PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

CURRENT ELECTRICITY

Multiple Choice Questions 4 0 Basic Concept

1. The current , which is assumed to be flowing in a circuit from positive terminal to negative, is called

A. electronic current

B. conventional current

C. alternating current

D. pulsating current

Answer: B

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Multiple Choice Questions

1. The carriers of electricity, in a solid conductor, are

A. protons

B. electrons

C. positive ions

D. negative ions

Answer: B

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2. The flow of positive charge, in one direction, is equivalent to the flow of an equal

A. negative charge in the same direction

B. negative charge in the opposite direction

C. positive charge in the same direction

D. positive charge in the opposite direction

Answer: B

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3. No current flows between two charged bodies when connected, if they have the same

A. capacity

B. potential

C. charge

D. none of these

Answer: B

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4. When electric field $\left(\vec{E}\right)$ is applied on the ends of a conductor, the free electrons starts moving in direction

A. similar to E

B. opposite to E

C. perpendicular to E

D. cannot be predicted

Answer: B

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5. The charge carriers, in liquids, are

A. anions

B. cations

C. electrons

D. both 'a' and 'b'

Answer: D

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6. In gases, the carriers of electricity are

A. ions

B. protons

C. neutrons

D. electrons

Answer: A

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7. The charge carriers in semiconductor are

A. electrons

B. holes

C. positive ions

D. both 'a' and 'b'

Answer: D

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8. The charge carriers in a superconductor are

A. holes

B. free electrons

C. coherent pair of electrons

D. both 'a' and 'b'

Answer: C

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9. The rate of flow of electric charge is

A. electric current

B. voltage

C. power

D. resistance

Answer: A

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10. The electric current is a

A. scalar quantity

B. vector quantity

C. unitless

D. none of these

Answer: A

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11. If an electron has an initial velocity in a direction different from that of an electric field, then the path of the electron is

A. parabola

B. circle

C. ellipse

D. straight line

Answer: D

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12. If an electric current is passed through the nerve, the man

A. is excited

B. begins to weep

C. begins to laugh

D. becomes insensitive to pain

Answer: A

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13. In vacuum tubes, the flow of electricity is due to the electrons coming out of

A. ions

B. cathode

C. anode

D. filament

Answer: B

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14. S.I. unit of current is :-

A. ampere

B. stat ampere

C. coulomb

D. henry

Answer: A

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15. If the electronic charge is $1.6 \times 10^{-19}C$, then the number of electrons passing through a section of wire per second, when the wire carries a current of 1A, is

A. 0.625×10^{19}

B. 0.625×10^{17}

C. 1.6×10^{19}

D. 1.6×10^{17}

Answer: A

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16. A conductor carries a current of 300 mA. The number of electrons passing through it in 1 minute are about

A. 1.125×10^{17}

B. 1.125×10^{20}

C. 1.125×10^{23}

D. 1.125×10^{25}

Answer: B

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17. A flow of 10^7 electrons per second in a conducting wire constitutes a current of

A. $1.6 \times 10^{-26} A$

B. $1.6 \times 10^{-12} A$

C. $1.6 \times 10^{12} A$

D. $1.6 \times 10^{26} A$

Answer: B

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18. In a region $10^{19} \propto$ -particles and 10^{19} protons move to the left, while 10^{19} electrons moves to the right per second. The current is

A. 3.2 A towards left

B. 6.4 A towards left

C. 9.6 A towards left

D. 6.4 A towards right

Answer: B

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19. An electron of charge 'e' is revolving in a circular orbit of radius r around a nucleus with speed v. The equivalent current is

A. $2e\pi rv$

B. e vr

C. $\frac{ev}{2\pi r}$

D. zero

Answer: C

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20. An electorn moves in a circle of radius 10cm with a constant speed of $4.0 \times 10^{6} ms^{-1}$.Find the electric current at a point on the circle.

A. $2 \times 10^{-12} A$

B. $1.019 \times 10^{-12} A$

C. $1 \times 10^{-13} A$

D. $1 \times 10^{-14} A$

Answer: B

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21. In 10 minutes, 3000 coulomb of free electrons enter one end of a conductor and 3000 leave the other end. The current is

A. zero

B. $5A$

C. $10A$

D. $30A$

Answer: B

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22. A steady current is passing through a linear conductor of non-uniform cross-section. The net quantity of charge crossing any cross-section per second is.

A. independent of the area of cross section

B. directly proportional to area of cross section

C. directly proportional to length of cross section

D. inversely proportional to length of cross section

Answer: A

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23. An electron carrying a charge of $1.6 \times 10^{-19} C$ revolves in a circle at 10^{16} revolutions per second. The equivalent current is

A. $1.6 \times 10^{-2} A$

B. $1.6 \times 10^{-3} A$

C. $1.6 \times 10^{-4} A$

D. $1.9 \times 10^{-3} A$

Answer: B

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24. Are the paths of free electrons straight lines between successive collisions (with the positive ions of metal wire) in the-

(i) Absence of electric field (ii) Presence of electric field

A. random

B. unidirectional

C. bidirectional

D. circular

Answer: A

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25. A large number of free electrons are present in metals. Why is there no current in the absence of electric field across it, but threre is a current in the presence of electric field?

A. net flow of charge of one direction

B. net flow of charge in two directions

C. no net flow of charge in any direction

D. none of these

Answer: C

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26. The average velocity of electrons in a conductor in the absence of electric field is

A. 10^2m/s

B. 10^{-2}m/s

C. 10^4 m/s

D. 10^{-4} m/s

Answer: C

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27. The direction of conventional current flowing through a metal due to applied potential difference or electric field is

A. opposite direction of flow of electrons

B. in the same direction of field

C. in the same direction of flow of positive charge

D. all of these

Answer: D

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28. A charge of magnitude q flows through the conductor in time 't' . The current through the conductor is

A. $I = q/t$

B. $I = qt$

C. $I = t/q$

D. $I = q^2t$

Answer: A

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29. The velocity with which a free electron in a conductor gets drifted under the influence of the applied electric field is ,

A. average velocity

B. drift velocity

C. thermal velocity

D. all of these

Answer: B

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30. The drift velocity of electron in a metal conductor under effective of elecrtic field applied is

A. 10^2 m/s

B. 10^{-2} m/s

C. 10^4 m/s

D. 10^{-4} m/s

Answer: D

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31. If A is the area of cross section of conductor, e be the charge on the electrons, n be the number of electrons per unit volume and J be the current density then drift velocity of electrons is

A. $v_d = \frac{\mathrm{J}}{\mathrm{n\,e}}$

B. $v_d = J \cdot ne$

C. $v_d = \mathrm{ne}/\mathrm{J}$

D. $v_d = J^2\text{ne}$

Answer: A

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32. If A is the area of cross section of conductor, v_d is the drift velocity of electrons and n is the number of electrons per unit volume, then current density through conductor is

A. ne v_d

B. $\frac{neA}{v_d}$

C. $\frac{nev_d}{A}$

D. $\left(\frac{n}{a}\right)Av_d$

Answer: A

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33. Under the section of electric field, a material is said to be a conductor of electricity if there is flow of

A. same type of charge in or opposite direction of field

B. opposite type of charge in the same direction of field

C. no flow of charge

D. none of these

Answer: A

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34. In conductors, current conduction take place due to

A. electrons moving in the direction of field

B. electrons moving opposite to the direction of field

C. positive ions moving in the direction of field

D. none of these

Answer: B

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35. The direction of conventional current flowing through a metal due to applied potential difference or electric field is

A. same as the direction of field

B. from high potential end to low potential end

C. from low potential end to high potential end

D. both 'a' and 'b'

Answer: D

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36. A conductor of length of l and area of cross section A has n number of electrons per unit volume of the conductor. The total charge carried by the conductor is

A. nA/e

B. $\frac{e}{nAl}$

C. $\frac{nAl}{e}$

D. $n \cdot e$

Answer: A

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37. A conductor of length l and area of cross-section A has n number of electrons per unit volume of the conductor. The current flowing through conductor in time t is given by

A. $I = \frac{nAle}{t}$

B. $I = nAl$

C. $I = \frac{e}{nAlt}$

D. $I = \frac{ne}{t}$

Answer: A

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38. When a current I is set up in a wire of radius r, the drift velocity is v_d. If the same current is set up through a wire of radius 2r, the drift speed will be

A. $0.25v_d$

B. $0.5v_d$

C. $2v_d$

D. $4v_d$

Answer: A

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39. There is a current of 0.21 A in a copper wire of area of cross section $10^{-6} m^2$. If the number of electrons per m^3 is 18.4×10^{28} then the drift velocity is ($e = 1.6 \times 10^{-19} C$)

A. $1.562 \times 10^{-5} m / s$

B. $2 \times 10^{-5} m / s$

C. $0.64 \times 10^{5} m / s$

D. $1 \times 10^{5} m / s$

Answer: A

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40. The speed at which current travels, in a conductor, is nearly

A. 300 m/s

B. $3 \times 10^5 m / s$

C. $3 \times 10^6 m / s$

D. $3 \times 10^8 m / s$

Answer: D

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41. An electron in the hydrogen atom circles around the proton with a speed of 2.18×10^6m/s in an orbit of radius 0.53Å . The equivalent current is

A. $1.048 \times 10^{-2} A$

B. $1.048 \times 10^{-3} A$

C. $1.048 \times 10^{-4} A$

D. $1.058 \times 10^{-4} A$

Answer: B

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42. A potential difference is applied across the ends of a metallic wire. If the potential difference is doubled, the drift velocity will

A. doubled

B. halved

C. quadrupled

D. unchanged

Answer: A

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43. In your city electricity cost 40 paise per kWh. You pay for

A. electric charge

B. electric power

C. electric energy

D. electric current

Answer: C

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44. The electric intesity E, current density j and conductivity σ are related as:

A. $J = \sigma E$

B. $J = \sigma^2 E$

C. $J = \frac{E}{\sigma}$

D. $J = \frac{\sigma}{E}$

Answer: A

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45. The drift velocity of electrons is given by

A. $v_d = \frac{e}{m}\frac{V}{l}t$

B. $v_d = \frac{eVt}{l}$

C. $v_d = \frac{e}{m}t$

D. $v_d = \frac{V}{l}\frac{m}{e}t$

Answer: A

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46. The average time interval between two successive collisions of electrons with the vibrating atom is

A. periodic time

B. relaxation time

C. mean time

D. none of these

Answer: B

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47. Resistivity of a material of conductor in terms of relaxation time is given by

A. $\rho = \dfrac{m}{ne^2 t}$

B. $\rho = mne^2 t$

C. $\rho = \dfrac{ne^2 t}{m}$

D. $\rho = ne^2 t$

Answer: A

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48. Resistivity of a material of a conductor is inversely proportional to

A. number of electrons per unit volume of the conductor

B. relaxation time

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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49. The relaxation time in conductors

A. decreases with increase in temperature

B. increases with increase in temperature

C. decreases with decrease in temperature

D. increases with decrease in temperature

Answer: A

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50. In the absence of electric field, the mean velocity of the electrons in a conductor at absolute temperature

T is

A. zero

B. independent of temperature

C. proportional to $\sqrt{T}$

D. proportional to T

Answer: A

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

A. a fraction of mm/s

B. velocity of light

C. several thousand metres/second

D. A few hundred metres per second.

Answer: A

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52. For ohmic conductor, the drift velocity v_d and the electric field applied across it are related as

A. $v_d \propto \sqrt{E}$

B. $v_d \propto E$

C. $v_d \propto E^{3/2}$

D. $v_d \propto E^2$

Answer: B

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53. An electron is revolving n times per second. The charge passing in t second is

A. net

B. $\frac{ne}{t}$

C. $\frac{nt}{e}$

D. $\frac{et}{n}$

Answer: A

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54. If n, e, τ, m, are representing electron density charge, relaxation time and mass of an electron respectively then the resistance of wire of length 1 and cross sectional area A is given by

A. $\frac{ml}{ne^2tA}$

B. $\frac{2ntA}{ne^2l}$

C. $\frac{ne^2t}{2m}\cdot\frac{A}{l}$

D. $\frac{ne^2m}{2t}\cdot\frac{l}{A}$

Answer: A

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55. The quantity in electricity analogous to friction in linear mechanical motion is

A. resistance

B. potential

C. charge

D. inductance

Answer: A

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56. When a potential difference (V) is applied across a conductor at temperature T, the drift velocity of electrons is proportional to

A. V^{-1}

B. V^2

C. $\sqrt{V}$

D. V

Answer: D

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57. The quantity in electricity analogous to temperature is

A. resistance

B. potential

C. charge

D. inductance

Answer: B

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58. In which property of free electrons causes increase in the resistance of a conductor with rise in temperature ?

