the right gap to a point, which divides the bridge wire in the ratio 3:2. If the length of the wire is 1m. The length of one ohm wire is

A. 0.057m

B. 0.067m

C. 0.37m

D. 0.134m

Answer: B

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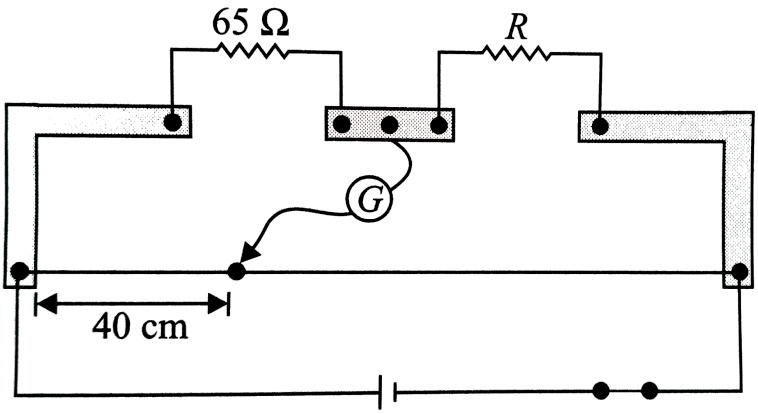
4. What is the value of unknown resistance R, if galvonometer shows null delection in the given meter bridge shows null deflection in the given meter bridge set up?



A. 97.50Ω

B. 105Ω

C. 150Ω

D. 110Ω

Answer: A

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Potentiometer

1. In a potentiometer of 10 wires, the balance point is obtained on the 7^{th}. To shift the balance point to 9^{th} wire, we should

A. decrease resistance in the main circuit.

B. increase resistance in the main circuit.

C. decrease resistance in series the cell whose emf is to be measured.

D. increase resistance in series with the cell whose emf is to be determined

Answer: D

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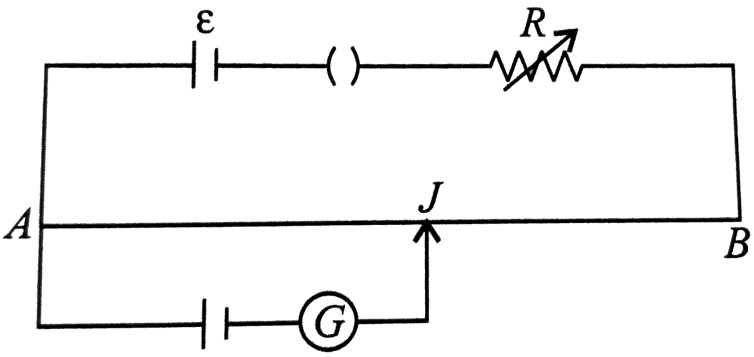
2. AB is wire of potentiometer with the increase in the value of resistance R, the shift in the balance point J will be



A. toward B

B. toward A

C. remains constant

D. first towards B then back towards A

Answer: A

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3. In a poteometer a cell of emf 1.5V gives a balanced point 32cm length of the cell is replaced by another cell then the balance point shifts to 65.0cm the emf of second cell is

A. 3.05V

B. 2.05V

C. 4.05V

D. 6.05V

Answer: A

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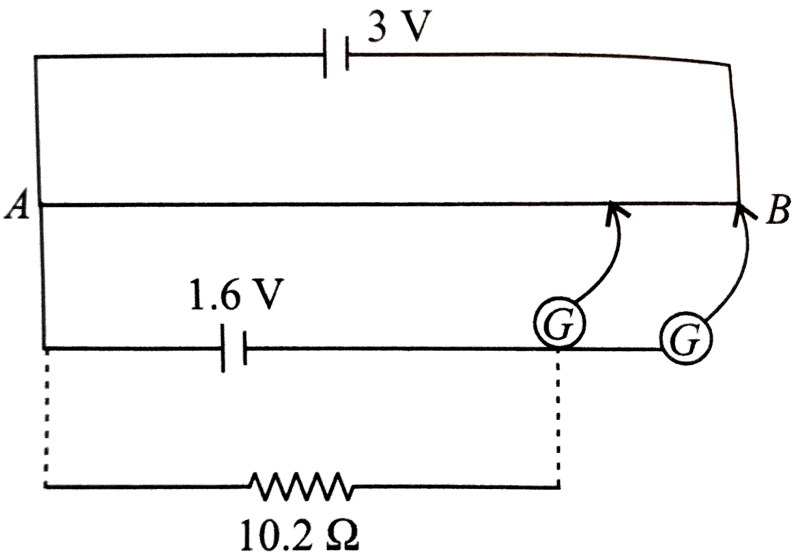
4. 3V poteniometer used for the determination of internal resistance of a 2.4V cell. The balanced point of the cell in open circuit is 75.8cm. When a resistor of 10.2Ω is used in the external circuit of the cell the balance point shifts to 68.3cm length of the potentiometer wire. The internal

