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PHYSICS

BOOKS - MODERN PUBLICATION

ELECTRIC CURRENT. RESISTANCE AND E.M.F

Example

1. What is the number of electrosn that constitues a current of one ampere?

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2. Estimate the average drift speed of conductio electrons in a copper wire of cross-sectional area $10^{-7}m^2$ carrying a current of 1.5 A, Assume the density of conduction electrosn to be $9 \times 10^{28}m^{-3}$ and change on electio $= 1.6 \times 10^{-19}jC$

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3. A potential difference of 5 V is applied across a conductor of length 0.1 m. If drift velocity of electrons is $2.5 \times 10^{-4} ms^{-1}$, calculate the electron mobility.

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4. Cacculate the resissivity of the amterial of a wire 1.0 m long, 0.4 mm in diameter and having a resistance of 2.0 ohm.

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5. A wrie has a resistance of 7.5Ω at $22^\circ C$ and $15.7\Omega at 175^\circ C$. Determne the temperature coefficient of resistance of the material.

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6. How much current will a heater rated 2.5 kW draw, whe nconnected to a 250 V electric supply?

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7. The resistance of two conductors in seris is 40 hm and their resistance becomes 7.5 ohm, when connected in parallel. Find the resistance of individual conductors.

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8. A battery of e.m.f. 12 V and internal resistance 5Ω is connected to a resistor. If the current through the circuit is 0.3 A, what is the resistance of the resistor? What is the

terminal voltage of the battery, when the circuit is closed?

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9. How many electrons pass through a wire in 2 minutes, If the current passing through wire in 300 mA?

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10. In hydrogen atom, electron revolves around the nucelus along a path of radius $0.51\overset{\circ}{A}$ making 6.8×10^{15} revolutions per second. Calculate the equivalent current. Given that charge on electrno $= 1.6 \times 10^{-19} C$

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11. In a discharge tube the number of hydrogen ions (i.e., protons) drifting across a cross- section per second is 1.0×10^{18}, while

number of electrons drifting in opposite direction across another cross-section is 2.5×10^{18}per second. If the supply voltage is 220 V, what is the effective resistance of the tube ?

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12. Estimate the average drift speed of conductin electrons in a copper wire of cross sectional area $1.0 \times 10^{-7} m^2$carrying a current of 1.5 A. Assume that each copper

atom contributes roughly one conduction electron. The density of copper is $9.0 \times 10^3 kgm^{-3}$ and its atomic mass is 63.5 u.

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13. The number density of electron in copper is $8.5 \times 10^{28} m^{-3}$. Find the current flowing through a copper wire of length 20 cm, area of cross section 1 mm square,when connected to a battery of 3 V. Given the electron mobility =

$4.5 \times 10^{-6} m^2 V^{-1} s^{-1}$ and electron charge = $1.6 \times 10^{-19} C$.

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14. A current of 1.8 A flows through a wire of cross-sectional area $0.5 mm^2$? Find the current density in the wire. If the number density of conduction electrons in the wire is $8.8 \times 10^{28} m^{-3}$, find the drift speed of electrons.

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15. A potential difference of 3V is applied across a conductor of resistance 1.5 Omega. Calculate the number of electrons flowing through it in one second. Given charge on electron, $e = 1.6 \times 10^{-19} C$.

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16. A potential difference of 200 volt is maintained across a conductor of resistance 100ohm. Calculate the number of electrons

flowing through it in one second. Charge on electron $e = 1.6 \times 10^{-19} C$

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17. A wire having a mass of 0.45 kg posseses a resistanfce of 0.014Ω . If the resistivity of the material fo wire is $1.78 \times 10^{-7} \Omega m$, calculate its length and radius. Given that the density of the material of wire is $8.93 \times 10^{3} kgm^{-3}$

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18. A 8 ohm resistance wire is stretched to double its length. Calculate the new resistance of the wire.

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19. Calculate the electrical conductivity of the material of a conductor of length 3m, area of cross section 0.2 mm^2 having a resistance of 2 ohm.

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20. A wire carries a current of 1.2 A when a potential difference of 1.8 V is applied across it. What is its conductance? If the wire is of length 3 m and area of cross-section $5.4 \times 10^{-6} m^2$ calculate its conductivity.

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21. The resistance of a wire is 5 ohm at $50^\circ C$ and 6 ohm at $100^\circ C$. The resistance of the wire at$0^\circ C$

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22. A current of 5.0 A flows through an electric press of resistance 11Ω. Calculate the energy consumed b the press in 5 minutes.

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23. A lamp of 100 W works at 220 volt. What is its resistance and current capacity?

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24. Caculate the number of electrons moving per second through the filament of a lamp of 100 watt, operating at 200 volt. Given, charge on silver. Electron $e = 1.6 \times 10^{-19} C$

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25. A lamp rated 100 W at 220 V is connected to the mains electric supply. What current is drawn from the supply line if the voltage is 220V.

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26. How will you represent a resistance of $3,700\Omega \pm 10\,\%$ by colour code?

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27. A series combination of three resistor takes a current of 2A from a 24 V supply. If the resistors are in the ratio $1:2:3$, find the values f the unknown resistors.

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28. A parallel combination of 3 resistances takes a current of 7.5 A from a 30 V supply. If two resistances are 10Ω and 12Ω, find the third resistances.

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29. A resistor of 5Ω resistance is connected in series with a paralel combination of a number of resis-tors each of 6Ω. If the total resistance

of the combination is 7Ω, how many resistors are in parallel?

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30. A cell of emf E and internal resistance r is connected to two external resistance R_1 and $R_2$and a perfect ammeter. The current in the circuit is measured in four different situations :

(i) without any external resistance in the circuit

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31. A cell of emf E and internal resistance r is connected to two external resistance R_1 and R_2 and a perfect ammeter. The current in the circuit is measured in four different situations :

(ii) with resistance R_1 only

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32. A cell of emf E and internal resistance r is connected to two external resistance R_1 and $R_2$and a perfect ammeter. The current in the circuit is measured in four different situations :

(iii) with R_1 and R_2 in series combination

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33. A cell of emf E and internal resistance r is connected to two external resistance

R_1 and $R_2$and a perfect ammeter. The current in the circuit is measured in four different situations :

(iv) with R_1 and R_2 in parallel combination

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34. Four resistors of 12Ω each are connected in parallel . Three such combinations are then connected in series. What is the total resistance ? If a battery of 9 V emf and negligible internal resistance is connected

across the networks, find the current flowing through of each resistors.

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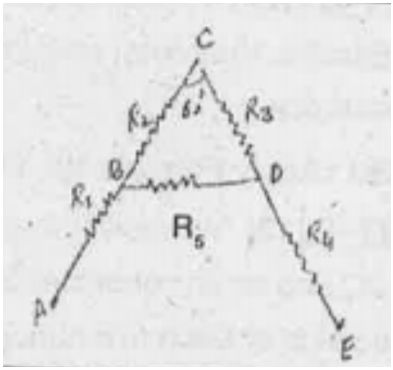
35. A letter .A. consists of a uniform wire of resisrtance .A. one ohm per cm. The sides of the letter are each 20 cm long and crosspiece in the middle is 10cm long, while the apex angle is 60°. Find the resistance of the letter between two ends of the legs A. and E as

shown in figure given below.



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36. When a voltage of 120 V is impressed across the primary of a transformer, the current in the primary is 1.85 mA. Find the voltage across the secondary, when it delivers

150 mA. The transformer has an efficiency of 95 %.

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37. Find the current drawn from a cell of emf 1V and internal resistance $\frac{2}{3}\Omega$ connected to

the network given adjoint.