A. Number density

B. relaxation time

C. Mass

D. none of these

Answer: D

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

A. relaxation time decreases

B. relaxation time increases

C. electron density increases

D. electron density decreases

Answer: A

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

A. $1.5625 \times 10^{-2} m / s$

B. $1.5625 \times 10^{-23} m / s$

C. $1.5625 \times 10^{3} m / s$

D. $1.5625 \times 10^{-4} m / s$

Answer: A

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61. A source which gives constant potential difference and hence flow of charge is

A. source of e.m.f.

B. source of light

C. source of heat

D. none of these

Answer: A

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62. The energy spent by the cell in circulating unit charge once through the complete circuit is

A. e.m.f of cell

B. terminal potential difference of cell

C. current capacity

D. force

Answer: A

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63. The potential difference across the terminals of the cell in open circuit is called as

A. current

B. pot. diff. of cell

C. e.m.f. of cell

D. resistance

Answer: C

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64. The e.m.f. of a cell is always

A. equal to terminal pot. diff. of a cell

B. greater than pot. diff . of a cell

C. less than pot. diff. of a cell

D. internal resistance of a cell

Answer: B

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65. In S.I. system, unit of electromotive force of a cell is

A. newton

B. dyne

C. volt

D. ampere

Answer: C

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66. The e.m.f. of a cell is independent of

A. quantity of electrolyte

B. distance between the electrodes

C. area of the electrodes

D. all of these

Answer: D

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67. The e.m.f. of a cell depends on

A. neture of plates

B. nature of electrolytes

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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68. What determines the e.m.f. between the two metals placed in an eletrolyte ?

A. quantity of electrolyte

B. Strength of electrolyte

C. Distance between the metal plates

D. Position of metals in electrochemical series

Answer: D

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69. The e.m.f. of a cell is a

A. unit vector

B. zero vector

C. scalar quantity

D. vector quantity

Answer: C

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70. The amount of work done by the cell in sending a unit charge once through the external resistance of the circuit is

A. current

B. resistance

C. e.m.f. of a cell

D. terminal potential difference of a cell

Answer: D

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71. As the current drawn from the cell increases, terminal potential difference of a cell is

A. constant

B. decreases

C. increases

D. none of these

Answer: B

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72. The resistance offered by electrolytic solution of a cell is

A. impedance

B. reactance

C. internal resistance of cell

D. admittance

Answer: C

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73. The value of internal resistance of ideal cell is

A. zero

B. 0.5Ω

C. 1Ω

D. infinity

Answer: A

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74. Internal resistance of a cell depends on

A. distance between the electrodes

B. concentration of electrolyte

C. polarization

D. all of these

Answer: D

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75. A device which converts chemical energy into electrical energy is called

A. electrochemical cell

B. photo cell

C. atomic cell

D. none of these

Answer: A

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76. An arrangement, in which chemical reaction can be proceeded at a steady rate so as to convert chemical energy into electrical energy, is called

A. photo cell

B. atomic cell

C. electric generator

D. electrochemical cell

Answer: D

77. The electric cell is a device to obtain electric energy from

A. electrons

B. electric charge

C. chemical energy

D. electric force

Answer: C

78. Within the electric cell, the charge is transported by

A. free electrons

B. positive ions

C. negative ions

D. both 'b' and 'c'

Answer: D

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79. First electrochemical cell was designed by

A. Galvani

B. Faraday

C. Leclanche

D. Edison

Answer: A

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80. The ability of a cell to supply electric energy is called as

A. resistance of a cell

B. capacity of a cell

C. terminal pot. diff. of a cell

D. all of these

Answer: B

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81. The current capacity of a cell is measured in terms of

A. ampere

B. ampere hour

C. watt

D. watt hour

Answer: B

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82. The current capacity of a charged secondary cell depends upon

A. temperature

B. rate of charging

C. rate of discharging

D. both 'a' and 'b'

Answer: B

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83. A certain electric circuit with a resistance R is supplied power simultaneously from n identical storage batteries. For what internal resistance of the storage batteries will the current in the circuit be the same when they are connected in series and in parallel ?

A. $r = R$

B. $r = 2R$

C. $r = R^2$

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

Answer: A

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84. Two cells , each of $emf E$ and internal resistance r, are connected in parallel across a resistor R. The power delivered to the resistor is maximum if R is equal to

A. $R = \frac{r}{2}$

B. $R = r$

C. $R = 2r$

D. $R = 0$

Answer: A

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85. The relation between current and potential difference is given by

A. Ohm's law

B. Coulomb's law

C. Kirchhoff's law

D. Newton's law

Answer: A

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86. Ohm's law is true for

A. metallic conductor

B. non metallic conductor

C. both 'a' and 'b'

D. none of these

Answer: A

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87. The V - I graph for a conductor makes angle θ with V-axis. Here V denotes voltage and I denotes current. What is the resistance of this conductor?

A. $\sin\theta$

B. $\cos\theta$

C. $\tan\theta$

D. $\cot\theta$

Answer: D

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88. Ohm's law is applicable to

A. metals

B. electrolytes

C. both 'a' and 'b'

D. none of these

Answer: C

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89. Ohm's law is valid, when the temperature of the conductor is

A. constant

B. very high

C. very low

D. varying

Answer: A

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90. When the potential difference applied across a solid conductor is increased, the rate of flow of electrons

A. decreases

B. increases

C. remains same

D. decreases sharply

Answer: B

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91. In case of liquids, the Ohm's law is

A. fully obeyed

B. partially obeyed

C. never obeyed

D. sometimes obeyed

Answer: B

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92. For the validity of Ohm's law, which of following quantity is constant ?

A. Length

B. Temperature

C. Area of cross-section

D. all of these

Answer: D

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93. If the physical state of the conductor remains unchanged then the current through the conductor is directly proportional to potential difference between the ends of a conductor. This is the statement of

A. Ohm's law

B. Laplace's law

C. Lenz's law

D. Kirchhoff's law

Answer: A

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94. Ohm's law is not applicable for

A. vacuum tube devices

B. semiconductors

C. metals

D. both 'a' and 'b'

Answer: D

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95. In a closed circuit, the e.m.f. and internal resistance of the generator are E and r respectively. If the external resistance in the circuit is R, then Ohm's law has the form

A. $I = \frac{E}{Rr}$

B. $I = \frac{E}{R}$

C. $I = \frac{E}{r}$

D. $I = \frac{E}{(R+r)}$

Answer: D

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96. Which of the following is mathematical equation of Ohm's law ?

A. V = IR

B. I = GV

C. $V = I^2 R$

D. both 'a' and 'b'

Answer: D

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97. An external resistance R is connected to a cell of internal resistance r. The current in the circuit is maximum when

A. $R < r$

B. $R > r$

C. $R = r$

D. $R = 2r$

Answer: C

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98. Ohm is the S.I. unit of

A. resistance

B. conductance

C. resistivity

D. capacitance

Answer: A

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99. The reciprocal of resistance is

A. resistivity

B. conductance

C. capacitance

D. inductance

Answer: B

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100. If a potential difference of 1 volt applied across the conductor causes a current of 1 ampere to flow through, it then the resistance of a conductor is a

A. ohm

B. siemen

C. farad

D. henry

Answer: A

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101. S.I. unit of conductance is

A. ohm

B. mho

C. siemen

D. both 'b' and 'c'

Answer: D

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102. The resistance of a conductor depends on its

A. Length

B. area of cross section

C. temperature

D. all of these

Answer: D

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103. The reciprocal of conductivity is called as

A. resistivity

B. specific resistance

C. both 'a' and 'b'

D. none of these

Answer: C

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104. A conductor of length l and area of cross-section A has a resistance R then its specific resistance is

A. $\rho = \frac{RA}{l}$

B. $\rho = RAl$

C. $\rho = \frac{l}{RA}$

D. $\rho = \frac{R^2 A}{l}$

Answer: A

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105. The resistance of the material of unit length and unit area of cross section is

A. specific resistance

B. conductance

C. inductance

D. capacitance

Answer: A

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106. S.I. unit of specific resistance is

A. Ωcm

B. Ωm

C. Ω / m

D. Ω / cm

Answer: B

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107. When the length and area of cross-section both are doubled, then its resistance

A. halved

B. unchanged

C. doubled

D. none of these

Answer: B

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108. The specific resistance of all metals is most affected by

A. temperature

B. pressure

C. degree of illumination

D. applied magnetic field

Answer: A

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109. If 'n' is the number of free electrons in a metallic wire, then the resistance is proportional to

A. $1/n^2$

B. $1/n$

C. n^2

D. n

Answer: B

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110. The example of an ohmic conductor is

A. diode

B. germanium

C. tungsten wire

D. torch bulb

Answer: C

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111. The example for non- ohm ice resistance is

A. diode

B. copper wire

C. filament lamp

D. carbon resistance

Answer: A

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112. A metal wire of cross-sectional area $1mm^2$ contains 5×10^{22} electrons per cm^3 . If the electrons move along the wire with average drift velocity $1mm/s$, then the current in the wire is ($e = 1.6 \times 10^{-19}C$)

A. 8A

B. 4A

C. 2A

D. 1A

Answer: A

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113. A nichrome wire of length 100 cm and area of cross-section $0.5mm^2$ has a resistance of 2.2Ω. The resistivity of nichrome is

A. 110Ω

B. $0.11\Omega m$

C. $121\Omega m$

D. $11 \times 10^{-7} \Omega m$

Answer: D

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114. If a wire of resistance 25Ω is uniformly stretched until its length becomes three times its original length then its new resistance is

A. 100Ω

B. 225Ω

C. 2.25Ω

D. 122.5Ω

Answer: B

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115. The resistance of a wire is 2Ω. The wire is stretched to doubel its length. Now the resistance of the wire will become

A. $0.25R$

B. $0.5R$

C. $2R$

D. $4R$

Answer: D

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116. A certain piece of copper is to be shaped into a conductor of minimum resistance, its length and cross sectional area should be

A. L and A

B. 2L and $\frac{A}{2}$

C. $\frac{L}{2}$ and A

D. $\frac{L}{3}$ and 4A

Answer: D

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117. A wire of 50 cm long, $1mm^2$ in cross-section carries a current of 4 A, when connected to a 2 V battery, the resistivity of wire is

A. $5 \times 10^{-6} \Omega m$

B. $2 \times 10^{-6} \Omega m$

C. $4 \times 10^{-6} \Omega m$

D. $1 \times 10^{-6} \Omega m$

Answer: D

Watch Video Solution

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

A. 2.5Ω

B. $40/3\Omega$

C. 40Ω

D. 100Ω

Answer: C

Watch Video Solution

119. A metallic wire carries a current of 100 A , its area of cross section is $1cm^2$. If the resistivity of the copper is $1.7 \times 10^{-8}\Omega m$, then the electric field strength in the copper will be

A. $1.7 \times 10^{-2} V/m$

B. $2.7 \times 10^{-2} V/m$

C. $1.7 \times 10^{-3} V/m$

D. $2.7 \times 10^{-3} V/m$

Answer: A

Watch Video Solution

120. A wire 1m long has a resistance of 1Ω. If it is uniformly stretched, so that its length increases by 25% then its resistance will increase by

A. 0.25

B. 0.5

C. 0.5625

D. 0.7733

Answer: C

Watch Video Solution

121. In an electric circuit, potential difference across a lamp is 20 V and current through the lamp is 0.5A. The resistance of the lamp is

A. 10Ω

B. 20Ω

C. 30Ω

D. 40Ω

Answer: D

Watch Video Solution

122. A cell of e.m.f. 2 V and internal resistance 2Ω and an external resistance 18Ω forms closed circuit. The current through the circuit is

A. 0.1A

B. 1A

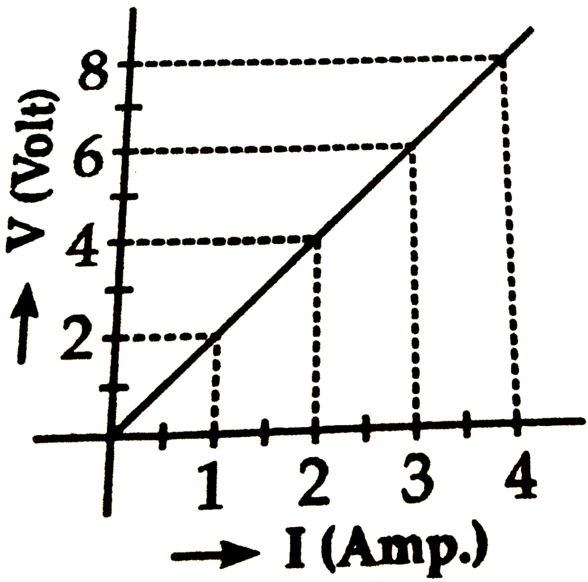
C. 10A

D. 100A

Answer: A

Watch Video Solution

123. Variation of current and voltage in a conductor is shown in the adjoining figure. The resistance of the conductor is



A. 4Ω

B. 2Ω

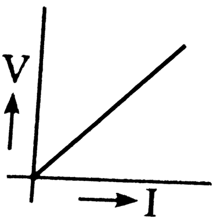
C. 1Ω

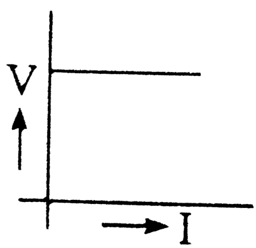
D. 0.5Ω

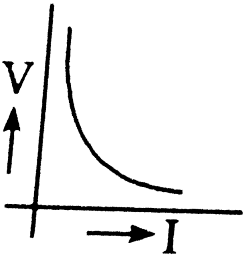
Answer: B

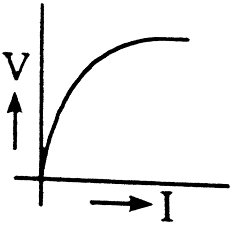
Watch Video Solution

124. Which of the following I-V graph represents ohmic conductors?

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

125. The external diameter of a 5 metre long hollow tube is 10 cm and the thickness of its wall is 5 mm. If the specific resistance of copper be 1.7×10^5 ohm-metre, then determine its resistance.