resistance of the cell is



A. 2.5Ω

B. 2.25Ω

C. 1.12Ω

D. 3.2Ω

Answer: C

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5. In a potentiometer the balancing with a cell is at length of 220cm. On shunting the cell with a resistance of 3Ω balance length becomes 130cm. What is the internal resistance of this cell.

A. 4.5Ω

B. 7.8Ω

C. 6.3Ω

D. 2.08Ω

Answer: D

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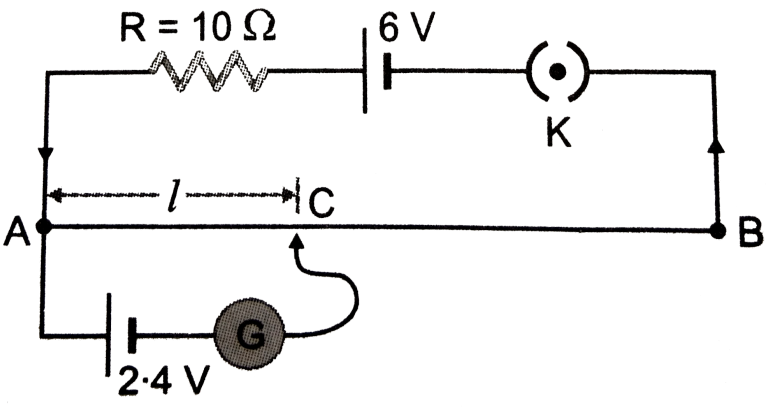
6. The potentiometer wire of length $200cm$ has a resistance of 20Ω. It is connected in series with a resistance 10Ω and an accumulator of emf $6V$ having negligible internal resistance. A source of $2.4V$ is balanced against length 1 of the potentiometer wire. Find the length l of the

potentiometer wire. Find the length l



A. 100cm

B. 120cm

C. 110cm

D. 140cm

Answer: B

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7. A potentiometer wire of length 100 cm has a resistance of 100Ω it is connected in series with a resistance and a battery of emf 2 V and of

negligible internal resistance. A source of emf 10 mV is balanced against a length of 40 cm of the potentiometer wire. what is the value of the external resistance?

A. 790Ω

B. 890Ω

C. 990Ω

D. 1090Ω

Answer: A

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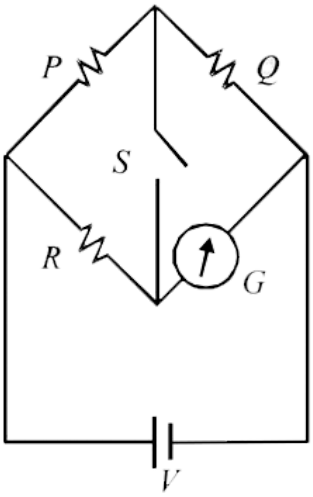
Higher Order Thinking Skills

1. 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

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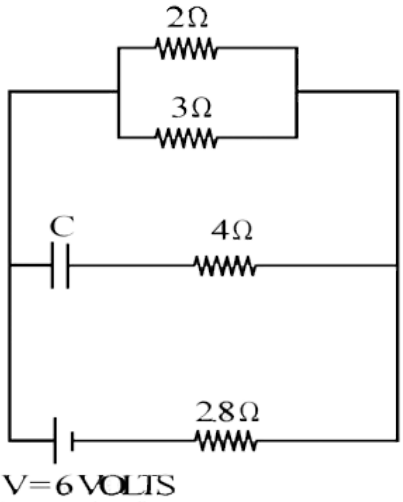
2. Calculate the steady state current in the 2- ohm resistor shown in the circuit in the figure. The intermal resistance of the battery is negligible

and the capacitance of the condenser C is 0.2 microfarad.