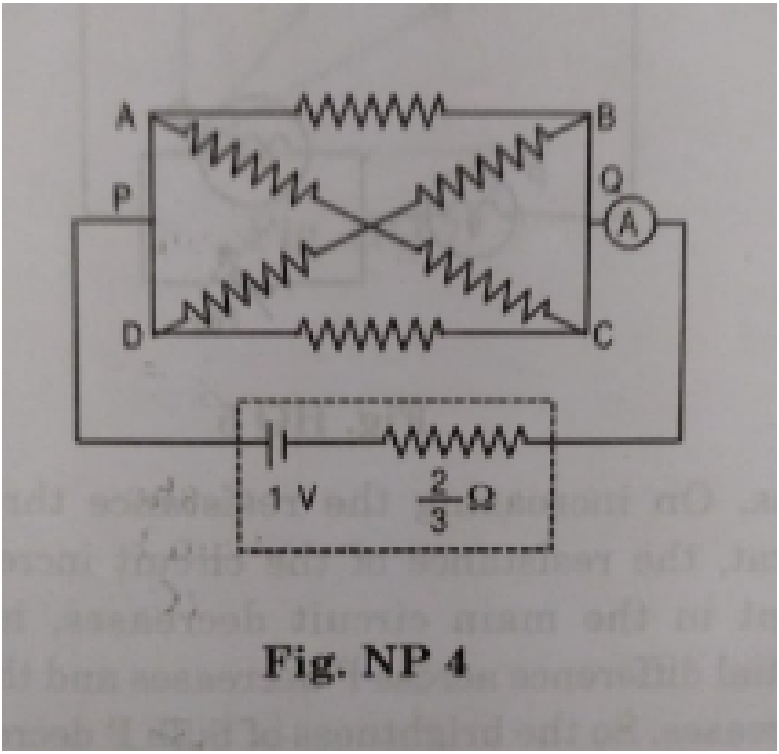

Fig. NP 4

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38. A cell of emf epsilon and internal resistance r gives a current of 0.5 A with an

external resistance of $12\Omega$and a current of 0.25 A with an external resistance of 25Ω. Calculate (a) internal resistance of the cell

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39. A cell of emf ε and internal resistance r gives a current of 0.5 A with an external resistance of $12\Omega$and a current of 0.25 A with an external resistance of 25Ω. Calculate (b) emf of the cell.

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40. Three unequal resistor in parallel are equivalent to a resistance 1Ω If two of them are in the ratio 1:2 and if no resistance value is fractional the largest of the three resistance in ohm .

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41. A uniform wire of resistance $12\Omega$is cut into three pieces in the ratio 1 : 2 : 3 and the three pieces are connected to form a triangle. A cell

of emf 8 V and internal resistance 1Ω is connected across the highest of the three resistors. Calculate the current through each part of the circuit.

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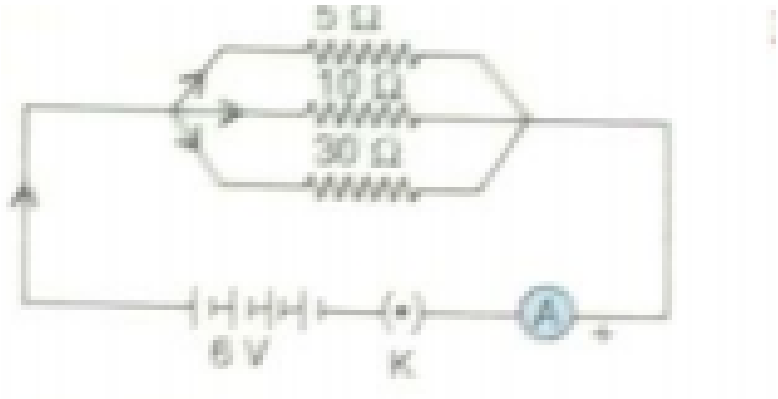
42. For the circuit shown in the diagram: Calculate the total effective resitance of the

circuit.



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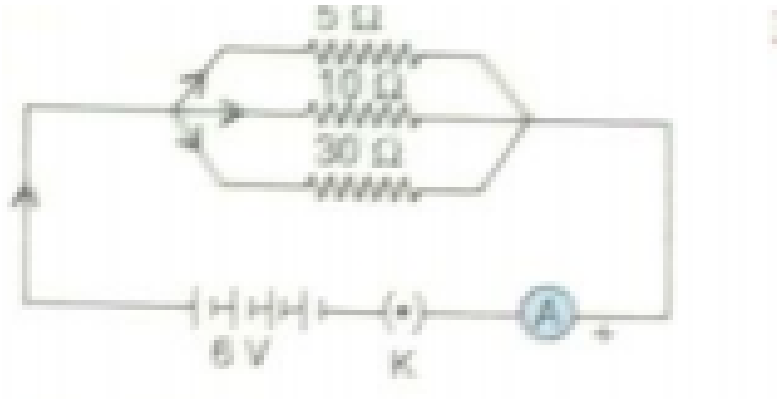
43. For the circuit shown in the diagram:

Calculate the

total current in the circuit.



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44. Three identical cells of emf 4V each and unknown internal resistances are connected in parallel.The combination is connected to 10 ohm resistor. If terminal voltage across the cells is 2V, find internal resistance of each cell.

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45. Two cells of emf 1V and 2V and internal resistance 2 ohm and 1 ohm are connected first in series then in parallel. what should be the external resistance in the circuit so that the current through the resistance be the same in the two cases?

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46. Four identical cells each of emf 2V, are joined in parallel providing supply of current to external circuit consisting of two 15 Omega resistors joined in parallel. The terminal voltage of the cells ae read by an ideal voltmeter is 1.6V. Calculate the internal resistance of each cell.

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47. Two identical cells, whether joined together in series or in parallel give the same current, when connected to an external resistance of 1Ω. Find the internal resistance of each cell.

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48. A set of 4 cells, each of emf 2 V and internal resistance 1.5Ω are connected across an external load of 10Ω with 2 rows, 2 cell sin

each branch. Calculate the current in each branch and potential difference across 10Ω

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49. A hollow copper tube of 5 m length has got external diameter equal to 10 cm and the walls are 5 mm thick . If specific resistance of copper is 1.7×10^{-8} ohm meter. Calculate the resistance of the tube.

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50. A Nichrome wire of resistivity ω is streched to make 10% longer. What is the percentage change in its resistance?

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51. A resistance is made by connecting two wires (series) of same material of radii 2 mm and 5 mm and length 8cm and 5 cm. A potential difference of 22V is applied to them. What is the potential difference on the longer wire?

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52. The resistances of the four sides of square ABCD are $10\Omega, 5\Omega, 7\Omega$ and 3Ω in that order. A resistance of 10Ω is connected in between A and C . Calcualte the equivalent resistance between A and B.

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53. An electric kettle has two coils. When one of these is switched on, the water in the kettle boils in 6 minutes. When the other coil is switched on, the water boils in 3 minutes. If the two coils are connected in series, find the time taken to boil the water in the kettle.

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54. Two sources of equal emf are connected to an external resistance R. The internal

resistance of the two sources are R_1 and $R_2(R_1 > R_1)$. if the potential difference across the source having internal resistance R_2 is zero, then find vlaue of R.

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55. Twelve cells each having the same e.m.f are connected in series and are kept to a closed box. Some of the cell are connected in reverse order .The battery is connected in series with an ammeter an external resistance R and two

cells of the same type as an in the battery .The current when they and support each other is 3 ampere and current is 2 ampare when the two oppose each other. How many cells are connected in servese order ?

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56. 10^{20} electrons, each having a charge of $1.6 \times 10^{-19} C$, pass from a point A towards another point B in 0.1 s. What is the current in ampere ? What is its direction ?

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57. What is conventional current?

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58. What is the direction of conventional current?

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59. What is the significance of direction of electric current?

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60. Define SI unit of current.

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61. Define drift velocity of electricity and establish its relation with velocity of the

electrons and the intensity of applied electric field.

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62. Write down the relation between a coulomb and an ampere.

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63. Give relationship of drift velocity with the current flowing through in conductor.

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64. How does drift velocity of electrons in a metallic conductor vary with the rise of temperature?

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65. Answer the following questions: A steady current flows in a metallic conductor of non-uniform cross-section. Which of these

quantities is constant along the conductor: current, current density, electric field, drift speed?

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66. The potential difference across a given copper wire is increased. What happens to the drift velcoity of the charge carriers?

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67. If the electron drift speed is so small and the electron's charge is small, how can we still obtain large amount of current in a conductor?

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68. Two different wires X and Y of same diameter but different materials are joined in series across a battery. If the number density of electrons in X is twice that in Y, find the

ratio of drift velocity of electrons in the two wires .

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69. Define conductivity of a conductor. Give its S.I. unit?

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70. Define the term mobility of charge carriers in a conductor. Write its SI unit.

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71. State Ohm's law. Write the symbols used in electric circuit to represent voltmeter?

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72. Resistance of a conductor depends on:

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73. What is ohmic device? Give one example.

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74. What is non-ohmic device? Give one example.

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75. Difference between ohmic and non ohmic devices.

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76. What is SI unit of resistivity?

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77. Which material has least value of resistivity.