A. $5.7 \times 10^{-5} \Omega$

B. $2.7 \times 10^{-5} \Omega$

C. $2 \times 10^{-5} \Omega$

D. $5 \times 10^{-5} \Omega$

Answer: A

Watch Video Solution

126. Statement-1 : The temperature coefficient of resistance is positive for metals and negative for p-type semiconductor.

Statement-2 : The effective charge carriers in metals are negatively charged whereas in p-type semiconductor, they are positively charged

A. carbon

B. silicon

C. germanium

D. aluminium

Answer: D

Watch Video Solution

127. Which of the following has negative temperature coefficient of resistance ?

A. Tungsten

B. Carbon

C. Nichrome

D. Platinum

Answer: B

View Text Solution

128. At a temperature of $0^\circ K$, the germanium behaves as

A. conductor

B. super conductor

C. insulator

D. ferromagnetic

Answer: C

Watch Video Solution

129. When the temperature of a metallic conductor is increased, its resistance

A. always decreases

B. always increases

C. may increases or decreases

D. remains constant

Answer: B

Watch Video Solution

130. Thermistors are usually, perpared from

A. insulators

B. semiconductor materials

C. conductor materials

D. none of these

Answer: B

Watch Video Solution

131. Thermistor is

A. an ohmic device

B. a non ohmic device

C. both 'a' and 'b'

D. none of these

Answer: B

Watch Video Solution

132. If temperature is increases, then relaxation time of electrons in metals will

A. increase

B. decrease

C. fluctuate

D. remain constant

Answer: B

Watch Video Solution

133. Thermistors are usually, perpared from

A. metals

B. nonmetals

C. oxides of metals

D. oxides of non metals

Answer: C

Watch Video Solution

134. A typical thermistor can easily measure a change in temperature of the order of

A. $10^{3}.^{\circ}C$

B. $10^{2}.^{\circ}C$

C. $10^{-2}.^{\circ}C$

D. $10^{-3}.^{\circ}C$

Answer: D

Watch Video Solution

135. The algebraic sum of currents at junction points in any electric circuit is equal to

A. zero

B. infinity

C. both a and b

D. none of these

Answer: A

Watch Video Solution

136. The mathematical equation of Kirchhoff's current law is

A. $\sum I = 0$

B. $\sum IR = 0$

C. $\sum E + \sum IR = 0$

D. $\sum E = 0$

Answer: A

137. $\Sigma IR = \Sigma E$ is the mathematical equaiton of

A. Kirchhoff's current law

B. Kirchhoff's voltage law

C. New ton's law

D. Ohm's law

Answer: B

Watch Video Solution

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

A. charge

B. energy

C. momentum

D. all of these

Answer: A

Watch Video Solution

139. Kirchhoff's second law is based on law of conservation of

A. charge

B. energy

C. momentum

D. current

Answer: B

Watch Video Solution

140. Kirchhoff's second law is based on law of conservation of

A. mass

B. momentum

C. energy

D. all of these

Answer: C

Watch Video Solution

141. Kirchhoff's law are used to calculate the current in

A. simple circuits

B. complicated circuits

C. parallel circuit

D. none of these

Answer: B

Watch Video Solution

142. A stready current i is flowing through a conductor of uniform cross-section. Any segment of the conductor has

A. negative charge

B. positive charge

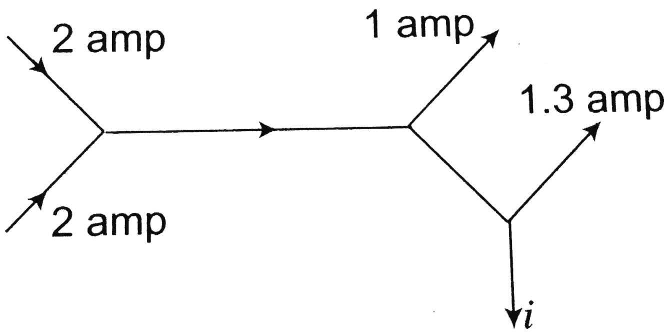
C. zero charge

D. none of these

Answer: C

Watch Video Solution

143. The figure below shows current in a part of electric circuit. The current i is



A. 1.7A

B. 3.7A

C. 1.3A

D. 1A

Answer: A

Watch Video Solution

144. Sign conventions used to apply Kirchhoff's current law are

A. entering and leaving currents are positive

B. entering and leaving currents are negative

C. entering currents are positive and leaving currents are negative

D. all of these

Answer: C

Watch Video Solution

145. Twelve wires, each of resistance 6Ω are connected to form a cube. The effective resistance between two diagonally opposite corners of the cube is

A. 6Ω

B. 12Ω

C. 5Ω

D. 10Ω

Answer: C

Watch Video Solution

146. There are n similar conductors each of resistance R . The resultant resistance comes out to be x when connected in parallel. If they are connected in series, the resistance comes out to be

A. n^2R

B. nR

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

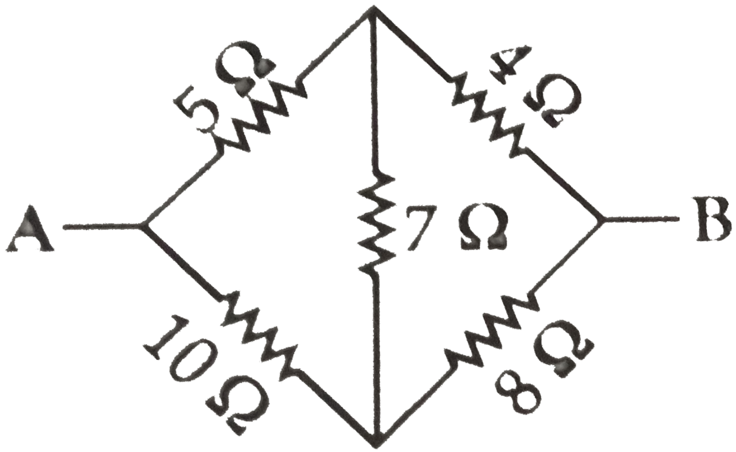
D. $\frac{R}{n^2}$

Answer: A

Watch Video Solution

147. Five resistances are connected as shown in figure.

The effective resistance between A and B is



A. $\frac{10}{3}\Omega$

B. $\frac{20}{3}\Omega$

C. 15Ω

D. 6Ω

Answer: D

Watch Video Solution

148. The Total resistance when connected in series in 9Ω and when connected in parallel is 2Ω The value of two resistance are

A. 2Ω and 9Ω

B. 3Ω and 6Ω

C. 3Ω and 9Ω

D. 2Ω and 6Ω

Answer: B

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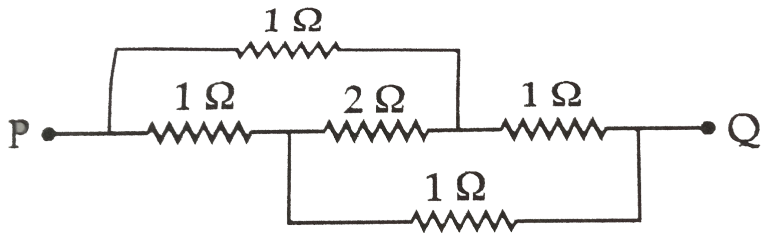
149. The equivalent resistance across P and Q in the given electric circuit will be



A. 1Ω

B. 2Ω

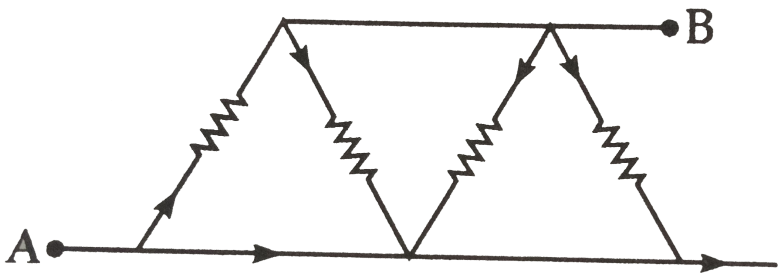
C. 3Ω

D. 5Ω

Answer: A

Watch Video Solution

150. In the diagram below each resistance is of 1Ω. The total resistance between A and B is



A. $3/8\Omega$

B. $3/5\Omega$

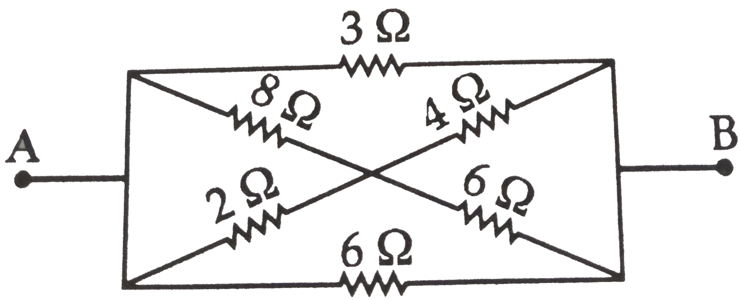
C. $2/8\Omega$

D. $5/7\Omega$

Answer: C

Watch Video Solution

151. In the adjoining figure, the equivalent resistance between A and B is



A. $17/24\Omega$

B. $4/3\Omega$

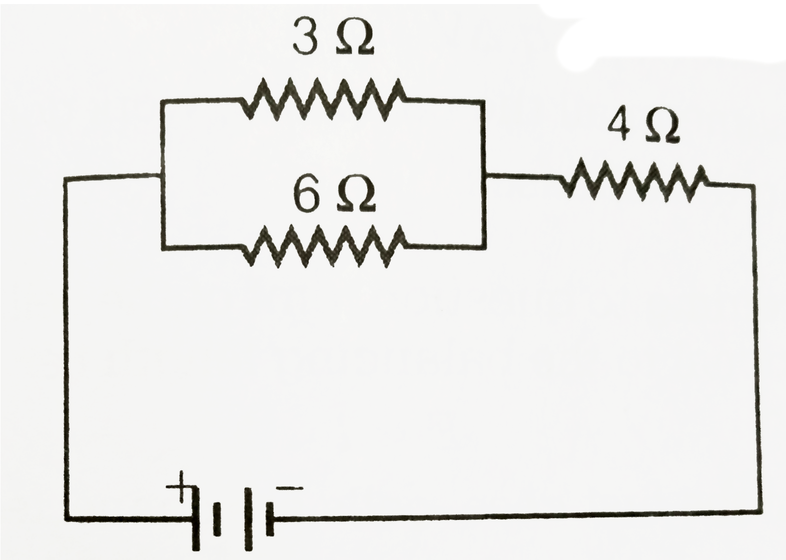
C. 29Ω

D. $24/17\Omega$

Answer: B

Watch Video Solution

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



A. 9.6V

B. 4.8V

C. 2.6V

D. 1.2V

Answer: B

Watch Video Solution

153. Resistors of 1, 2, 3 ohm are connected in the form of a triangle. If a 1.5 volt cell of negligible internal resistance is connected across 3 ohm resistor, the current flowing through this resistance will be

A. 0.25A

B. 0.5A

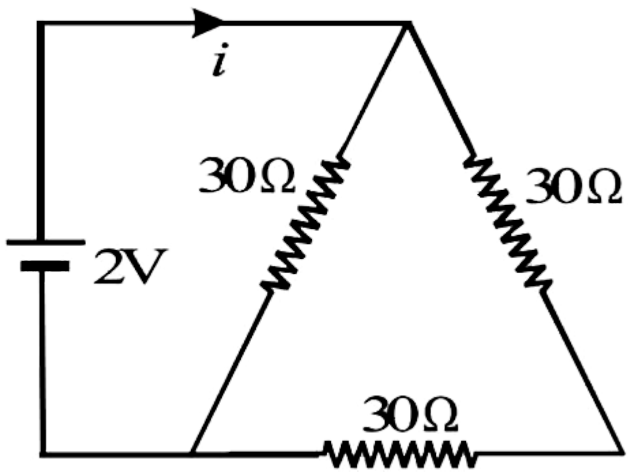
C. 1.0A

D. 1.5A

Answer: B

Watch Video Solution

154. The current I in the circuit is



A. $1/45A$

B. $1/15A$

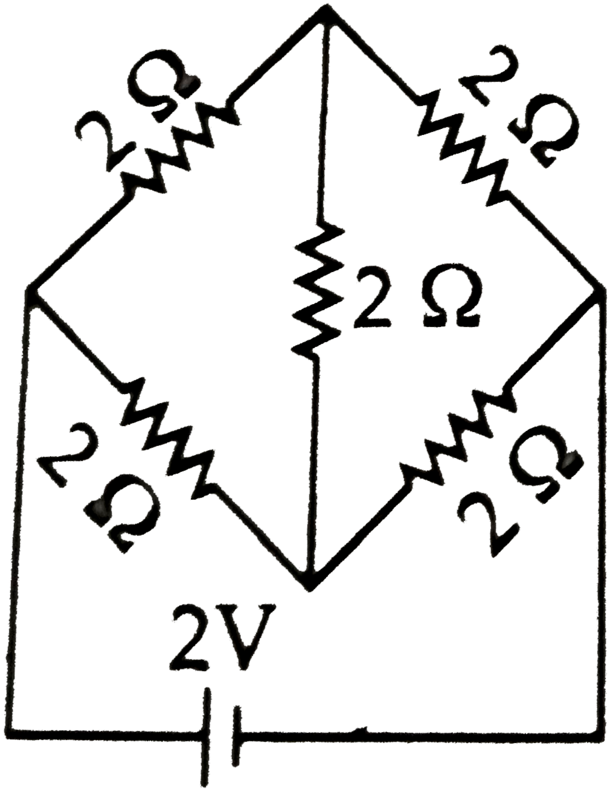
C. $1/10A$

D. $1/5A$

Answer: C

Watch Video Solution

155. In the circuit shown below the current flowing from the battery is



A. 0.5A

B. 1A

C. 2A

D. 2.25A

Answer: B

Watch Video Solution

156. A battery supplies a current of 0.9 A through a 2Ω resistor and a current of 0.3 A through a 7Ω resistor. Calculate the emf and internal resistance of the battery.