A. 0.6A

B. 0.9A

C. 1.2A

D. 0.1A

Answer: B

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3. A straight copper-wire of length $100m$ and cross-sectional area $1.0mm^2$ carries a current $4.5A$. Assuming that one free electron corresponds to each copper atom, find

(a) The time it takes an electron to displace from one end of the wire to the other.

(b) The sum of electrostatic forces acting on all free electrons in the given wire. Given resistivity of copper is $1.72 \times 10^{-8}\Omega - m$ and density of copper is $8.96g/cm^3$.

A. The time taken by an electron to displace from one end of the wire to the other is 4 x 106 s.

B. The sum of electric force acting on all free electrons in the given wire is 1 x 106 N.

C. The time taken by an electron to displace from one end of the wire to the other is 3 x 106 s.

D. Both (b) and (c).

Answer: D

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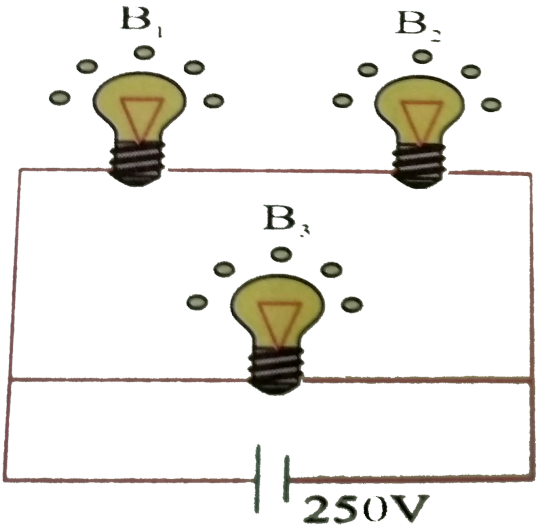

4.

A 100 W bulb B_1 and two 60 W bulbs B_2 and B_3, are connected to a 250V source, as shown in the figure now W_1, W_2 and W_3 are the output powers of the bulbs B_1, B_2 and B_3 respectively then

A. $W_1 > W_2 = W_3$

B. $W_1 > W_2 > W_3$

C. $W_1 < W_2 = W_3$

D. $W_1 < W_2 < W_3$

Answer: D

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5. Two batteries of emf e_1 and e_2 having internal resistance r_1 and r_2 respectively are connected in series to an external resistance R. Both the batteries are getting discharged. The above described combination of these two batteries has to produce a weaker current than when any one of the batteries is connected to the same resistor. For this requirement to be fulfilled

A. $\frac{\varepsilon_2}{\varepsilon_1}$ must not lie between $\frac{r_2}{r_1+R}$ and $\frac{r_1}{r_2+R}$

B. $\frac{\varepsilon_2}{\varepsilon_1}$ must not lie between $\frac{r_2}{r_1+R}$ and $\frac{r_2+R}{r_1}$

C. $\frac{\varepsilon_2}{\varepsilon_1}$ must lie between $\frac{r_2}{r_1+R}$ and $\frac{r_1}{r_2+R}$

D. $\frac{\varepsilon_2}{\varepsilon_1}$ must not lie between $\frac{r_2}{r_1+R}$ and $\frac{r_2+R}{r_1}$

Answer: B

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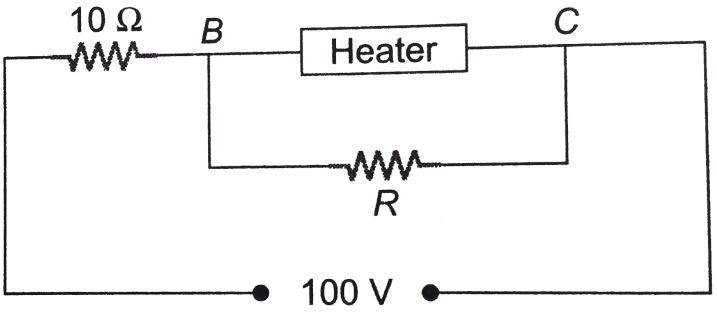
6. A heater is designed to operate with a power of $1000W$ in a $100V$ line. It is connected in combination with a resistance of 10Ω and a resistance R, to a $100V$ mains as shown in figure. What will be the value of R so that the heater operates with a power of $62.5W$?