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78. Resistivities of copper, silver and manganin are $1.7 \times 10^{-8}\Omega m, 1.0 \times 10^{-8}\Omega m$ and $44 \times 10^{-8}\Omega$ m respectively. Which of these is the best conductor?

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79. Show on graph, the variation of resistivity with temperature for a tyical semiconductor.

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80. What is the order of resistivity of an insulator?

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81. If a wire is streched to double its original length without loss of mass, how will the resistivity of the wire be influenced?

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82. A wire of resistivity ρ is stretched to double its length. Then its new resistivity will:

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83. Two wire A & B are of the same metal and are of same length have area of cross section in the ratio of 2:1 If the same potential difference is applied across each wire. What will be the ratio of the current flowing through the wires A & B ?

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84. Two wires A and B are of same metal, have the same area of cross-section and have their lengths in the ratio 2 : 1. What will be the ratio of currents flowing through them respectively when the same potential difference is applied across the length of each of them ?

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85. Draw a graph to show the variation of resistance of a metal wire as a function of its

diameter, keeping length and temperature constant.

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86. Explain how does resistivity of a conductor depend upon

number density n of free electron

relaxation time τ?

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87. Explain how the resistivity of a conductor depends upon relaxation time τ?

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88. Write down the units of resistance, resistivity, conductance and conductivity?

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89. Why conducting wires are made of copper?

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90. How does resistivity of conductor vary with temperature?

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91. Show on graph, the variation of resistivity with temperature for a tyical semiconductor.

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92. Explain with the help of a graph, the variation of conductivity with temperature for a metallic conductor?

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93. How does the conductance of a semiconducting material change with rise in temperature?

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94. What is the effect of rise in temperature on the conductivity of copper and silicon ?

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95. Discuss the effect of temperature on the resistance of a conductor. Hence define the temperature coefficient of resistance. What is the unit of the temperature coefficient of resistance?

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96. Of metal and alloy, which has greater value of temperature coefficient?

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97. Why are alloys used for making standard resistance coils?

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98. Why do we use manganin wire for making standard resistance?

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99. Why are alloys used for making standard resistance coils?

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100. Name any one material having a small value of temperature coefficient of resistance. Write one use of this material.

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101. is the value of temperature coefficient of resistance always positive?

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102. What is a thermistor?

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103. What is a superconductor?

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104. what happens to the resistance of a of a metal wire, when its temperature is reduced to Kelvin zero?

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105. Define electric power and unit of electric power

Watch Video Solution

106. Define electric energy

Watch Video Solution

107. Why are resistance connected in series ?

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108. A wire has a resistance of 90 Ω and it is cut into three pieces having equal lengths. If these are now connected in parallel, find the resistance of the combination so formed.

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109. Given the resistances of $1\Omega, 2\Omega, 3\Omega$, how will be combine them to get an equivalent resistance of (i) $(11/3)\Omega$ (ii) $(11/5)\Omega$, (iii) 6Ω , (iv) $(6/11)\Omega$?

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110. A student obtains resistances 3, 4, 12 and 16 Ohm using only two metallic resistors either separately or joined together. What is the resistance of each of the resistors?

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111. What do you mean by emf of a cell?

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112. What is electromotive force of a cell?

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113. On what factors does the internal resitance of the cell depend?

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114. A resistance R is connected across a cell of emf ε and internal resistance r. A potentiometer now measures the potential difference between the terminals of the cell as V. Write the expression for 'r' in terms of ε, V and R.

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115. A cell of emf 2 V and internal resistance 0.1Ω is connected to 3.9Ω external resistance. What will be the potential difference across the terminals of the cell?

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116. Two identical cells, each of emf E, having negligible internal resistanc,e are connected in parallel with each other across the external

resistance R. What is the current through this resistance?

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117. A low voltage supply from which one needs high currents must have very low internal resistance. Why?

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118. Answer the following questions: A high tension (HT) supply of, say, 6 kV must have a very large internal resistance. Why?

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119. In what respect, does a nearly discharged lead acid secondary cell differ mainly from a freshly charged cell in its emf or in its internal resistance.

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120. A car battery is of 12 V. Eight dry cells of 1.5 V connected in series can give 12 V. But such cells are not used in starting a car. Why?

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121. It is easier to start a car engine on a warm day than on a chilly day. Why?

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122. n cells, each having emf e, are connected in series what is the emf of the combination?

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123. n cells, each having emf. E and internal resistance r are connected in parallel. What is the net internal resistance of the combination?

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124. A large number of free electrons are present in metals. Why is there ni current in the absence of elctric field across it?

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125. Is a wire carrying current charged?

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126. Define the term 'drift velociy' and 'relaxation time' giving their physical significance.

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127. Define average relaxation time. Find the expression of drift velocity in terms of average relaxation time?

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128. Since drift velociy of electrons is very small, how then is current established almost the instant a circuit is closed?

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129. How does drift velocity of electrons in a metallic conductor vary with the rise of temperature?

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130. How does the drift speed of electrons in a metallic conductor vary, when applied potential difference is decreased keeping temperature constant?

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131. How does drift velocity of electrons in a metallic conductor vary with the rise of temperature?

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132. A conductor of length L is connected across a dc source of e.m.f E. If the conductor is replaced by another of the same materials and area of cross-section but of length 5 L, by what factor will the drift velocity change?

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133. In a wire of cross-section radius r, free electrons travel with drift velocity v when a current I flows through the wire. What is the current in another wire of half the radius and

of the same material when the drift velocity is 2v?

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134. Two metallic wires of the same material B, have the same length out cross-sectional area is in the ratio 1:2. They are connected (i) in series and (ii) in parallel. Compare the drift velocities of electrons in the two wires in both the cases (i) and (ii) .

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135. What happens to the dirft velocity (v_d) of electrons and to the resistance (R), if the length of a aconductor is doubled (keeping potential difference unchanged)?

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136. Write mathematical relation between mobility and drift velocity of charge carries in a conductor. Name the mobile charge carries responsible for conduction of electric current

in

an electrolyte?

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137. Write mathematical relation between mobility and drift velocity of cahrge carries in a conductor. Name the mobile charge carries responsible for conduction of electric current in

an ionised gas.

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138. If the current supplied to a variable resistor is constant, draw a graph between voltage and resistance.

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139. The diagram shows a piece of pure semiconductor S, in series with a varaible resistor R and a source of constant voltage V. Would you increase or decrease the value of R to keep the reading of ammeter (A) constant,

when semiconductor S is heated? Give reason.

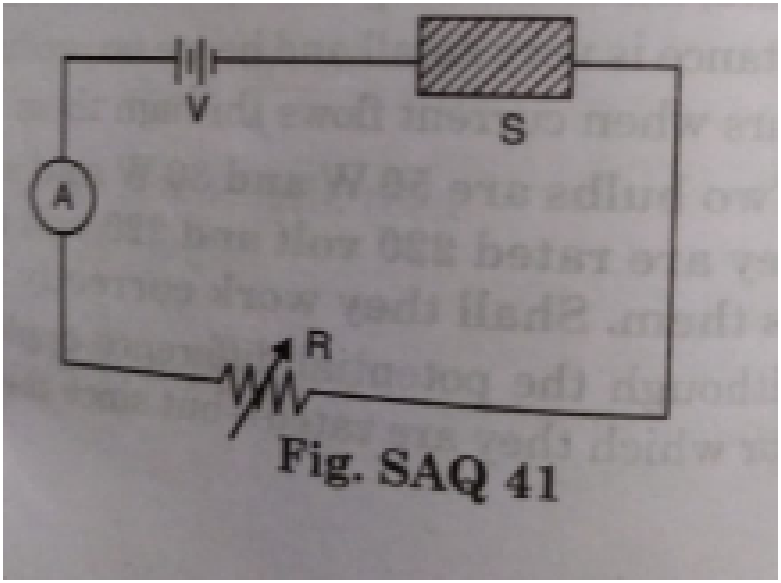

Fig. SAQ 41

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140. State and define S.I. units of potential. Derive dimensional formula of potential difference.

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141. What are ohmic and non-ohmic resistors? Give one example of each.

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142. Define resistivity of a material and discuss the factors on which it depends.

Watch Video Solution

143. Explain how does resistivity of a conductor depend upon

number density n of free electron

relaxation time τ?

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144. Explain how the resistivity of a conductor depends upon relaxation time τ?

Watch Video Solution

145. How does the resistance depend upon the temperature?

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146. Find out the resistivity of a conductor in which a current density $2.5 \times 10^6 Am^{-2}$ is found to exist, when an electric field of 15 V m^-1` is applied on it.