A. 0.1Ω

B. 0.3Ω

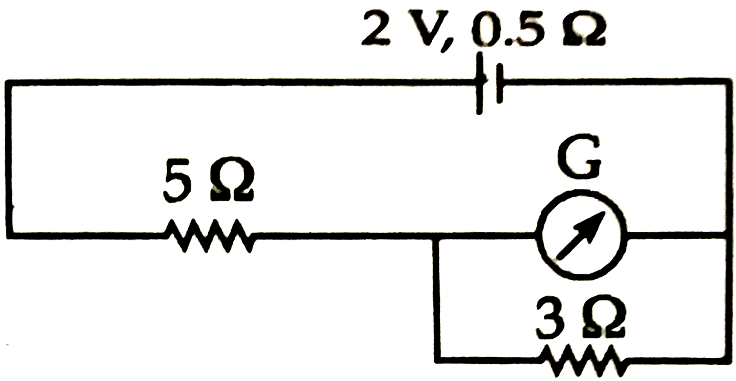
C. 0.5Ω

D. 0.7Ω

Answer: C

Watch Video Solution

157. If the resistance of the galvanometer G is 15Ω, then current through the galvanometer will be



A. $1/3A$

B. $1/8A$

C. $1/17A$

D. $1/24A$

Answer: D

Watch Video Solution

158. Two cells of 1.5 V and 2 V , having internal resistances of 1Ω and 2Ω respectively, are connected in parallel so as to read the current in the same direction through an external resistance of 5Ω . The current in the external resistance will be

A. $\frac{5}{17}A$

B. $\frac{17}{5}A$

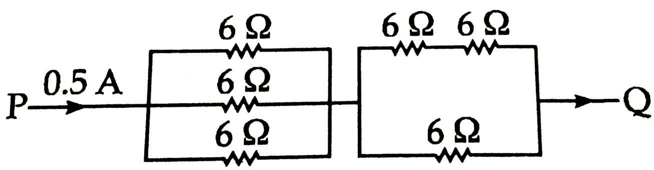
C. $\frac{5}{12}A$

D. $\frac{12}{5}A$

Answer: A

Watch Video Solution

159. Resistances of 6Ω each are connected in the manner shown in the following figure. The potential difference $V_p - V_q$ is



A. 13.6V

B. 6V

C. 3V

D. 17.2V

Answer: C

Watch Video Solution

160. Wheatstone's bridge is an arrangement used for measuring

A. e.m.f. of a cell

B. unknown resistance

C. unknown current

D. potential difference

Answer: B

Watch Video Solution

161. On sending the current in the bridge, the bridge is said to be balanced, if

A. there is no defleaction in the galvanometer

B. there is a deflection in the galvanometer

C. partially deflection in the gavanometer

D. none of these

Answer: A

Watch Video Solution

162. The sensitivily of Wheatstone's network depends upon the value of

A. current

B. resistance

C. voltage

D. all of these

Answer:

Watch Video Solution

Watch Video Solution

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

A. different order

B. same order

C. partially same order

D. partially different order

Answer: B

Watch Video Solution

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

A. 0

B. 1

C. 10

D. infinity

Answer: B

Watch Video Solution

165. the post office box works on the peinclple of :

A. Ampere's law

B. Wheatstone's network principle

C. Potentiometer principle

D. Flemings rule

Answer: B

Watch Video Solution

166. Four resistances 10, 10 , 10 and 15Ω are connected so as to form Wheatstone's bridge. The resistance connected across 15Ω resistance to balance the bridge is

A. 10Ω

B. 20Ω

C. 30Ω

D. 40Ω

Answer: C

Watch Video Solution

167. Wheatstone bridge is most sensitive when the resistance of all four arms are

A. $R_1 = R_2$ and $R_3 = R_4$

B. $R_1 = R_2 = R_3 = R_4$

C. $R_1 + R_2 = R_3 + R_4$

D. $R_1 - R_2 = R_3 - R_4$

Answer: B

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168. Slide wire bridge or metre bridge is an application of

A. potentiometer

B. Wheatstone's bridge

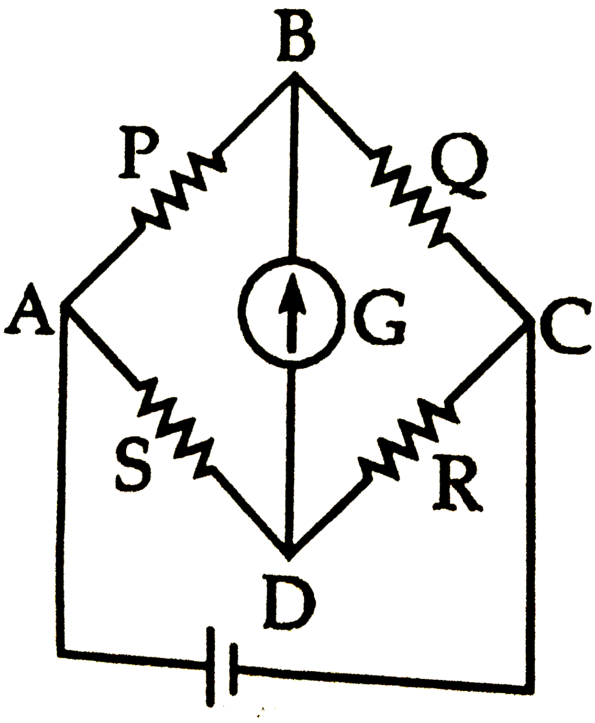
C. voltmeter

D. both 'a' and 'c'

Answer: B

Watch Video Solution

169. A Wheatstone's bridge is shown in figure. The condition for balancing the bridge is



A. $\frac{P}{Q}=\frac{R}{S}$

B. $\frac{P}{S}=\frac{R}{Q}$

C. $\frac{P}{R}=\frac{S}{Q}$

D. $\frac{P}{Q}=\frac{S}{R}$

Answer: D

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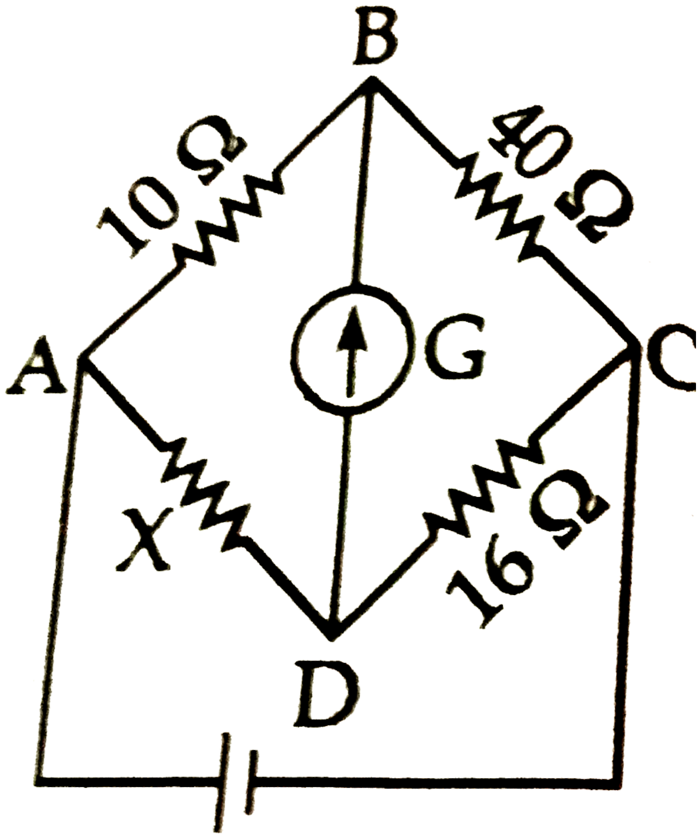
170. A Wheatstone's bridge shown in figure, is to be balanced. The value of X must be



A. 4Ω

B. 8Ω

C. 16Ω

D. 32Ω

Answer: A

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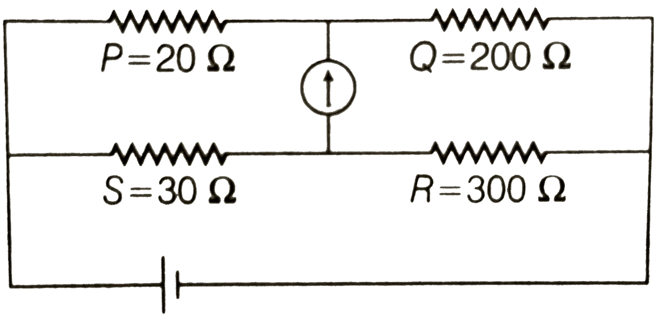
171. Figure below shows a balanced Wheat stone's network. If it is distributed by changing P to 22 Ω, then which of the following steps will bring the bridge to balance again ?



A. increasing S by 3Ω

B. increasing Q by 20Ω

C. increasing R by 50Ω

D. both 'a' and 'b'

Answer: D

Watch Video Solution

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

A. an ammeter

B. a voltmeter

C. a voltameter

D. a metre bridge

Answer: D

Watch Video Solution

173. In a metre bridge experiment l_x and l_r are the balancing lengths and R is known resistance then unkown, resistance is given by

A. $X = \frac{l_x}{l_r}.\ R$

B. $X = \frac{R}{l_x.\ l_r}$

C. $X = l_x.\ l_r.\ R$

D. $X = l_x^2 R$

Answer: A

Watch Video Solution

174. Kelvin's method of determination of resistance of galvanometer by metre bridge is

A. equal deflection method

B. null deflection method

C. equal distance method

D. all of these

Answer: A

View Text Solution

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175. Which of the following statement is not correct in metre bridge experiment ?

A. the resistance wire must be of uniform cross sectional area.

B. the readings should be taken at the middle of wire.

C. the readings should be taken by interchanging the positions known and unknown resistance.

D. the jockey should be changed.

Answer: D

Watch Video Solution

176. In the measurement of resistance by a meter-bridge, the current is necessarily reversed through the bridge wire to eliminate

A. end errors

B. index error

C. random error

D. error due to thermoelectric effect

Answer: A

Watch Video Solution

177. In a metre bridge experiment, unknown resistance X and known resistance of 60Ω is connected in left and right gap of a metre bridge respectively. If the null point is obtained at 40 cm from the left end then the unknown resistance is

A. 20Ω

B. 40Ω

C. 60Ω

D. 80Ω

Answer: B

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178. Metre bridge is the modification of

A. Wheatstone's network

B. galvanometer

C. potentiometer

D. speedometer

Answer: A

Watch Video Solution

179. Metre bridge is used to

A. determine unknown resistance

B. measure current

C. measure P.D.

D. all of these

Answer: A

Watch Video Solution

180. For the accurate measurement of resistance by metre bridge, the null point should be obtained

A. towards left end

B. towards right end

C. at the middle of wire

D. all of these

Answer: C

Watch Video Solution

181. To find resistance of galvanometer by Kelvin's method by metre bridge, usually galvanometer is connected

A. in left gap

B. between jockey and centre of middle copper strip

C. in series with the cell across the metre bridge wire

D. none of these

Answer: A

Watch Video Solution

182. The find resistance of galvanometer by Kelvin's method using metre bridge, the null point is observed in such a way that

A. the pointer of galvanometer should be at zero

B. the pointer of galvanometer should be towards the right of zero

C. there should not be any change in the deflection of galvanometer

D. all of these

Answer: C

Watch Video Solution

183. In a balanced metre bridge, the segment of wire opposite to a resistance of 70Ω is 70 cm. The unknown resistance is

A. 30Ω

B. 60Ω

C. 90Ω

D. 15Ω

Answer: A

Watch Video Solution

184. A meter bridge is balanced by putting 20π resistance in the left gap and 40π in the right, gap, if

40π resistance is now shunted with 40π resistance the shift in the null point towards right is nearly

A. 16.67 cm

B. 50 cm

C. 25 cm

D. 70.67 cm

Answer: A

Watch Video Solution

185. With resistances P and Q in the left and the right gap respectively of a metre bridge, the null point divides the wire in the ratio $3:4$. When P and Q are increased by 20Ω each, the null point divides the wire in the ratio $5:6$. The values of P and Q are