A. 15Ω

B. 10Ω

C. 5Ω

D. 25Ω

Answer: C

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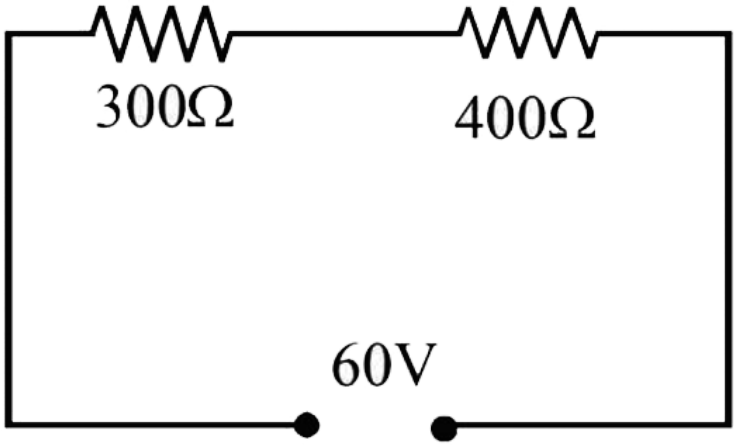
7. State ohm's law.

In the circuit shown in figure, a voltmeter reads 30 volts when it is connected across 400 ohm resistance. Calculate what the same voltmeter will read when it is connected across the 300 ohm resistance.



A. 30V

B. 12.5V

C. 15V

D. 22.5V

Answer: D

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8. It is desired to make a long cylindrical conductor whose temperature coefficient of resistivity at $20^{\circ} C$ will be close to zero. If such a conductor is made by assembling alternate disks of iron and carbon, find the ratio of the thickness of a carbon disk to that an iron disk. $\left(\text{For carbon, } p=3500 \times 10^{-8} \Omega m \text{ and } \alpha=-0.50 \times 10^{-3} .^{\circ} C^{-1} \text{for iron}\right.$

A. 0.36

B. 0.036

C. 1

D. 2

Answer: B

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Ncert Exemplar

1. Consider a current carrying wire (current I) in the shape of a circle. Note that as the current progresses along the wire, the direction of $\vec{J}$ (current density) changes in an exact manner, while the current I remains unaffected. The agent that is essentially responsible for is

A. source of e.mf.

B. electric field produced by charges accumulated on the surface of wire.

C. the charges just behind a given segment of wire which push them just right way by repulsion

D. the charges just behind a given segment of wire which push them just right way by repulsion

Answer: B

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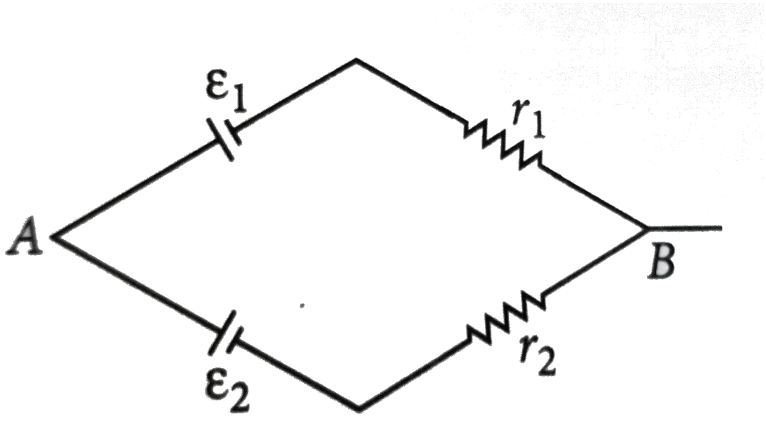
2. Two batteries of emf E_1 and $E_2(E_2 > E_1)$ and internal resistances r_1 and r_2 respectively are connected in parallel as shown in figure.