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147. Using the matahematical expression for the conductivity of a material, explain how it varies with temperature for semiconductor

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148. Using the matahematical expression for the conductivity of a material, explain how it varies with temperature for good conductor.

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149. Explain the effect of temperature on the resistivity of pure semiconductors.

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150. What is the value of electrical conductivity of a semiconductor at absolute zero?

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151. A wire of resistance 1Ω is stretched to double its length. What is the new resistance?

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152. Two wires of equal lengths, one of copper and the other of manganin, have the same resistance. Which wire is thicker?

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153. Compare the resistance of two wires of same material. Their lengths are in the ratio 2:3 and their diameters are in the ratio 1:2

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154. A given wire having resistance R is stretched so as to reduce its diameter to half of its previous value. What will be its new resistance?

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155. A potential difference V is applied to a conductor of length L, diameter D. How are electric field E, the drift velocity v_d and the resistance R affected when V is doubled.

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156. A potential difference V is applied to a conductor of length L, diameter D. How are electric field E, the drift velocity v_d and the resistance R affected when L is doubled .

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157. A potential difference V is applied to a conductor of length L, diameter D. How are electric field E, the drift velocity v_d and the resistance R affected when D is doubled ?

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158. Two wires of the same material having lengths in the ratio 1 : 2 and diameters in the

ratio 2 : 3 are connected in series with an accumulator. Compute the ratio of P.D. across the two wires.

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159. Calculate the electrical conductivity of the material of a conductor of length 3m, area of cross section 0.2 mm^2 having a resistance of 2 ohm.

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160. Write the sequence of colours present in a carbon resistor having value of $62 \times 10^4 \Omega \pm 20\ \%$

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161. Write the nature of the material having resistivity of the order of $1.7 \times 10^{-8} \Omega m$

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162. Write the nature of the material having resistivity of the order of $10^{15}\Omega m$ at $0^{\circ}C$.

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163. How does the resistance depend upon the temperature?

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164. Calcualte the temperature at which the resistance of a conductor becomes 20% more than its resistance at $27^{\circ}C$. The value of the temperature coefficient of resistance of the conductor is $2.0 \times 10^{-4}K^{-1}$

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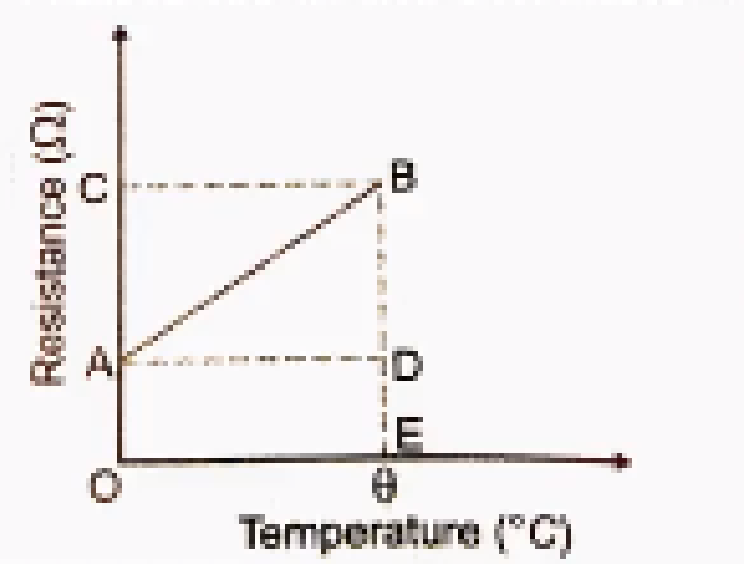
165. The variation of resistance of a metallic conductor with temperature is shown in figure. Calculate the temperature coefficient of

resistance from the graph.



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166. Resistance of a conductor increases with the rise of temperature, because.

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167. The voltage current variation of two metallic wires X and Y at constant temperature are a shown in the figure HQ. 7. Assuming that the wires have the same length and the same diameter explain which of two

wires will have larger resistivity.

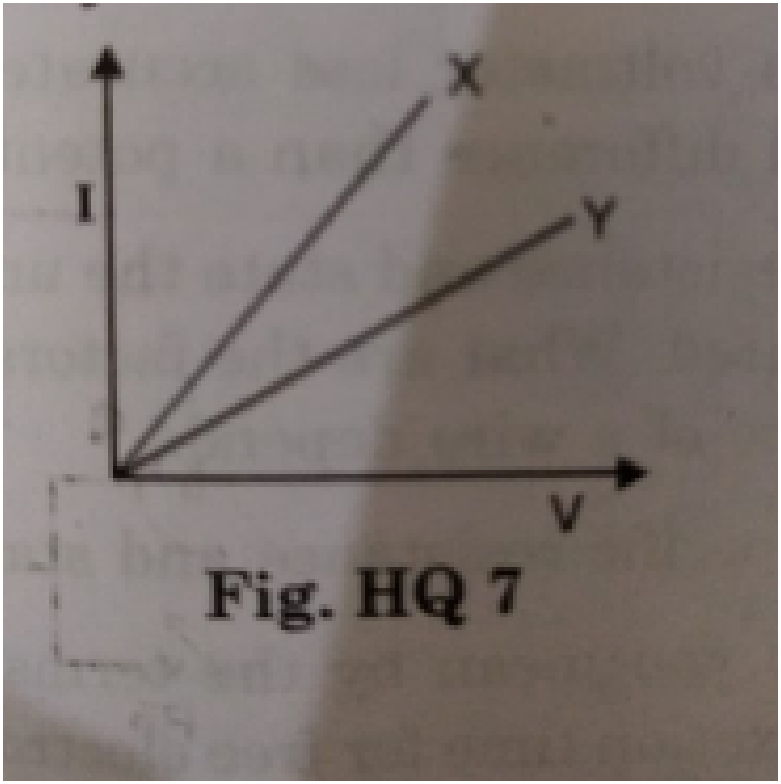

Fig. HQ 7

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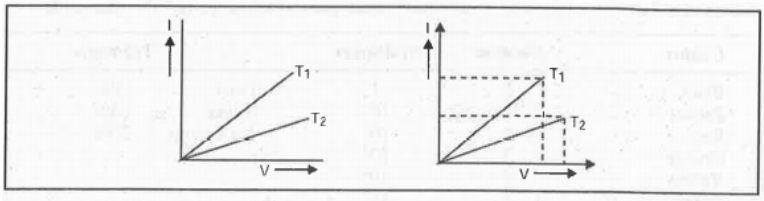
168. V-I graph for a mettalic wire at two different temperatures T_1 and T_2 is as shown in figure. WHich of the temperatures T_1 and T_2 is higher and why.



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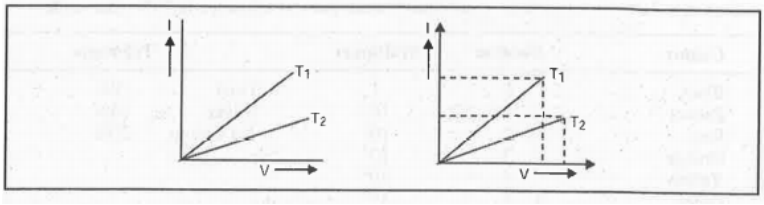
169. V-I graph for a mettalic wire at two different temperatures T_1 and T_2 is as shown

in figure. WHich of the temperatures T_1 and T_2 is higher and why.



Watch Video Solution

170. A piece of copper and another of germanium are cooled from room temperature to 100 K. What will happen to their conductivities? Explain.

Watch Video Solution

171. A piece of copper and another of germanium are cooled from room temperature to 100 K. What will happen to their conductivities? Explain.

Watch Video Solution

172. Same potential difference is applied to a good conductor and a bad conductor of same dimensions. Which one of them will proeduce more heat and why?

Watch Video Solution

173. What is a thermistor? Write its three applications.

Watch Video Solution

174. Mangal's room heater is marked as 1,000 W -200 V. Find the percentage change in the power of the heater, if the voltage drops to 160 V.

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175. Two identical slabs, of a given metal are joined together in two different ways, as shown in figure (i) and (ii). What is the ratio of the resistance of these two combinations?