A. $30\Omega, 40\Omega$

B. $20\Omega, 40\Omega$

C. $30\Omega, 80\Omega$

D. $20\Omega, 20\Omega$

Answer: A

Watch Video Solution

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

A. remains unaltered

B. alters

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

D. none of these

Answer: A

Watch Video Solution

187. If the balance point is obtained at the 35th cm in a metre bridge the resistances in the left and right gaps are in the ratio of

A. $13:7$

B. $11:9$

C. $7:13$

D. $2:3$

Answer: C

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188. In a potentiometer, potential difference across the potentiometer wire is directly proportional to its

A. Length

B. area

C. resistance

D. all of these

Answer: A

Watch Video Solution

189. If the length of potentiometer wire is increased, then the accuracy in the determination of null point

A. decreases

B. increases

C. remains unaffected

D. none of these

Answer: B

Watch Video Solution

190. In a potentiometer circuit, all the +ve terminals should be connected at

A. one point

B. different points

C. alternate points

D. either 'b' or 'c'

Answer: A

Watch Video Solution

191. The best instrument for the accurate measurement of the e.m.f. of a cell is

A. voltmeter

B. ammeter

C. potentiometer

D. Wheatstone's bridge

Answer: C

Watch Video Solution

192. A potentiometer is an ideal device of measuring potential difference because

A. it has a long wire

B. it uses a sensitive galvanometer

C. it does not disturb the potential difference it measures

D. both 'a' and 'b'

Answer: C

Watch Video Solution

193. The e.m.f. of two cells can be compared by

A. potentiometer

B. ammeter

C. luxmeter

D. speedometer

Answer: A

Watch Video Solution

194. The balancing lengths for the cells of e.m.f. E_1 and E_2 are l_1 and l_2 respectively. If they are connected separately then

A. $\frac{E_1}{E_2}=\frac{l_1}{l_2}$

B. $\frac{E_1}{E_2}=\frac{l_1+l_2}{l_1-l_2}$

C. $\frac{E_1}{E_2}=\frac{l_1+l_2}{l_2}$

D. $\frac{E_1}{E_2}=\frac{l_1-l_2}{l_2}$

Answer: A

Watch Video Solution

195. The equation, $\frac{E_1}{E_2}=\frac{l_1+l_2}{l_1-l_2}$, is used to compare e.m.f. of two cells by

A. individual method

B. sum and difference method

C. null deflection method

D. equal deflection method

Answer: B

Watch Video Solution

196. The internal resistance of the cell can be determined by,

A. ohm meter

B. galvanometer

C. voltmeter

D. potentiometer

Answer: D

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197. The unit of potential gradient is

A. volt cm

B. ohm cm

C. volt/cm

D. volt/ampere

Answer: C

Watch Video Solution

198. In comparing e.m.f. of two cells by a potentiometer balance point is obtained on 5^{th} wire, the current flowing through the wire is taken

A. from both cells

B. from one cell

C. from the main battery of circuit

D. none of these

Answer: C

Watch Video Solution

199. The sensitivity of the potentiometer can be increased by

A. increasing the length of the wire

B. increasing the e.m.f. of the cell

C. decreasing the length of the wire

D. none of these

Answer: A

Watch Video Solution

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

A. e.m.f. of driving cell is low

B. e.m.f. of accumulator is high

C. length of wire is small

D. length of wire is large

Answer: A

Watch Video Solution

201. When null point is obtained in the potentiometer the current is drawn from

A. cell only

B. main battery only

C. both the cell and main battery

D. neither cell nor main battery

Answer: B

Watch Video Solution

202. Potentiometer was first invented by

A. Ampere

B. Newton

C. Poggendorf

D. Millikan

Answer: C

Watch Video Solution

203. In the construction of potentiometer, the length of wire used is

A. equal to one metre

B. less than one metre

C. greater than 1m upto 10 m

D. all of these

Answer: C

Watch Video Solution

204. A potentiometer is more sensitive when

A. its wire is of small length

B. its wire is of large length

C. applied P.D. is large

D. potential gradient along the wire is very low

Answer: D

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205. Instead of voltmeter, potentiometer is always used to measure e.m.f. of cell, because at the null point, the potentiometer

A. does not draw current from balanced cell

B. draw current from driven cell

C. ends its current through driven cell

D. none of these

Answer: A

Watch Video Solution

206. The potentiometer wire of resistance R is connected in series with a cell of e.m.f. E and of resistance R_h. The current flowing through the potentiometer wire is

A. $I = \dfrac{E}{R + r + R_h}$

B. $I = \dfrac{E}{R + r}$

C. $I = \dfrac{RE}{R_h + r}$

D. $I = \dfrac{E}{R}$

Answer: A

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207. Potentiometer is used to

A. measure e.m.f. of cell

B. compare e.m.f. of two cells

C. determine internal resistance of cell

D. all of these

Answer: D

Watch Video Solution

208. The internal resistance of a cell by potentiometer is given by

A. $r_1 = R_1\left(\frac{l_1 - l_2}{l_2}\right)$

B. $r_1 = R_1\left(\frac{E_1 - V_1}{V_1}\right)$

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

Watch Video Solution

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

A. decreasing the current due to auxiliary battery

B. inceasing the current due to auxiliary battery

C. putting a suitable resistance in series to the cell

D. putting a shunt resistance in parallel to the cell

Answer: A

Watch Video Solution

210. The current, in a potentiometer wire of 100 cm length, is adjusted to give a null point at 5 cm with standard cell of e.m.f. 1.018 V. The e.m.f. of cell which gives null point of 60 cm is

A. 1.221V

B. 2.22V

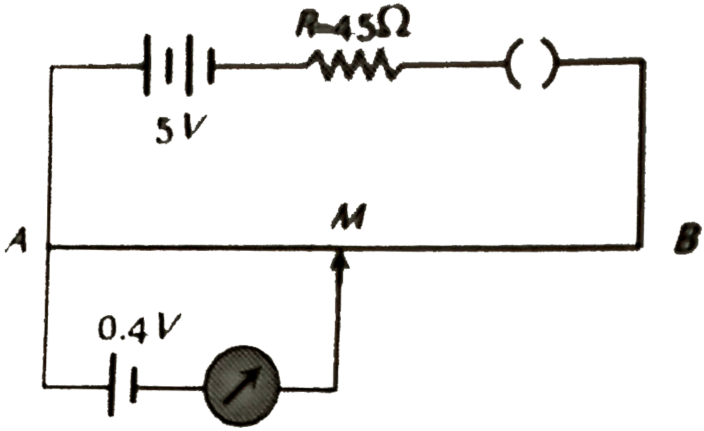
C. 3.22V

D. 4.22V

Answer: A

Watch Video Solution

211. In given figure, the potentiometer wire AB has a resistance of 5Ω and length 10 m . The balancing length AM for the emf of 0.4 V is



A. 2.52m

B. 3.52m

C. 1.52m

D. 4.52m

Answer: C

Watch Video Solution

212. The wire of potentiometer has resistance 4Ω and length 1m. It is connected to a cell of e.m.f. 2V and internal resistance 1Ω. The current flowing through the potentiometer wire is

A. 0.1A

B. 0.2A

C. 0.4A

D. 0.8A

Answer: C

Watch Video Solution

213. A potentiometer has a uniform wire of length 10m and resistance 5Ω. The potentiometer is connected to an across a cell of e.m.f. 2 V and internal resistanc 10Ω. The reading of voltmeter is

A. 1mV/m

B. 5mV/m

C. 0.1 mV/m

D. 4 mV/cm

Answer: B

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214. A voltmeter has a resistance of 50Ω is connected across a cell of e.m.f. 2V and internal resistance 10Ω. The reading of voltmeter is

A. 1.667V

B. 16.7V

C. 167V

D. 0.167V

Answer: A

Watch Video Solution

215. With a potentiometer null point were obtained at 140 cm and 180 cm with cells of emf 1.1 V and one unknown χ volts. Unknown emf is

A. 0.1V

B. 1.21V

C. 1.414V

D. 1.8V

Answer: C

Watch Video Solution

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

A. 5.2Ω

B. 4Ω

C. 1.5Ω

D. 1Ω

Answer: C

Watch Video Solution

217. The potential gradient along the length of a uniform wire is 5 V/m. There are two points on the same wire at a distance of 20 cm and 40 cm from initial end of the wire. The potential difference between these points is

A. 1V

B. 2V

C. 3V

D. 4V

Answer: A

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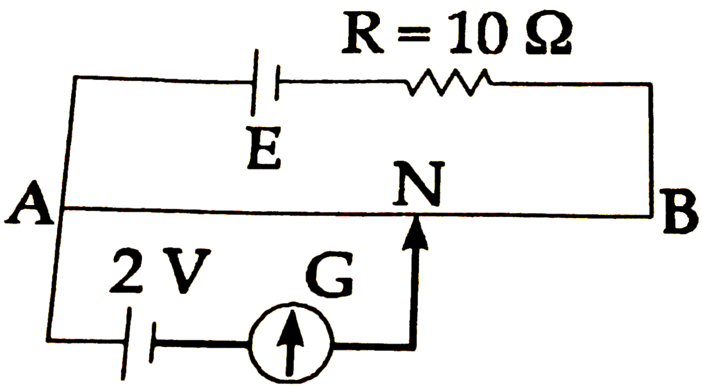
218. In figure AB is a potentiometer wire of length 10 m and resistance 1Ω. The balancing length for 2V potential drop is 18 m. The e.m.f. of the battery E is



A. 12.5V

B. 22.5V

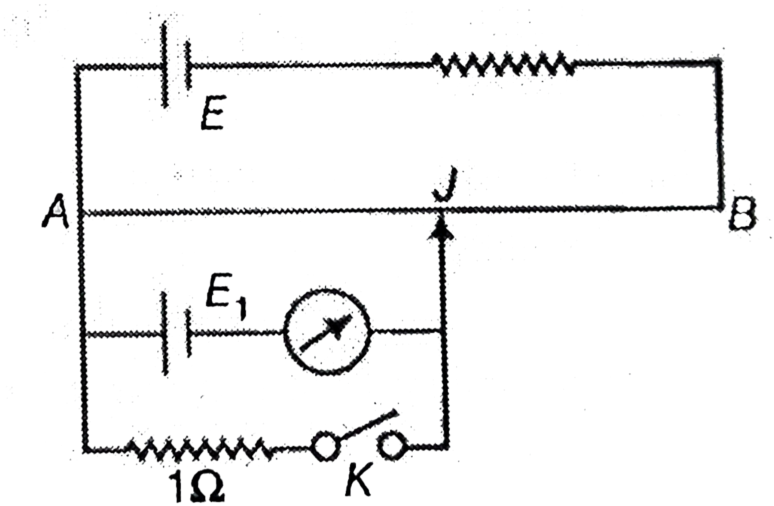
C. 27.5V

D. 15.5V

Answer: C

Watch Video Solution

219. In figure, AB is a potentiometer wire, length 10 m and resistance 2Ω with open the balancing length is 5.5 m. However, on closing key K the balancing length reduces to 5 m. The initial resistance of the cell E_1 is



A. 0.01Ω

B. 0.1Ω

C. 0.2Ω

D. 1Ω

Answer: B

Watch Video Solution

220. A plantinum wire has resistance of 10Ω at $0^{\circ}C$ and 20Ω at $273^{\circ}C$. Find the value of coefficient of resistance.

