PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT 1960 PHYSICS (HINGLISH)

CURRENT ELECTRICITY

Exercise

1. Current of 4.8 amperes is flowing through a conductor. The number of electrons per second will be

A. 3×10^{19}

B. 7.68×10^{21}

C. 7.68×10^{20}

D. 3×10^{20}

Answer: A

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2. When the current i is flowing through a conductor, the drift velocity is v . If 2i current is flowed through the same metal but having double the area of cross-section, then the drift velocity will be

A. $v/4$

B. $v/2$

C. v

D. $4v$

Answer: C

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3. When current flows through a conductor, then the order of drift velocity of electrons will be

A. $10^{10} m / \sec$

B. $10^{-2} cm / \sec$

C. $10^{4} cm / \sec$

D. $10^{-1} cm / \sec$

Answer: B

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4. Every atom makes one free electron in copper. If 1.1 ampere current is flowing in the wire of copper having 1 mm diameter, then the drift velocity (approx.) will be (Density of copper $= 9 \times 10^3 kgm^{-3}$ and atomic weight = 63)

A. $0.3mm / \sec$

B. $0.1mm / \sec$

C. $0.2mm / \sec$

D. $0.2cm / \sec$

Answer: B

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5. Which one is not the correct statement

A. 1 volt $\times$ 1 coulomb = 1 joule

B. 1 volt $\times$ 1 ampere = 1 joule/second

C. 1 volt $\times$ 1 watt = 1 H.P.

D. Watt-hour can be expressed in eV

Answer: C

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6. If a 0.1% increase in length due to stretching, the percentage increase in its resistance will be

A. 0.2%

B. 2%

C. 1%

D. 0.1%

Answer: A

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7. The specific resistance of manganin is $50 \times 10^{-8} ohm \times m.$

The resistance of a cube of length 50 cm will be

A. 10^{-6} ohm

B. 2.5×10^{-5} ohm

C. 10^{-8} ohm

D. 5×10^{-4} ohm

Answer: A

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8. The resistivity of iron is 1×10^{-7} ohm -m. The resistance of a iron wire of particular length and thickness is 1 ohm. If the length and the diameter of wire both are doubled, then the resistivity in ohm-m will be

A. 1×10^{-7}

B. 2×10^{-7}

C. 4×10^{-7}

D. 8×10^{-7}

Answer: A

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9. The temperature coefficient of resistant of wire is $12.5 \times 10^{-4} / C^{\circ}$. At $300K$ the resistance of the wire is $1ohm$. The temperature at which resistance will be $2ohm$ is

A. $1154K$

B. $1100K$

C. $1400K$

D. $1127K$

Answer: D

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

A. Will become half

B. Will be doubled

C. Will remain the same

D. Will become four times

Answer: C

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11. The resistance of a wire is $20 ohm$. It is so stretched that the length becomes three times, then the new resistance of the wire will be

A. $6.67 ohms$

B. $60.0 ohms$

C. $120 ohms$

D. $180.0 ohms$

Answer: D

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12. The resistivity of a wire

A. Increases with the length of the wire

B. Decreases with the area of cross-section

C. Decreases with the length and increases with the cross-section of wire

D. None of the above statement is correct

Answer: D

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13. Ohm's law is true

A. For metallic conductors at low temperature

B. For metallic conductors at high temperature

C. For electrolytes when current passes through them

D. For diode when current flows

Answer: A

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14. The example for non- ohm ice resistance is

A. Copper wire

B. Carbon resistance

C. Diode

D. Tungston wire

Answer: C

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15. Drift velocity v_d varies with the intensity of electric field as per their relation

A. $v_d \propto E$

B. $v_d \propto \frac{1}{E}$

C. $v_d =$ constant

D. $v_d \propto E^2$

Answer: A

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16. On increasing the temperature of a conductor, its resistance increases because

A. Relaxation time decreases

B. Mass of the electrons increases

C. Electron density decreases

D. None of the above

Answer: A

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17. In a conductor 4 coulombs of charge flows for 2 seconds . The value of electric current will be

A. 4 volts

B. 4 amperes

C. 2 amperes

D. 2 volts

Answer: C

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18. The specific resistance of a wire is ρ, its volume is $3m^3$ and its resistance is $3 ohms$, then its length will be

A. $\sqrt{\frac{1}{\rho}}$

B. $\frac{3}{\sqrt{\rho}}$

C. $\frac{1}{\rho}\sqrt{3}$

D. $\rho\sqrt{\frac{1}{3}}$

Answer: B

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19. 62.5×10^{18} electrons per second are flowing through a wire of area of cross-section $0.1m^2$, the value of current flowing wil be

A. 1A

B. $0.1A$

C. $10A$

D. $0.11A$

Answer: C

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20. A piece of wire of resistance 4 ohm s is bent through 180° at its mid point and the two halves are twisted together, then the resistance is