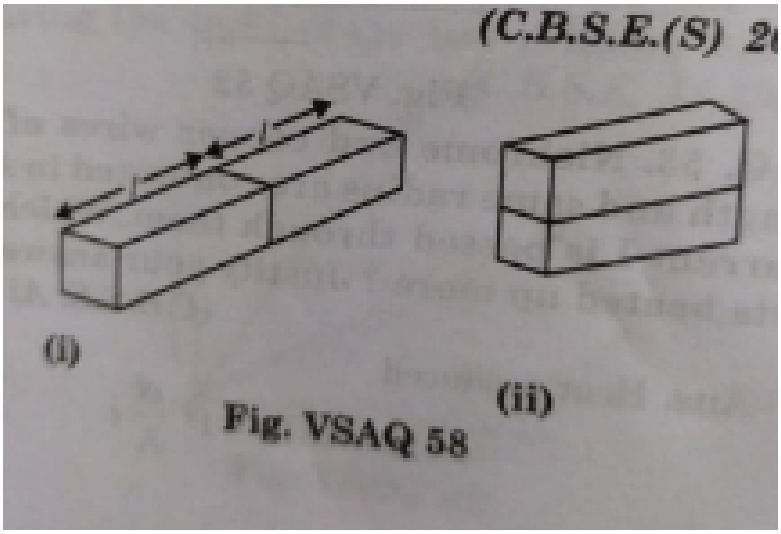

Fig. VSAQ 58

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176. In how many equal parts a wire having resistance of 100Ω be cut, so that we may obtain a resistance of 1Ω by connecting them in parallel?

Watch Video Solution

177. When two resistances are in series, they have value 25Ω and in parallel 4Ω. Find each.

Watch Video Solution

178. You are given n resistors each of resistance r .These are first connected to get minimum resistance .In the secoind case these are again connected differently to get maximum possible resistance. Compute the ratio between the minimum and maximum value of resistance so obtained.

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179. A set of n identical resistors, each of resistance R Omega, when connected in series have an effective resistance X Omega and when the resistors are connected in parallel, their effective resistance is Y Omega. Find the relation between R, X and Y.

Watch Video Solution

180. A cell of emf E and internal resistance r is connected to external resistance R_1 and R_2

and a perfect ammeter. The current in the circuit is measured in four different situations.

without any external resistance in the circuit

with resistance R_1 only

with R_1 and R_2 in parallel combination

with R_1 and R_2 in series combination

the currents measured in the four cases are 0.42 A, 1.05A, 1.4A adn 4.2 A, but not necessarily in that order. Identify the currents corresponding to the four case mentioned above.

Watch Video Solution

181. A cell of emf E and internal resistance r is connected to external resistance R_1 and R_2 and a perfect ammeter. The current in the circuit is measured in four different situations.

without any external resistance in the circuit

with resistance R_1 only

with R_1 and R_2 in parallel combination

with R_1 and R_2 in series combination

the currents measured in the four cases are 0.42 A, 1.05A, 1.4A adn 4.2 A, but not necessarily in that order. Identify the currents

corresponding to the four case mentioned above.

Watch Video Solution

182. A cell of emf E and internal resistance r is connected to external resistance R_1 and R_2 and a perfect ammeter. The current in the circuit is measured in four different situations.

without any external resistance in the circuit

with resistance R_1 only

with R_1 and R_2 in parallel combination

with R_1 and R_2 in series combination

the currents measured in the four cases are 0.42 A, 1.05A, 1.4A adn 4.2 A, but not necessarily in that order. Identify the currents corresponding to the four case mentioned above.

Watch Video Solution

183. A cell of emf E and internal resistance r is connected to external resistance R_1 and R_2 and a perfect ammeter. The current in the

circuit is measured in four different situations.

without any external resistance in the circuit

with resistance R_1 only

with R_1 and R_2 in parallel combination

with R_1 and R_2 in series combination

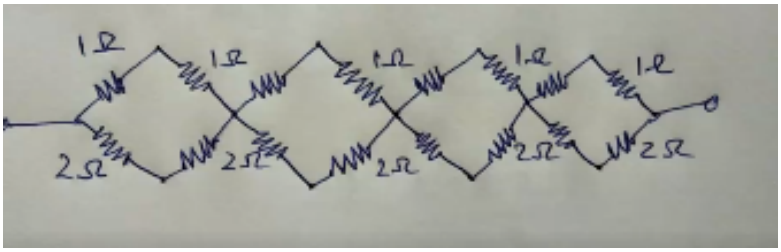
the currents measured in the four cases are 0.42 A, 1.05A, 1.4A adn 4.2 A, but not necessarily in that order. Identify the currents corresponding to the four case mentioned above.

Watch Video Solution

184. You have three resistance of value R each. How will you connect these for obtaining a total resistance of 3 R/2 ? Show this connection by a diagram.

Watch Video Solution

185. Determine the equivalent resistance of the netwerok shown in the figure



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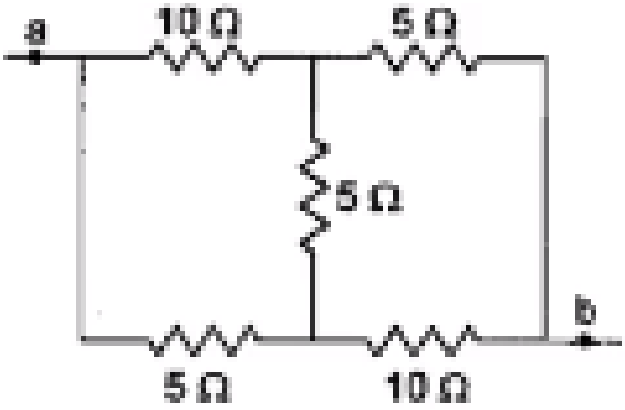
186. A wire of resistance 8Ω is bent in the form of a circle. What is the effective resistance between the ends of a diameter of this circle.

Watch Video Solution

187. Three resistances each of 4 ohm are connected in the form of an equilateral triangle. What is the effective resistance between two corners of the triangle?

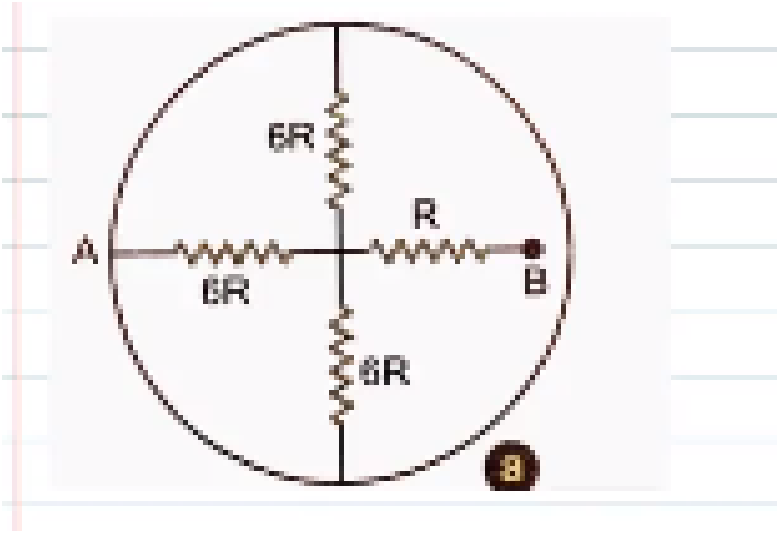
Watch Video Solution

188. What is the equivalent reistance between points A and B of the cirucit shown in the figure



Watch Video Solution

189. A circular ring having negligible resistance is used to connect four resistors of resistances 6 R, 6R, 6R and R shown in the figure. Find the equivalent resistance between points A and B.



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190. A uniform wire of resistance R is shaped into a regular n sided polygon, where n is even. Find the equivalent resistance between opposite corners of the polygon

Watch Video Solution

191. A uniform wire of resistance R is shaped into a regular n sided polygon, where n is even. Find the equivalent resistance between adjacent corners of polygon.

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192. Is internal resistance a defect in the cell?

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193. A secondary cell after long use has an emf of 1.9 V and a large internal resistance of 380Ω. What maximum current can be drawn from the cell? Could the cell drive the starting motor of a car?

Watch Video Solution

194. A battery of e.m.f 6 V is connected to a resistor of 100Ω through an ammeter of resistance 2Ω. If 50 mA current flows through resistor, find the itnernal resistance of the battery.

Watch Video Solution

195. A cell, with finite internal resistance r, is connected across two external resistances

R_1 and $R_2(R_1 > R_2)$, one by one. In which case would the terminal potential difference of the cell more ? Justify your anwer.