A. 273 per degree C

B. 273 per degree K

C. $\frac{1}{273}$ per degree C

D. $\frac{1}{273}$ per degree K

Answer: C

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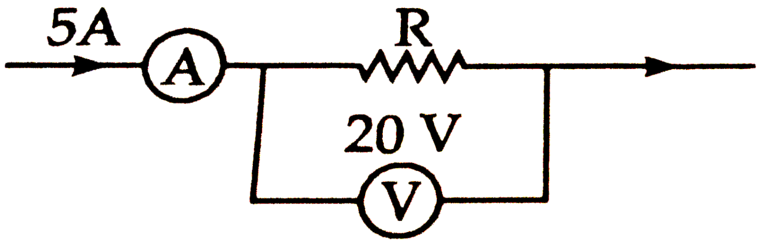
221. In the adjacent circuit the ammeter reads 5.0 A and voltmeter reads 20V. The value of resistance R is



A. 4Ω

B. 100Ω

C. 0.25Ω

D. 0.5Ω

Answer: A

Watch Video Solution

222. Following are the readings of potential and current through a specimen when it is connected to a source of variable potential :

Voltage : $0.2V, 0.4V, 0.6V, 0.8V, 1V$

Current : $3mA, 5mA, 9mA, 13mA, 17mA$

From the observations, the specimen

A. obeys Ohm's law and is a conductor

B. obeys Ohm's law and is an insulator

C. does not obey Ohm's law and is a semiconductor

D. obeys Ohm's law and can be conductor or semiconductor

Answer: C

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223. In a potentiometer experiment the balancing length is 8 m, when the two cells E_1 and E_2 are joined in series. When the two cells are connected in opposition the balancing length is 4m. The ratio of the e.m.f. of two cells (E_1 / C_2) is

A. $1:2$

B. $2:1$

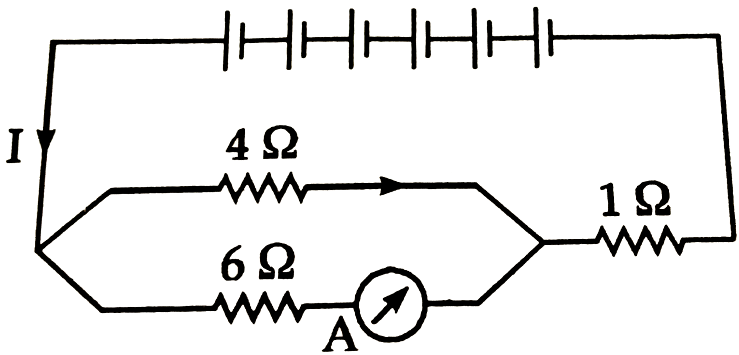
C. $1:5$

D. $3:1$

Answer: D

Watch Video Solution

224. Six cells each of e.m.f. 2 V and internal resistance 0.1Ω are connected to three resistances as shown in figure. The reading of a low resistance ammeter A in the circuit is,



A. $2.1A$

B. $3.0A$

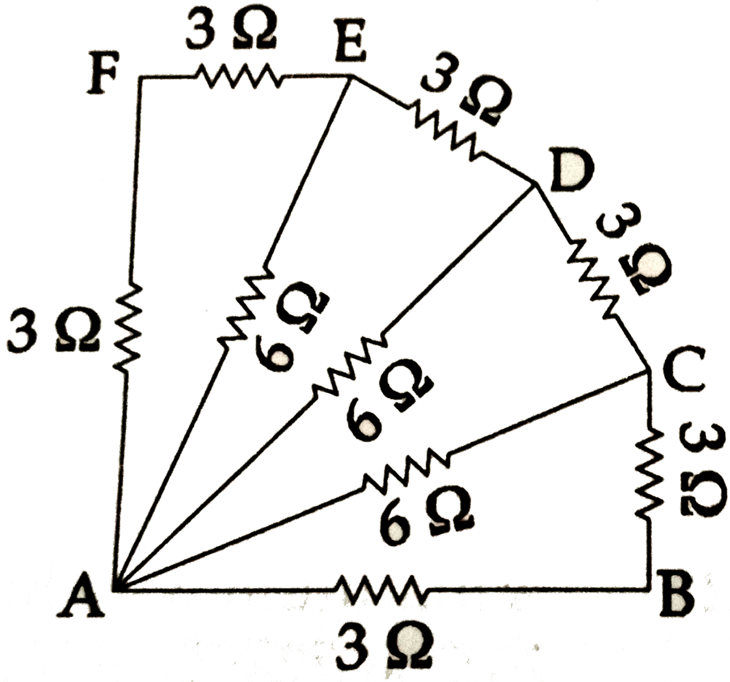
C. $1.2A$

D. $1.5A$

Answer: C

Watch Video Solution

225. Find the equivalent resistance of the network given in the figure,



A. 4Ω

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

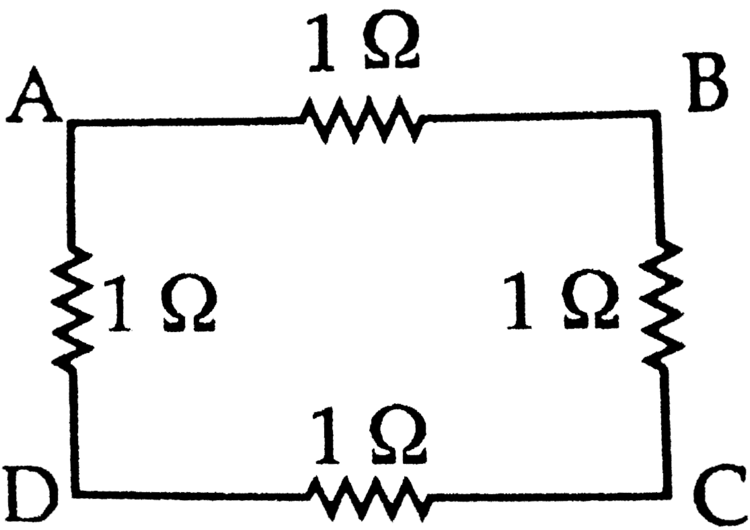
C. 2Ω

D. 1Ω

Answer: C

Watch Video Solution

226. Four identical resistances are joined as shown in the figure. The equivalent resistance between points A and B is R_1 and that between A anc C is R_2 then ratio R_1 / R_2 is



A. $1:1$

B. $4:3$

C. $3:4$

D. $1:2$

Answer: C

Watch Video Solution

227. The length and readius of a wire is l and r respectively. Its resistance is R. After hammering the radius of the wire is made (r/2) then the new resistance will be

A. 4R

B. 8R

C. 12R

D. 16R

Answer: D

Watch Video Solution

228. A copper wire of length $1m$ and radius is joined in series with an iron wire of length $2m$ and radius $3mm$ and a current is passed through the wire. The ratio of the current density in the copper and iron wires is

A. $3/1$

B. $1/3$

C. $9/1$

D. $1/9$

Answer: C

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229. The internal resistance of a primary cell is 4Ω . It generates a current of 0.2 A in a external circuit of 21Ω . The rate at which electric energy is consumed in providing the current is

A. 1 J/s

B. 2 J/s

C. 1.5 J/s

D. 2.5 J/s

Answer: A

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230. A capacitor of $10\mu F$ has a potential difference of 40 V across it. If it is discharge in 0.2 s, the average current during discharge is

A. 1 mA

B. 2 mA

C. 3 mA

D. 4 mA

Answer: B

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231. The resistance of a conductor is 5Ω at 50°C and 6Ω at $100^{\circ}C$. The resistance at $0^{\circ}C$ is

A. 2Ω

B. 4Ω

C. 2.5Ω

D. 4.5Ω

Answer: B

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232. In an electrical cable there is a single wire of radius $9mm$ of copper. Its resistance is 5Ω. The cable is replaced by 6 different insulated copper, wires the radius of each wire is $3mm$. Now the total resistance of the cable will be

A. 7.5Ω

B. 5.5Ω

C. 6Ω

D. 8Ω

Answer: A

Watch Video Solution

233. A copper wire of length l and radius r is nickel plated till its final radius is 2r. If the resistivity of the copper and nickel are ρ_c and ρ_n, then find the equivalent resistance of the wire.

A. $\dfrac{l}{\pi r^2\left[\dfrac{1}{\rho_c}+\dfrac{3}{\rho_n}\right]}$

B. $\dfrac{l}{\pi r^2\left[\dfrac{1}{\rho_c}-\dfrac{3}{\rho_n}\right]}$

C. $\dfrac{2l}{\pi r^2\left[\dfrac{1}{\rho_c}-\dfrac{3}{\rho_n}\right]}$

D. $\dfrac{2l}{\pi r^2\left[\dfrac{1}{\rho_c}+\dfrac{3}{\rho_n}\right]}$

Answer: A

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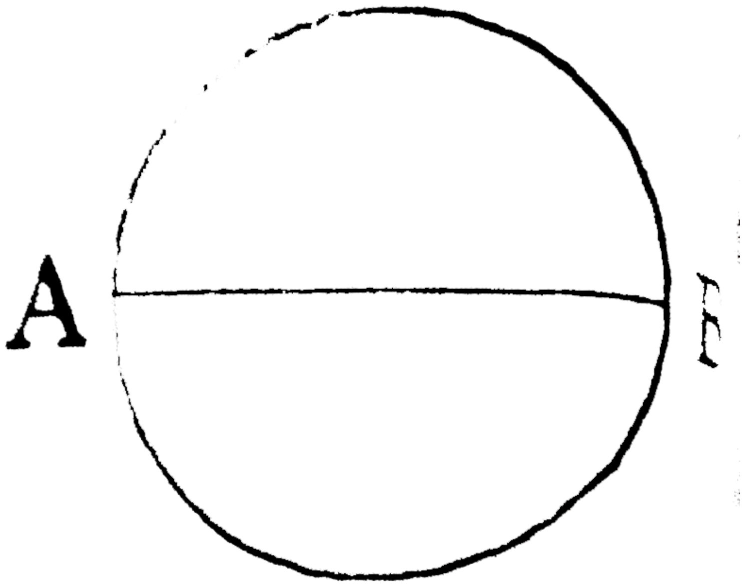
234. In the figure given below find the resistance between points A and B. Both the circle and the diatmeter are made of uniform wire of resistance $r\Omega$

per meter. The length AB is 2 metre.



A. 0.88 r

B. 0.68 r

C. r

D. 2r

Answer: A

Watch Video Solution

235. The resistance of a wire of iron is $10 ohm$ and temperature coefficient of resistivity is $5 \times 10^{-3} / .^{\circ} C$, At $20^{\circ} C$ it carries $30 mA$ of current. Keeping constant potential difference between its ends. The temperature of the wire is raised to $120^{\circ} C$. The current in mA that flows in the wire now is.

A. 10 mA

B. 20 mA

C. 5 mA

D. 15 mA

Answer: B

Watch Video Solution

236. Drift velocity of electrons in a conductor bearing potential difference V across its terminals is v. If the length of wire is stretched to three times and same potential differece V is applied, then the drift velocity will become

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

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

C. $\frac{v}{6}$

D. v

Answer: A

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237. 100 cells each of emf 5V and internal resistance 1Ω are to be arranged to produce maximum current in a 25Ω resistance. Each row contains equal number of cells. Find the number of rows.

A. 2

B. 3

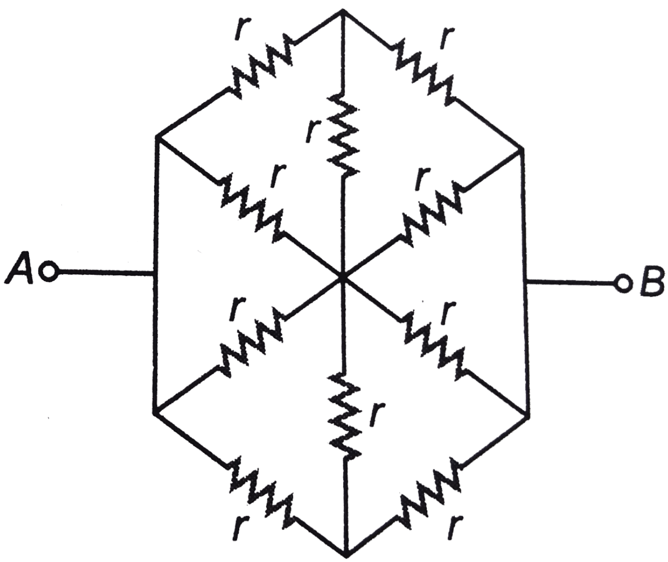
C. 50

D. 40

Answer: A

Watch Video Solution

238. The equivalent resistance of the hexagonal network as shown figure between points A and B is



A. r

B. 2 r

C. 3r

D. 0.5 r

Answer: D

Watch Video Solution

239. Twelve wires, each of resistance 1Ω are connected to form a skeleton cube. Battery of 10V and neglibible internal resistance is connected across diagonally opposite corners of the cube. Determine the equivalent resistance of the network and current supplied by the battery.

A. $\frac{5}{6}\Omega$ and 12A

B. $\frac{6}{5}\Omega$ and 12 A

C. $\frac{5}{6}\Omega$ 4A

D. $\frac{6}{5}\Omega$ and 4A

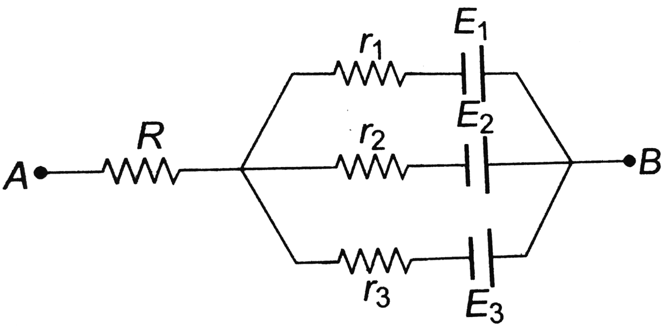
Answer: A

Watch Video Solution

240. In the network shown the potential difference between A and B is

$(R = r_1 = r_2 = r_3 = 1\Omega, E_1 = 3V, E_2 = 2V, E_3 = 1V$

)



A. 1V

B. 2V

C. 3V

D. 4V

Answer: B

Watch Video Solution

241. Twelve equal wires each of resistance $r\Omega$ form a cube. The effective resistance between the corners of the same edge of the cube is