A. Two batteries of emf E1 and Ei{E2 gt E1) and internal resistances r1 and r2 respectively are connected in parallel as shown in figure.

B. The equivalent emf Eeq is smaller than E

C. Two batteries of emf E1 and Ei{E2 gt E1) and internal resistances r1 and r2 respectively are connected in parallel as shown in figure.

D.

Answer: A

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3. A resistance R is to be measured using a meter bridge. Student chooses the standard 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 following is a useful way?

A. He should measure l1 more accurately.

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

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

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

Answer: C

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

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

B. Toe 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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5. A metel rod of the length 10cm and a rectangular cross-section of 1 cm xx $1/2$ cm is connected to a battery across opposite faces. The resistance will be

A. maximum when the battery is connected across

B. maximum when the battery is connected across

C. maximum when the battery is connected across

D. same irrespective of the three faces.

Answer: A

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6. Which of the follwing characteristies of electrons determines the current in a conductor?

A. Drift velocity alone

B. Thermal velocity alone

C. Boh drift velocity and thermal velocity

D. Neither drift nor thermal velocity

Answer: A

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Assertion And Reason

1. Assertion : Electrons which constitute the current arc negatively charged.

Reason: Current carrying wire is negatively charged.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: C

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2. Assertion : Current can be represented with an arrow

Reason: Current is a vector quantity.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is true but reason is false

D. If both assertion and reason are false.

Answer: C

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3. Assertion : Current flows in a conductor only when there is an external electric field within the conductor.

Reason: The drift velocity of the electrons is directly proportional to the electric field.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: A

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4. Assertion: The bending of an insulated wire increase the resistance of wire

Reason : The drift velocity of electron in this wire decreases

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C.

D. If assertion is true but reason is false.

Answer: D

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5. Assertion: Drift velocity of electrons is independent of time.

Reason: Electrons are accelerated in the presence of electric field.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: B

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6. Assertion: For good conductors, the I-V graph is a perfect straight line inclined to current axis.

Reason: By Ohm's law, voltage across the ends of a conductor is directly proportional to the resistance of the conductor.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: D

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7. Assertion: The resistance of a conductor decreases with increase in cross sectional area.

Reason: On increasing the cross sectional area of a conductor, more current will flow through the conductor.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: A

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8. Assertion : Insulators do no allow flow of current through them.

Reason: Insulators have no free charge carrier

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C.

D. If assertion is true but reason is false.

Answer: A

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9. Assertion: Ohm's law is not valid if current depends on voltage non-linearly.

Reason: Ohm's law is a fundamental law of nature.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: C

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10. Assertion : Electromotive force is a force which helps the electrons to flow and produce current.

Reason : Electromotive force is independent of the voltage across the cell.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: D

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11. Assertion : Some electric appliance have three pins, even though if we remove the top pin, it will continue working.

Reason: The third pin is used only as a safety device.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true

D. If assertion is true but reason is false.

Answer: A

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12. Assertion : Current is passed through a metallic wire, heating it red. Half of its portion is cooled by cold water jacket, then rest of the half portion become more hot.

Reason: Resistances decreases due to decrease in temperature and so current through wire increases.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true

D. If assertion is true but reason is false.

Answer: A

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13. Assertion: Kirchhoff's junction rule can be applied to a juction of several lines or a point in a line.

Reason : When steady current is flowing, there is no accumulation of charges at any junction in series with a galvonometer.

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: A

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14. Assertion : In metre bridge experiment, a high resistance is always connected in series with a galvanometer.

Reason : As resistance increases, current through the circuit increases,

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true

D. If assertion is true but reason is false.

Answer: C

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15. Assertion : Potentiometer is used only to compare potential differences.

Reason: The potentiometer draws current from the voltage source being measured .

A. If both assertion and reason are true and reason is the correct explantion of assertion.

B. If both assertion and reason are true and reason is not the correct explantion of assertion.

C. If assertion is false but reason is true.

D. If assertion is true but reason is false.

Answer: D

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