Watch Video Solution

196. A battery of e.m.f E and internal resistance r sends a current I_1 and I_2, when connected to an external resitance of R_1 and R_2 respectively. Find the e.m.f and internal resistance o the battery.

Watch Video Solution

197. When a secondary cell of e.m.f 2.0 V is being charged by an external supply, is the terminal voltage of the secondary cell greater or less than 2.0 V?

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198. A cell of e.m.f. E an internal resistance r is connected across an external resistance R. Plot a graph showing the variation of P.D. across R, verses R.

Watch Video Solution

199. A cell of e.m.f. E an internal resistance r is connected across an external resistance R. Plot a graph showing the variation of P.D. across R, verses R.

Watch Video Solution

200. Plot a graph showing the variation of current 'T' versus resistance 'R', connected to a

cell of emf E and internal resistance 'r'.

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201. Three cells of emf 2.0 v, 1.8 V and 1.5 V are connected in series. Their internal resistances are $0.05\Omega, 0.7\Omega \text{ and } 1\Omega$ respectively. If the battery is connected to an external resistor of 4Ωvia a very resistance ammeter, what would be the reading in the ammeter ?

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202. n cells, each having emf. E and internal resistance r are connected in parallel. What is the net internal resistance of the combination?

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203. Give the order of magnitude of atmosopheric current during lightening.

Watch Video Solution

204. Give the order of magnitude of current in the nerves of a human being.

Watch Video Solution

205. Give the order of magnitude of thermal velocity of free electrons in a metal.

Watch Video Solution

206. Give the order of magnitude of drift velocity of electrons in a metal.

Watch Video Solution

207. Give the order of magnitude of resistivity of metals.

Watch Video Solution

208. Give the order of magnitude of resistivity of insulators.

Watch Video Solution

209. If the free electron density of copper is $8.6 \times 10^{28} m^{-3}$ and resistivity of copper at room temperature is $1.7 \times 10^{-6} \Omega cm$, find the relaxation time for the free electrons of copper. Given, mass of electron $= 9.1 \times 10^{-31}$ kg , and charge of electron $= 1.6 \times 10^{-19} C$. Boltzmann's constant $k = 1.38 \times 10^{-23} JK^{-1}$

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210. Resistivity of the material of a conductor of uniform cross-section varies along its length as $\rho = \rho_0(1 + \alpha x)$. Find its resistance if its length is L and area of cross-section is A.

Watch Video Solution

211. A parallel plate capacitor has plates of area A separated by distance 'd' between them. It is filled with a dielectric which has dielectric constant that varies as $K(y) = k_0(1 + \alpha y)$

where ‘y’ is the vertical distance measured from base of the plates. The total capacitance of the system is best given by: $(K_0$is constant)

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212. At $0^\circ C$the resistance of conductor of a conductor B is n times that of condoctor A temperature coefficient of resistance for A and B areα_1 and $\alpha_2$respectively the temperature coefficient of resistance of a circiut segment constant A and B in series

Watch Video Solution

213. It is desired to make a 20.0Ωcoil of wire whose temperature coefficient of resistance is zero. To do this, a carbon resistor of resistance R_1 is placed in series with an iron resistor of resistanceR_2. The proportion of iron and carbon are so chosen that $R_1 + R_2 = 20\Omega$for all temperatures near $20^\circ C$. Find the values of R_1 and R_2. Temperature coefficient of resistance for carbon,

$\alpha_C = -0.5 \times 10^{-3}/^\circ C$ and that of iron is $\alpha_{Fe} = 5 \times 10^{-3}/^\circ C$.

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214. Two conductors have the same resistane at $o^\circ C$ but their temperature coefficiencts of resistance are α_1 and α_2. Find the repective temperature coefficients of their series and parallel combinations.

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215. A 24 V battery of internal resistance 4Ω is connected to a variable resistor. AT what value of the current drawn form the battery is the rate of heat produced in the resistor maximum?

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216. If 2.25×10^{20} electrons pass through a wire in one minute, find the magnitude of the current flowing through the wire.

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217. How many electrons pass through a lamp in 5 minutes, if the current through it is 0.1 A?

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218. A solution of sodium chloride discharges $6.1 \times 10^{16} Na^{+}$ ions and $4.6 \times 10^{6} Cl^{-}$ ions in 2s. Find the current passing through the solution.

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219. An electron moves in a circle of radius 0.15 m with a constant speed of $3.6 \times 10^6 ms^{-1}$. What electric current does this correspond to?

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220. The amount of charge passing through the cross-section of a wire in time t is given by $q = at^2 + bt + c$ what are the dimensional formulae of constant a b and c?

Watch Video Solution

221. The amount of charge passing through the cross-section of a wire in time t is given by $q = at^2 + bt + c$ If the values of constatns a,b,c are 3,5 and2 is SI units, find the value of current at t = 3 s.

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222. A current of 10A is maintained in a conductor of cross-section $10^{-4}m^2$. If the

number density of free electrons be $9 \times 10^{28} m^{-3}$, calcualte the drift velocity of free electrons. Given, charge on electron, $e = 1.6 \times 10^{-19} C$

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223. A current of 5A is passing through a metallic wire of area of cross-section $4 \times 10^{-6} m^2$, If the density of charge carriers of the wire is $5 \times 10^{26} m^{-}3$ find the drift velocity of electrons.

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224. A conductor with a cross-section of $10^{-4}m^2$ carries an electric current of 1.2 A. If the number of the free electrons are $5 \times 10^{28}m^{-3}$, calculate the electron drift velocity. Charge on the electron, $e = 1.6 \times 10^{-19}C$

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225. A copper wire of diameter 1.0 mm carries a current of 0.2 A. Copper has 8.4×10^{28} atoms per cubic metre. Find the drift velocity of electrons, assuming that one charge carrier of 1.6×10^{-19} C is associated with each atom of the metal.

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226. A 10 C charge flows through a wire in 5 minutes. The radius of the wire is 1mm. It

contaisn5×10^{22} electrons pper centimeters^3.

Calculate the current and drift velocity.

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227. What is the drift velocity of electrons in a silver wire of length 1 m, area of cross-section $3.14 \times 10^{-6} m^2$ and carrying a current of 10 A. Given, charge on electron $= 1.6 \times 10^{-19} C$, Avogadro number $= 6.02 \times 10^{23}$ atomic weight of silver = 108 and density of silver $= 10.5 \times 10^3 kgm^{-3}$.

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228. A potential difference of 6 V is applied across a conductor of length 0.12 m. Calculate the drift velcoity of electrons, if the electron mobility is $5.6 \times 10^{-6} m^2 V^{-1} s^{-1}$.

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229. A current of 1 A flows through a wire of length 0.24m and area of cross-section $1.2 mm^2$, when it is conneted to a battery of

3V. Find the number density of free electrons in the wire, if the electron mobility is $4.8 \times 10^{-6} m^2 V^{-1} s^{-1}$, given that charge on electron $= 1.6 \times 10^{-19} C$

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230. A current of 2.4 A flows through a wire of cross-sectional area $1.5 mm^2$. Find the current density in the wire. If the wire contains $8 \times 10^{28} m^{-3}$ elecrtrons per unit volume calculate the average relaxation on time. Given

that charge on electron $= 1.6 \times 10^{-19} C$ and mass of electron $= 9.1 \times 10^{-31} kg$.

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231. An aluminium wire of diameter 0.24 cm is connected in series to a coper wire of diamater 0.16 cm. The wires carry n electric current of 10 A. Find crrent density of free electrons in the aluminium wire.

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232. An aluminium wire of diameter 0.24 cm is connected in series to a coper wire of diamater 0.16 cm. The wires carry n electric current of 10 A. Find drift velocity of electrons in the copper wire. Given that number of density of free electrons in copper $= 8.4 \times 10^{28} m^{-3}$.

Watch Video Solution

233. A potential difference of 10 V is applied across a conducotr of resistance $1k\Omega$. Find the

number of electrons flowing through the conductor in 5 minutes.

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234. A potential difference of 3 V is applied across a conductor of resistance 1.5Ω . Calculate the number of electrons flowing through the conductor in 1 s. Given, charge on electorn , $e = 1. \times 10^{-19} C$

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235. The resistance of 100 cm of a thin strip of a metal is found to be 2.5Ω. The cross-section of the strip is a rectangle of $2mm \times 0.5mm$. Calcualte resistivity of the material fo strip.