A. $\frac{7}{12}r$

B. $\frac{12}{7}r$

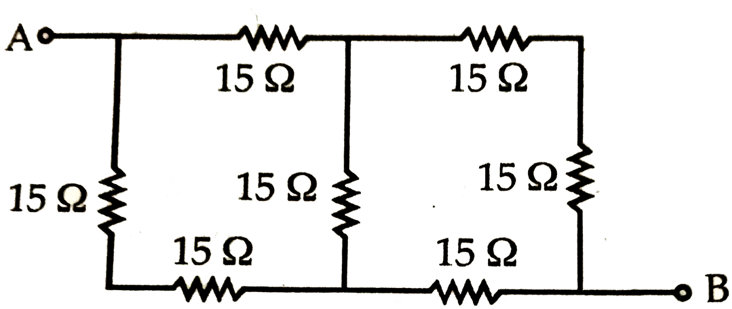
C. $\frac{5}{7}r$

D. $\frac{12}{5}r$

Answer: A

Watch Video Solution

242. The equivalent resistance between the terminals A and B in the network shown in the figure is



A. 7Ω

B. 14Ω

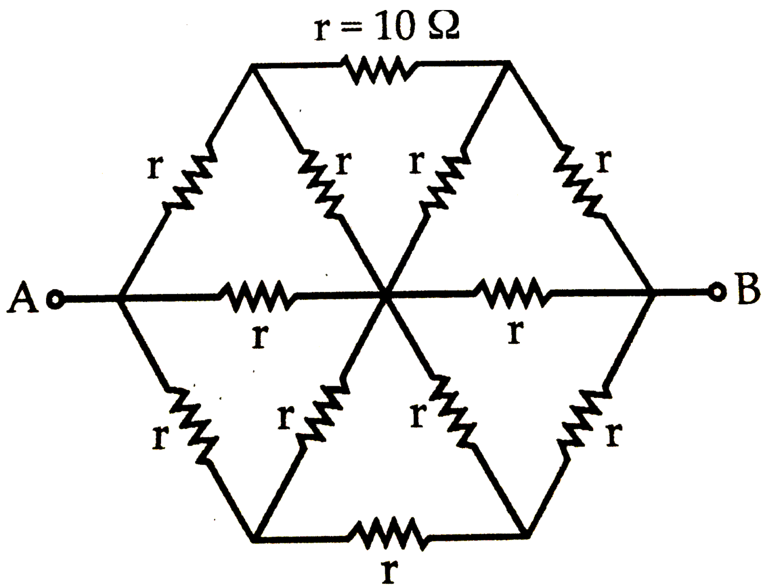
C. 15Ω

D. 21Ω

Answer: D

Watch Video Solution

243. 12 resistors each of 10Ω are connected as shown in the figure. The effective resistance between A and B is



A. 4Ω

B. 8Ω

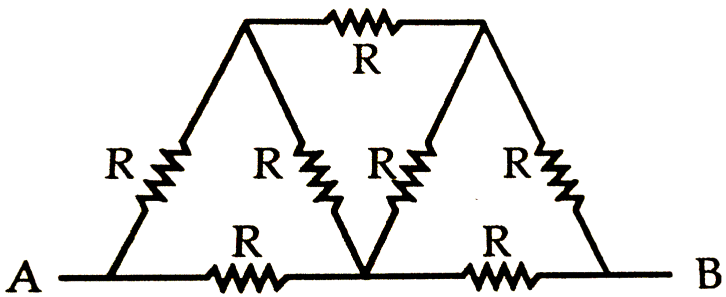
C. 2Ω

D. 6Ω

Answer: B

Watch Video Solution

244. In the network shown in figure each resistance is 1Ω. The effective resistance between A and B is



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

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

C. 1Ω

D. 2Ω

Answer: A

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245. the length of wire of diameter 0.5 mm needed to produce a coil of resistance 10Ω and specific resistance $4.4 \times 10^{-7}\Omega$ m is

A. 4.45 m

B. 5.55 m

C. 5.45 m

D. 1.45 m

Answer: A

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246. The resistance of a wire of length 40 m and radius 0.25 mm is 10Ω. The conductivity of the material of the wire is

A. 1×10^{-7} mho/m

B. 2×10^{-7} mho/m

C. 2×10^{7} mho/m

D. 1×10^{-7} mho/m

Answer: C

Watch Video Solution

247. A wire of resistance 12Ω is stretched uniformly till its length becomes three times original length. The change in resistance of wire is

A. 96Ω

B. 108Ω

C. 150Ω

D. 208Ω

Answer: A

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248. A wire of resistance 16Ω is bent in to a circle and a cell of e.m.f. 2V and internal resistance 1Ω is connected between two points of wire, a quarter circumference apart. The current in each segment of wire is

A. $\frac{8}{1}A, \frac{3}{8}A$

B. $\frac{1}{8}A, \frac{8}{3}A$

C. $\frac{8}{1}A, \frac{8}{3}A$

D. $\frac{1}{8}A, \frac{3}{8}A$

Answer: D

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249. Two cells of e.m.f. 2.5 V and 2.0 V having internal resistance of 1Ω and 2Ω respectively are connected in parallel with similar poles connected together so as to send the current in the same direction through an external resistance of 2Ω. The current in the external resistance is

A. 0.87 A

B. 1.29 A

C. 1.00 A

D. 2.29 A

Answer: A

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250. Two cells of e.m.f. E_1 and E_2, $E_1 > E_2$ having an internal resistance of 1Ω each form a closed circuit with an ammeter and a resistance . When the polarity of E_2 is reversed, the current changes from 120 mA to 20 mA . If the combined resistance of ammeter and resistance is 18Ω then the value of E_1 and E_2 will be

A. 2.5 V, 1.1 V

B. 1.5 V, 2.2 V

C. 1.5 V, 1.1 V

D. 2.5 V, 2.2 V

Answer: C

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251. Four resistances $1\Omega, 2\Omega, 2\Omega,$ and 4Ω are connected so as to form a Wheatstone's network. The cell of e.m.f. 2V is connected between its opposite points. The total current of bridge is

A. 1A

B. 0.5A

C. 2A

D. 1.5A

Answer: A

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252. Four resistances $3\Omega, 6\Omega, 4\Omega,$ and 12Ω are connected so as to form Wheatstone's network. Shunt needed across 12Ω resistor to balance the bridge is

A. 12Ω

B. 24Ω

C. 42Ω

D. 48Ω

Answer: B

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253. Two equal resistances are introduced in two gaps of a metre bridge. The shift in the null point if an equal resistance is connected in series with resistance in left gap is

A. 16.6 cm

B. 16.6m

C. 16.6mm

D. 66.6 cm

Answer: A

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254. With an unknown resistance X in the left gap and a resistance R in the right gap of a meter bridge, the neutral point is obtained at a distance of 75cm from the left end. The shift of null point if the unknown resistance is shunted by an equal resistance X and keeping same resistance in right gap is

A. 25 cm towards right

B. 25 cm towards left

C. 15 cm towards right

D. 15 cm towards left

Answer: D

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255. Two coils are connected in series in one gap of the Wheatstone's meter bridge and null point is obtained at the centre of the wire with a resistance of 100Ω in the other gap. When the two coils are connected in parallel in the same gap, the unknown resistance is to be changed by 84Ω to obtain the null point at the centre again. The resistance of the two coils will be

A. 30Ω and 80Ω

B. 80Ω and 30Ω

C. 20Ω and 80Ω

D. 50Ω and 50Ω

Answer: C

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256. With resistances P and Q in the left gap and right gap respectively, of a meter bridge. The null point is obtained at 60 cm from left end. When Q is increased by 10Ω the null point is obtained at 40 cm from left end. The values of P and Q are

A. 12Ω, 8Ω

B. 8Ω, 12Ω

C. 8Ω, 8Ω

D. 12Ω, 12Ω

Answer: A

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257. Two resistances prepared from the wire of the same material having diameters in the ratio 3:1 and length in the ratio 3:1 are connected in the left and right gap of Wheatstone's metre bridge.The distance of null point from the left end of the wire is

A. 55 cm

B. 25 cm

C. 35 cm

D. 52 cm

Answer: B

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258. Equal lengths of wires A and B are connected the left and the right gap respectively of a meter bridge. The null point is obtained at 0.4 m from the left end of the wire. If the diameters of the wires A and B are in the ratio 2:3 . Then the ratio of specific resistances of the materials of the wires will be

A. $8:27$

B. $8:15$

C. $27:8$

D. $15:8$

Answer: A

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259. A potentiometer wire is 500 cm long and potential difference of 4 V is maintained between the ends of the wire. The e.m.f. of the cell which balances against the length of 135 cm of the wire is

A. 0.08 V

B. 2.08 V

C. 2.88V

D. 1.08 V

Answer: D

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260. A steady voltage drop is maintained across a potentiometer wire which is 5m long. A Daniel cell is balanced by a length of 3m of wire. If length of potentiometer wire is increased to 6 m, find new length of wire across which Daniel cell will be balanced.

A. 3.6m

B. 6.6m

C. 6.3 m

D. 3.3m

Answer: A

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261. Two cells are connected in series and e.m.f. of combination is found to balance against length of 450 cm of potentiometer wire. Whent the two cells are connected in parallel emf of combination balances against 50 cm length of wire. The ratio of e.m.f. of two cells is

A. 2.25

B. 1.55

C. 1.25

D. 2.55

Answer: C

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262. The emf of cell is balanced by balancing length 450 cm . When the resistance of 10Ω is connected across the cell, balancing length changes by 100 cm. The internal resistance of a cell is

A. 1.8Ω

B. 2.8Ω

C. 3.8Ω

D. 2.5Ω

Answer: B

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263. A resistance of potentiometer wire is $1\Omega/m$. A Daniel cell of e.m.f. 1.08V balances at 216 cm on potentiometer. The current through wire is

A. 1.5A

B. 0.25A

C. 2.5A

D. 0.5A

Answer: D

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

A. 1.2 m

B. 0.5m

C. 2.2m

D. 0.2

Answer: A

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265. A potentiometer wire of length 4 cm has a some resistance. The resistance connected in series with the wire and accumulator of e.m.f. 2V is 16Ω. If the potential gradient along wire is $10^{-3}V/cm$. The resistance of potentiometer wire is

A. 0.066Ω

B. 0.022Ω

C. 0.033Ω

D. 0.044Ω

Answer: C

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266. The resistance of a potentiometer wire is 10Ω and its length is 10m. A resistance box and 2V accumulator are placed in series with it. The value of resistance in the resistance box, if it is desired to have potential drop of 1 microvolt/mm is

A. 1990Ω

B. 1890Ω

C. 1190Ω

D. 2290Ω

Answer: A

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267. Electromotive force is the force, which is able to maintain a constant

A. current

B. resistance

C. power

D. potential difference

Answer: D

Watch Video Solution

268. A series combination of two resistors 1Ω each is connected to a 12 V battery of internal resistance 0.4Ω. The current flowing through it will be

A. $12A$

B. $6A$

C. $5A$

D. $3.2A$

Answer: C

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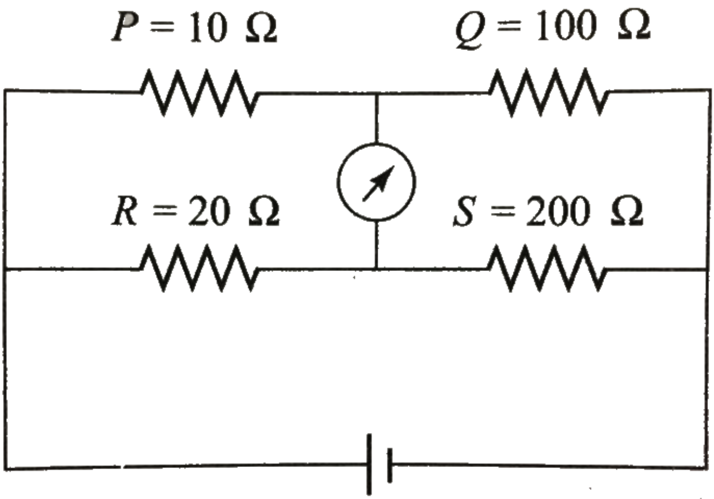
269. Figure6.52 shows a balanced wheatstone network. Now, it is disturbed by changing P to 11Ω. Which of the following steps will not bring the bridge to balance again?