Watch Video Solution

236. Calculate the resistivity of the material of a wire 2 m long. 0.4 mm in diameter and having a resistance of 4Ω.

Watch Video Solution

237. A rheostat has 100 turns of a wire of radius 0.4 mm having resistivity $4.2 \times 10^{-7}\Omega$ m. The diameter of each turn is 3 cm. What is the maximum value of resistance it can introduce?

Watch Video Solution

238. Given that resistivity of copper is $1.68 \times 10^{-8}\Omega$ m. Calculate the amount of copper required to draw a wire 10 km long

having resistane 10Ω. The density of copper is $8.9 \times 10^3 kgm^{-3}$

Watch Video Solution

239. If the free electron density of copper is $8.6 \times 10^{28} m^{-3}$ and resistivity of copper at room temperature is $1.7 \times 10^{-6} \Omega cm$, find the relaxation time for the free electrons of copper. Given, mass of electron $= 9.1 \times 10^{-31}$ kg , and charge of electron

$= 1.6 \times 10^{-19} C.$ Boltzmann's constant $k = 1.38 \times 10^{-23} JK^{-1}$

Watch Video Solution

240. A wire has a resistance of 32Ω It is melted and drawn into a wire of half of its original length. Calculate the resistance of the new wire. What si the percentage change in resistance?

Watch Video Solution

241. A copper wire of resistivetly ρ is stretched to make it 5% longer. Find the % change in its resistance.

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242. A wire of strethed by 20% . What is percentage change in its resistance?

Watch Video Solution

243. A wire is of resistance R is stretched, so that its radius decreases b factor n. Calculate its new resistance.

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244. A wire of uniform cross section has a resistance of 9 Omega. It is cut into three equal pieces. Each piece is stretched uniformly to three times its length and all the three stretched pieces are connected in

parallel.Assuming that stretching of wire does not cause any change in density of their material ,calculate the total resistance of the combination described.

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245. Two wires of the same material and length but diameters in the ratio 1:2 are stretched by the same force. The potential energy per unit volume for the two wires when stretched will be radio.

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246. A uniform copper wire of mass $2.23 \times 10^{-3} kg$ carries a current of 1 A when 1.7 V is applied across it. Calculate its length and area of cross-section. If the wire is uniformly stretched to double its length, calculate the new resistance. Density of copper is $8.92 \times 10^{3} kgm^{-3}$ and resistivity is $1.7 \times 10^{-8} \Omega$ m.

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247. Calculate the conductivity of a wire of length 200 cm, area of cross-section $2cm^2$ and of resistane $5 \times 10^4 \Omega$.

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248. Calculate the conductance and conductivity of a wire of resistance 0.01Ω area of cross-section $10^{-4}m^2$ and length 0.1 m.

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249. Calculate the electric field in a copper wire of cross-sectional area $2.0mm^2$ carrying a current of 1 A. The conductivity of copper $= 6.25 \times 10^7 Sm^{-1}$

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250. A wire has a resistance of 10.5Ω at $21^\circ C$ and 16.4Ω at $147^\circ C$. Find the value of coefficient of resistance.

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251. The resistance of a tungsten filament at $150^\circ C$ is 133Ω.What will be its resistance at $500^\circ C$? The temperaturecoefficient of resistance of tungsten at $0^\circ C$ is $0.0045^\circ C^{-1}$

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252. A carbon resistor has three olurs blue, yellow and red respectively. What will be the resistance?

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253. The sequence of bands marked on a carbon resistor are whtie, blue, orange and silver. Write the value of the resistance with tolerance?

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254. A carbon resistor is marked in colour band of red, black, orange and silver. What is the resistance and tolerance value of the resistance?

Watch Video Solution

255. A carbon resistor is marked in colour band of red, black, orange and silver. What is the resistance and tolerance value of the resistance?

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256. The sequence of coloured bands in two carbon resistors R_1 and R_2 are (i) brown,

green, blue. and (ii) orange, black, green Find the ratio of their resistors.

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257. The sequence of coloured bands in two carbon resistors R_1 and R_2 are (i) brown, green, blue. and (ii) orange, black, green Find the ratio of their resistors.

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258. A voltage of 200 V is applied across a colour coded carbon resistor with first, second and third rings of blue, black and yellow colours. What ist he current flowing through the resistor?

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259. A voltage of 60 V is applied across a carbon resistor with first, second and third rings of orange, black and blue colours

respectively. Find the value of current through the resistor?

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260. A carbon of $47k\Omega$ is to be marked with rings of different colours for its identification . Write the sequence of colours.

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261. The value of resistance of a carbon resistor is $100\Omega + 10\,\%$ Write the corresponding band colours of the resistor.

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262. Draw the colour code scheme of $42k\Omega + 10\,\%$ carbon resistance.

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263. Write the sequence of colours in carbon resistor having resistance $25 \times 10^6 \Omega \pm 10\,\%$

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264. Two resistors are in the ratio 1:4. If these are connected in parallel, their total resistance becomes 20Ω. Find the value of each resistance.

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265. The total resistance of two resistors, when connected in series is 9Ω and when connected in parallel, their total resistance ecomes 2Ω. Find the value of each resistance.

Watch Video Solution

266. When two resistances are in series, they have value 25Ω and in parallel 4Ω. Find each.

Watch Video Solution

267. When two resistances are in series, they have value 25Ω and in parallel 4Ω. Find each.

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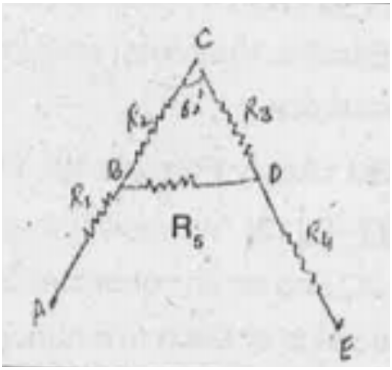
268. A parallel combination of 3 resistances takes a current of 7.5 A from a 30 V supply. If two resistances are 10Ω and 12Ω, find the third resistances.

Watch Video Solution

269. A letter .A. consists of a uniform wire of resisrtance .A. one ohm per cm. The sides of the letter are each 20 cm long and crosspiece in the middle is 10cm long, while the apex angle is 60°. Find the resistance of the letter between two ends of the legs A. and E as shown in figure given below.



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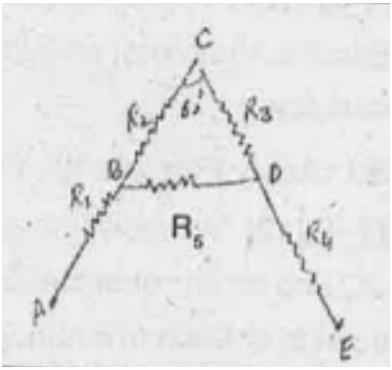
270. A letter .A. consists of a uniform wire of resisrtance .A. one ohm per cm. The sides of the letter are each 20 cm long and crosspiece in the middle is 10cm long, while the apex angle is 60°. Find the resistance of the letter between two ends of the legs A. and E as shown in figure given below.



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271. A storage battery of a car has e.m.f of 12 V. The maximum current that can be drawn from the battery is 24A. Calculate the internal resistance of the battery.

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272. A battery of e.m.f. 10V and internal resistance 3Ω is connected to a resistor. If the current in the circuit is 0.5 A, What is the

resistance of the resistor? What is the terminal voltage of the battery when the circuit is closed?

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273. The e.m.f of a cell is 1.5 V. On conneting a 14Ω resistance across the cel, the terminal potential diference falls to 1.4 V. Calcualte the internal resitsnce of thecell.

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274. Two poles of a cell of em.f 1.5 V are connected to the ends of a 10Ω coil. If current in the circuit in the cirucit is 0.1 A, calculate the interal resistance of the coil.

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275. The e.m.f of Daniel cell is 1.09 V and internal resistance is 2Ω. If the terminals of the cell are joined by a wire of resistance of 18Ω find the potential difference recorded by

a higher resistance voltmeter also connected to the terminals of the cell.

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276. If a battery of e.m.f 6.6 V can supply a current of 3A through a resistance of 1.8Ω, what curent does it supply through another resistance of 2.9Ω. Also calculate internal resistance of the battery.

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277. Two resistance of 6Ω and 12Ω are connected in parallel. Their terminals are conneted to a battery of e.m.f 4.8 V and internal resistance of 2Ω. Find the current supplied by the battery.

Watch Video Solution

278. A resistor is connected to a battery of emf 10 V and internal resistance 0.3Ω. What is the resistance of the resistor to be inserted in the circuit for the circuit current 1.2A?

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279. A cell of e.m.f. 1.5 V and internal resistance 1Ω sends a current through wires of resistance 6Ω and 12Ω connected in parallel. Find the current through each wire.

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280. The potential difference across the terminals of a battery is 8.4 V when there is a

current of 1.50 A in the battery from the negative to the positive terminal. When the current is 3.50 A in, the reverse direction, the potential difference becomes 9.4 V. The internal resistance and e.m.f. battery are:

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281. The potential differnce across the terminals of a 3 V battery is 3.6 V, when it is being charged by a current of 1.5 A. What is the internal resitance of the battery?

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282. A galvanometer, together with an unknown resistance in series, is connected across two identical batteries of each 1.5 V. When the batteries are connected in series,the galvanometer records a current of 1 A, and when the batteries are connected in parallel, the current is 0.6 A. In this case, the internal resistance of the battery

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283. Four identical cells each of emf 2V, are joined in parallel providing supply of current to external circuit consisting of two 5Ω resistors joined in parallel. The terminal voltage of the cells ae read by an ideal voltmeter is 1.6V. Calculate the internal resistance of each cell.

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284. Four identical cells each of emf 2V, are joined in parallel providing supply of current

to external circuit consisting of two 15 Omega resistors joined in parallel. The terminal voltage of the cells ae read by an ideal voltmeter is 1.6V. Calculate the internal resistance of each cell.

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285. Three identical cells each of 2 V and unknow internal resistance are connected in parallel. This combination is connected to a 5 ohm resistor. IF the terminal voltage across

the cell is 1.5 volt, what is the internal resistance of each cell?

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286. Two cells each of e.m.f. 1.1 V and internal resistance 2Ω are joined in parallel with a resistance of 10Ω. Find the curent throught the resistance and through each cell.

Watch Video Solution

287. Three identical cells each of 2 V and unknow internal resistance are connected in parallel. This combination is connected to a 5 ohm resistor. IF the terminal voltage across the cell is 1.5 volt, what is the internal resistance of each cell?

Watch Video Solution

288. Three identical cells each of 2 V and unknow internal resistance are connected in

parallel. This combination is connected to a 5 ohm resistor. IF the terminal voltage across the cell is 1.5 volt, what is the internal resistance of each cell?

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289. Two cells, of e.m.f. 2E and E, and internal resistance 2 r and r respectivley are connected in parallel. Obtain the expression for the equivalent e.m.f and the internal resistance of the combination?

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Exercise

1. What is drift velocity of electrons? How do you explain the flow of current in a conductor based on this?

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2. Derive an expressions between drift velocity of elctron and electric current.

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3. Define drift velocity of electricity and establish its relation with velocity of the electrons and the intensity of applied electric field.

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4. Explain the term drift velocity of electrons. Hence obtain the expression for the current

through the conductor in terms of the drift velocity.

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5. Prove that the current density of a metallic conductor is directly proportional to the drift velocity of electrons.

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6. Define 'relaxation time' in a conductor. Explain how it varies with increase in temperature of a conductor. State the relation between resistivity and relaxation time.

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7. What is the effect of temperature on relaxation time in a metal?

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8. Derive an expression for drift velocity of free electrons in a conductor in terms of relaxation time.

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9. Define relaxation time of the electrons drifting in a conductor. How is it related to the drift velocity of free electrons? Use this relation to deduce the expression for electrical resistivity of the material.

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10. What is drift velocity?

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11. What are ohmic and non-ohmic resistors? Give one example of each.

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12. Deduce Ohm's law using the concept of drift velocity.

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13. Discuss the various situations, which describe the failure of Ohm's law.

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14. Resistance of a conductor depends on:

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15. Resistance of a conductor depends on:

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16. On what factors resistivity of the material depend?

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17. Explain how the resistivity of a conductor depends upon relaxation time τ?

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18. Define 'relaxation time' in a conductor. Explain how it varies with increase in temperature of a conductor. State the relation between resistivity and relaxation time.

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19. Define the term resistivity and write its S.I. unit. Derive the expression for the resistivity in terms of number density of free electrons and relaxation time.

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20. What do you understand by electrical resistivity and give its relation in mass, charge, number density and relaxation time.

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21. Show that the resistance of a conductor is given by:

$$R = \frac{ml}{ne^2\tau A}$$

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22. A conductor of length l is connected to a d.c. source of potential V. If the length of the conductor is tripled by streaching it, keeping V constant, explain how do the following factors

vary in the conductor. 1) drift velocity 2) resistance

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23. Define 'relaxation time' in a conductor. Explain how it varies with increase in temperature of a conductor. State the relation between resistivity and relaxation time.

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24. Define resistivity of a conductor. Explain the variation of resistance with temperature in semiconductors.

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25. Define resistivity and state its SI unit. State and explain how to resitivity of a conductor varies with temperature.

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26. Write the mathematical relation for the resistivity of a material in terms of relaxation time, number density, mass and charge carries in it. Explain using this relation, why the resistivity of a metal increases and that of semiconductor decreases with rise in temperature.

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27. Explain with the help of a graph, the variation of conductivity with temperature for

a metallic conductor?

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28. Explain the variation of conductivity of a metallic conductor with temperature?

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29. Express electrical conductivity in terms of charge, mass, number density and relaxation time.

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30. Define electric power and electric energy. Give their units.

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31. Prove that electric energy (W) consumed in a conductor is given by the formula $W = I^2Rt$

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32. Obtain the formula for the power loss in a conductor of resistance R and carrying a current I.

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33. Explain colour code for carbon resistors giving examples.

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34. What is the need of combining different resistors? What is the resultant resistance when number of resistances are connected in series?

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35. Derive expression for the total resistance of a circuit in which a few resistors are connected in parallel.

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36. What do you mean by internal resiatnce, e.m.f. (electromotive force) and terminal potential difference of a cell?

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37. What is internal resistance of a cell? Derive an expression for it.

Watch Video Solution

38. What do you mean by internal resiatnce, e.m.f. (electromotive force) and terminal potential difference of a cell?

Watch Video Solution

39. What is internal resistance of a cell? Derive an expression for it.

Watch Video Solution

40. What is internal resistance of a cell? Derive an expression for it.

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41. What is the difference between e.m.f. and potential diffrence?

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42. When a battery of e.m.f E and internal resistance r is connected to a resistance R, a current I flows throgh it. Derive a relation between E,I,r and R.

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43. Derive the expression for internal resistance of a cell.

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44. A cell of e.m.f. E an internal resistance r is connected across an external resistance R. Plot a graph showing the variation of P.D. across R, verses R.

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45. A cell of e.m.f. E an internal resistance r is connected across an external resistance R. Plot a graph showing the variation of P.D. across R, verses R.

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46. Obtain the condition fo rmaximum current through a resisitor, when a number of cells are connected in series.

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47. Two cells of e.m.f E_1 and E_2 have internal resistance r_1 and r_2 respectively. What is the corresponding formula for the series combination?

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48. n cells, each having emf. E and internal resistance r are connected in parallel. What is the net internal resistance of the combination?

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49. Show with the help of a diagram, how two cells may be connected in parallel.

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50. Two identical cells, each of emf E, having negligible internal resistanc,e are connected in parallel with each other across the external resistance R. What is the current through this resistance?

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51. A number of identical cells, n , each of e.m.f. E, internal resistance r connected in series are

charged by a d.c. source of e.m.f. E', using a resitor R Deduce the expresison for the charging current and the potential difference across the combination of the cells.

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52. Show that the resistance of a conductor is given by:

$$R = \frac{ml}{ne^2\tau A}$$

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53. State Ohm's law and derive it from the basic ideas of drift velocity of electrons.

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54. Resistance of a conductor depends on:

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55. Explain the effect of temperature on the resistivity of pure semiconductors.

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56. What is the need of combining different resistors? What is the resultant resistance when number of resistances are connected in series?

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57. With the help of a diagram derive the formula for the equivalent resistance of three resistances connected in parallels?

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58. What is the need of combining different resistors? What is the resultant resistance when number of resistances are connected in series?

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59. Why are resistance connected in parallel?

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60. What is the difference between e.m.f. and potential diffrence?

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61. Obtain the condition fo rmaximum current through a resisitor, when a number of cells are connected in series.

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62. Obtain the condition for maximum current through a resistor, when a number of cells are connected in parallel.

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63. Memory cells are

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64. Deduce the condition for obtaining maximum current through an external

resistance, when the cells are mixed grouped.

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