A. increasing R by 2Ω

B. increasing Q by 10Ω

C. increasing S by 20Ω

D. all of these

Answer: C

Watch Video Solution

270. The alloys constantan and manganin are used to make standard resistance due to they have

A. high resistivity

B. low temperature coefficient of resistance

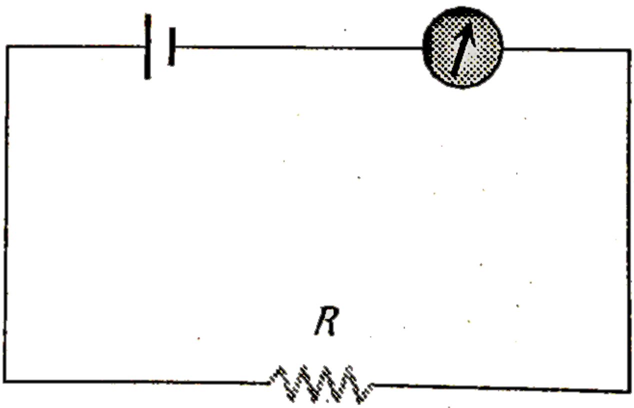
C. low resistivity

D. both 'a' and 'b'

Answer: D

Watch Video Solution

271. A battery of e mf 10 V and internal resistance 3Ω is connected to a resistor as shown in the figure. If the current in the circuit is 0.5 A . then the resistance of the resistor will be



A. 13Ω

B. 15Ω

C. 17Ω

D. 19Ω

Answer: C

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272. When a wire is stretched and its radius becomes $r/2$ then its resistance will be

A. 16 R

B. 4 R

C. 2 R

D. $R/2$

Answer: A

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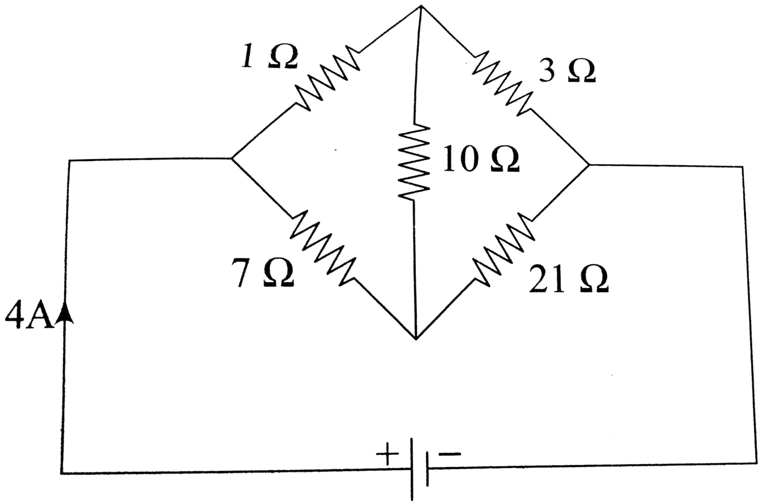
273. In the circuit shown in the figure, the current drawn from the battery is $4A$. If 10Ω resistor is replaced by 20Ω resistor, then current drawn from the circuit will be



A. $1A$

B. $2A$

C. $3A$

D. $4A$

Answer: D

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274. A cell of e.m.f. 2V and internal resistance 0.5Ω is connected across a resistor R. The current that flows is same as that, when a cell of e.m.f. 1.5V and internal resistance 0.3Ω is connected across the same resistor. Then

A. $R = 0.3\Omega$

B. $R = 0.6\Omega$

C. $R = 0.5\Omega$

D. $R = 0.75\Omega$

Answer: A

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275. The terminal potential difference for a cell is 8.5 V when current is 2A and 9 V when current is 1.5A. What is the internal resistance of cell ?

A. 4Ω

B. 2Ω

C. 3Ω

D. 1Ω

Answer: D

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276. A potentiometer wire has a length 10m and a resistance 20Ω. Its terminals are connected to a battery of e.m.f. 4V and internal resistance 5Ω. What are the distances at which null points are obtained when two cells of e.m.f.s 1.5V and 1.3 V are connected so as to a) assist and b) oppose each other ?

A. 4.75 m, 0.625 m

B. 8.75 m, 6.25 m

C. 8.75 m, 0.625 m

D. 3.75 m, 2.625 m

Answer: C

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277. If length of a conductor is doubled by keeping volume constant, then what is its new resistance if initial were 4Ω ?

A. 16Ω

B. 8Ω

C. 4Ω

D. 2Ω

Answer: A

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278. Two resistances are joined in parallel whose equivolent resistance is $\frac{3}{5}\Omega$. One of the resistance wire is broken and the effective resistance becomes 3Ω. The resistance (in ohms) of the wire that got broken was

A. 4Ω

B. 3Ω

C. 6Ω

D. 5Ω

Answer: B

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279. In a metrebridge, copper strips are used to

A. to decrease contact resistance

B. to reduce thermoelectric effect

C. to increase grip of wire

D. to increase length of wire

Answer: A

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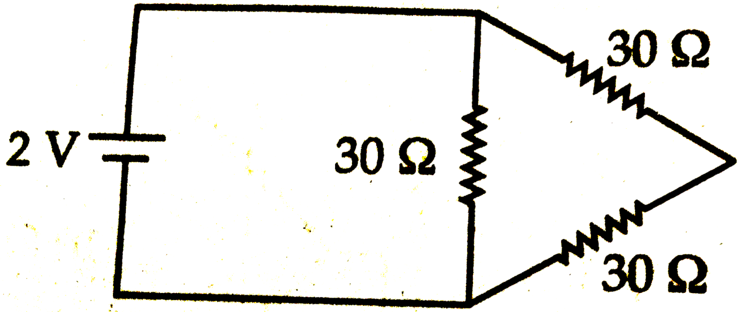
280. Current supplied by the cell in the adjoining figure is



A. 1.5 A

B. $1A$

C. $0.1A$

D. $0.5A$

Answer: C

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281. A wire of resistance 4Ω is stretched to four times of its original length resistance of wire now becomes

A. 4Ω

B. 8Ω

C. 64Ω

D. 16Ω

Answer: C

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282. A light bulb is rated at 100 W for a 220 V ac supply . The resistance of the bulb is

A. 200Ω

B. 100Ω

C. 484Ω

D. 450Ω

Answer: C

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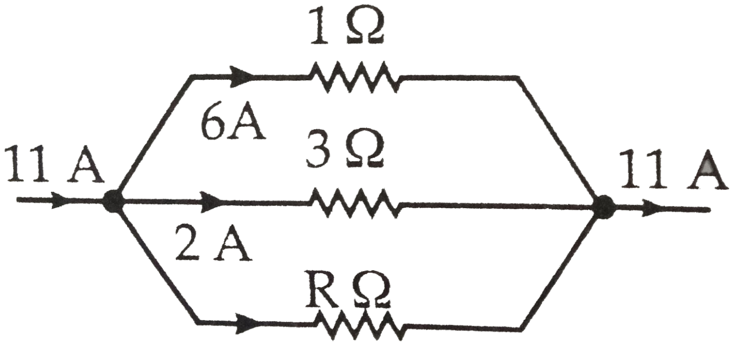
283. In the circuit shown in figure, the value of R is



A. 1Ω

B. 2Ω

C. 3Ω

D. 4Ω

Answer: B

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284. When length of wire is increased by 10% , then increase in resistance is

A. 0.1

B. 0.21

C. 0.25

D. 0.35

Answer: B

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285. For two wires, length ratio is $1:4$, radius ratio is 1:2, specific resistances ratio is 3:1. Compare their resistances.

A. $1:3$

B. $1:2$

C. $3:2$

D. $3:1$

Answer: D

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

A. 2.5Ω

B. 3Ω

C. 4Ω

D. 5Ω

Answer: A

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287. S.I. unit of specific resistance is

A. Ωcm

B. Ωm

C. Ω / cm

D. Ω / m

Answer: B

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288. Four resistances arranged to form a Wheatstone's network are 8Ω, 12Ω, 6Ω, and 27Ω. The resistance that should be connected across 27Ω resistance to balance the bridge is

A. 13.5Ω

B. 15.5Ω

C. 27Ω

D. 12Ω

Answer: A

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289. When galvanometer of unknown resistance connected across a series combination of two identical batteries each of 1.5 V, the current through the resistor is 1A. When it is connected across parallel combination of the same batteries, the current through it is 0.6 A. The internal resistance of each battery is

A. $1/5\Omega$

B. $1/4\Omega$

C. $1/3\Omega$

D. $1/2\Omega$

Answer: C

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

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

B. $10^{-9}V/m$

C. $10^{8}V/m$

D. $10^{6}V/m$

Answer: C

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

A. 10Ω

B. 5Ω

C. 20Ω

D. 40Ω

Answer: C

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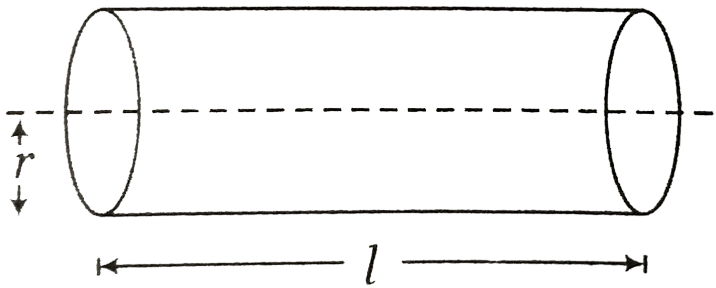
292. A wire has a resistance R. Find new resistance,

(i) if radius of cross-section of a cylindrical wire is doubled, then find ratio of initial to final resistance.

(ii) if length of wire is increased by 10%, then find the percentage increase in its resistance.

(iii) if length of wire is increased by 20%, then find the percentage increase in its resistance.



A. 0.1

B. 0.2

C. 0.4

D. 0.21

Answer: D

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293. Specific resistance of a metal conductor is $4 \times 10^{-5} \Omega$m and its area of cross section is $8cm^2$ when 0.2A current passes through the conductor then potential gradient of the conductor is

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

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

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

D. $10 V/m$

Answer: C

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294. A wire of length 1.6m has a resistance 8Ω is connected to a battery of 2 volts and internal resistance 2Ω. What is the potential gradient ?

A. $1.5 V/m$

B. $0.5 V/m$

C. $1 V/m$

D. $2V/m$

Answer: C

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295. Sensitivity of potentiometer can be increased by

A. increasing the length

B. increasing the PD

C. decreasing the series resistance

D. increasing the current in the potentiometer

Answer: A

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296. S.I. unit of potential gradient is

A. V cm

B. V/cm

C. V m

D. V/m

Answer: D

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297. Kirchhoff's first rule obeys law of conservation of charge. Explain.

A. mass

B. energy

C. charge

D. momentum

Answer: C

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298. The unit of specific resistance is

A. Ωcm

B. Ωm

C. Ω / cm

D. Ω / m

Answer: B

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299. Four resistances of $16\Omega, 12\Omega, 4\Omega$ and 9Ω respectively are connected in cycle order so from a Wheatstone bridge. Calculate the resistance in be connected in parallel with 9Ω resistance to balance the bridge.

A. 13.5Ω

B. 15.5Ω

C. 27Ω

D. 12Ω

Answer: A

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300. For measurement of potential difference, potentiometer is perferred in comparison to voltmeter because

A. potentiometer is more sensitive than voltmeter

B. the resistance of potentiometer is less than voltmeter

C. potentiometer is cheaper than volt meter

D. potentiometer does not take current from the circuit

Answer: D

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301. When a resistance of 100Ω is connected in series with a galvanometer of resistance R, then its range is V. To double its range, a resistance of 1000Ω is connected in series. Find the value of R.

A. 700Ω

B. 800Ω

C. 900Ω

D. 100Ω

Answer: C

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302. The thermo emf E of a thermocouple is found to vary wit temperature T of the junction (cold junction is $0^\circ C$) as

$$E = 40T - \frac{T^2}{20}$$

The temperature of inversion for the thermocouple is

A. $20^\circ C$

B. $400^\circ C$

C. $-200^\circ C$

D. $-100^\circ C$

Answer: C

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303. The specific resistance and area of cross section of the potentiometer wire are ρ' and A respectively. If a current i passes through the wire, its potential gradient will be

A. $A/I\rho$

B. $I\rho lA$

C. $I\rho/A$

D. $I\rho/lA$

Answer: C

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304. If the temperature of cold junction of thermocouple is lowered, then the neutral temperature

A. increases

B. decreases

C. remains constant

D. may increase or may decrease

Answer: C

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305. For a thermocouple, the temperature of inversion is that temperature at which thermo e.m.f. is

A. zero

B. maximum

C. minimum

D. none of the above

Answer: A

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

A. remains unaltered

B. alters

C. may or may not altered depending on the resistance of the battery and the galvanometer are interchanged. The balance condition

D. none of the above

Answer: A

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

A. 4Ω

B. 8Ω

C. 16Ω

D. 2Ω

Answer: C

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

A. 0.5Ω

B. 0.8Ω

C. 1.0Ω

D. 0.2Ω

Answer: A

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309. The resistance of the four arms P, Q, R and S in a Wheatstone's bridge are $10ohm30ohm$ and $90ohm$

rerspectively. The e.m.f. and internal resistance of the cell are $7vo <$ and $5ohm$ respectively. If the galvanometer resistance is $50ohm$, the current drawn for the cell will be

A. 0.2A

B. 0.1A

C. $2.0A$

D. $1.0A$

Answer: A

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310. In a Wheatstone's bridge, three resistances P,Q and R connected in the three arms and the fourth arm is formed by two resistances S_1 and S_2 connected in parallel. The condition for the bridge to be balanced will be

A. $\frac{R(s_1 + s_2)}{s_1 s_2}$

B. $\frac{s_1 s_2}{R(s_1 + s_2)}$

C. $\frac{R s_1 s_2}{(s_1 + s_2)}$

D. $\frac{(s_1 + s_2)}{R s_1 s_2}$

Answer: A

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

A. 6V

B. 9V

C. 12V

D. 15V

Answer: B

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312. The masses of the three wires of copper are in the ratio $5:3:1$ and their lengths are in the ratio $1:3:5$. The ratio of their electrical resistances is

A. $15:1:125$

B. $1:125:15$

C. $125:1:15$

D. $125:15:1$

Answer: D

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

A. 15 cm to the right

B. 15 cm to the left

C. 20 cm to the right

D. 20 cm to left

Answer: B

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314. A potentiometer wire of length 10 m is connected in series with a battery the emf of a cell balances against 250 cm length of wire if length of potentiometer wire is increased by 1 m then new balancing length of wire will be

A. $2.00m$

B. $2.25m$

C. $2.50m$

D. $2.75m$

Answer: D

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