A. 8 ohms

B. 1 ohm

C. 2 ohms

D. 5 ohms

Answer: B

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21. When a piece of aliminium wire of finite length is drawn through a series of dies to reduce its diameter to half its original value, its resistance will become

A. Two times

B. Four times

C. Eight times

D. Sixten times

Answer: D

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22. A wire 100cm long and 2.0mm diameter has a resistance of 0.7 ohm , the electrical resistivity of the material is

A. $4.4 \times 10^{-6} ohm \times m$

B. $2.2 \times 10^{-6} ohm \times m$

C. $1.1 \times 10^{-6} ohm \times m$

D. $0.22 \times 10^{-6} ohm \times m$

Answer: B

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23. A certain wire has a resistance R . The resistance of another wire identical with the first except having twice its diameter is

A. $2R$

B. $0.25R$

C. $4R$

D. $0.5R$

Answer: B

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24. In hydrogen atom, the electron makes 6.6×10^{15} revolutions per second around the nucleus in an orbit of radius $0.5 \times 10^{-10} m$. It is equivalent to a current nearly

A. $1A$

B. $1mA$

C. $1\mu A$

D. $1.6 \times 10^{-19} A$

Answer: B

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25. A wire of length 5m and radius 1mm has a resistance of 1 ohm . What length of the wire of the same material at the same temperature and of radius 2mm will also have a resistance of 1 ohm

A. $1.25m$

B. $2.5m$

C. $10m$

D. $20m$

Answer: D

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26. When there is an electric current through a conducting wire along its length, then an electric field must exist

A. Outside the wire but normal to it

B. Outside the wire but parallel to it

C. Inside the wire but parallel to it

D. Inside the wire but normal to it

Answer: C

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27. Through a semiconductor, an electric current is due to drift of

A. Free electrons

B. Free electrons and holes

C. Positive and negative ions

D. Protons

Answer: B

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28. In an electrolyte 3.2×10^{18} bivalent positive ions drift to the right per second while 3.6×10^{18} monovalent negative ions drift to the per second. Then the current is

A. 1.6 amp to the left

B. 1.6 amp to the right

C. 0.45 amp to the right

D. 0.45 amp to the left

Answer: B

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29. A metallic block has no potential difference applid across it, then the mean velocity of free electrons is $(T =$ absolute temperature of the block)

A. Proportional to T

B. Proportional to $\sqrt{T}$

C. Zero

D. Finite but independent of temperature

Answer: B

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30. 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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31. The positive temperature coefficient of resistance is for

A. Carbon

B. Germanium

C. Copper

D. An electrolyte

Answer: C

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32. The fact that the conductance of some metals rises to infinity at some temperature below a few Kelvin is called

A. Thermal conductivity

B. Optical conductivity

C. Magnetic conductivity

D. Superconductivity

Answer: D

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33. Dimensions of a block are $1cm \times 1cm \times 100cm$. If specific resistance of its material is $3 \times 10^{-7} ohm - m$, then the resistance between the opposite rectangular facesis

A. $3 \times 10^{-9} ohm$

B. $3 \times 10^{-7} ohm$

C. $3 \times 10^{-5} ohm$

D. $3 \times 10^{-3} ohm$

Answer: B

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34. In the above question, the resistance between the square faces is

A. $3 \times 10^{-9} ohm$

B. $3 \times 10^{-7} ohm$

C. $3 \times 10^{-5} ohm$

D. $3 \times 10^{-3} ohm$

Answer: D

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35. There is a current of 20 amperes in a copper wire of 10^{-6} square metre area of cross-section. If the number of free electrons per cubic metre is 10^{29} then the drift velocity is

A. $125 \times 10^{-3} m / \sec$

B. $12.5 \times 10^{-3} m / \sec$

C. $1.25 \times 10^{-3} m / \sec$

D. $1.25 \times 10^{-4} m / \sec$

Answer: C

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36. The electric intensity E , current density j and specific resistance k are related to each other by the relation

A. $E = jlk$

B. $E = jk$

C. $E = klj$

D. $k = jE$

Answer: B

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37. The resistance of a wire of uniform diameter d and length L is R . The resistance of another wire of the same material but diameter $2d$ and length 4L will be

A. $2R$

B. R

C. $R/2$

D. $R/4$

Answer: B

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38. There is a current of 1.344 amp in a copper wire whose area of cross-section normal to the length of the wire is

$1mm^2$. If the number of free electrons per cm^2 is 8.4×10^{22} then the drift velocity would be

A. $1.0mm / \sec$

B. $1.0m / \sec$

C. $0.1mm / \sec$

D. $0.01mm / \sec$

Answer: C

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39. It is easier to start a car engine on a hot day than on a cold day. This is because the internal resistance of the car battery

A. Decreases with rise in temperature

B. Increases with rise in temperature

C. Decreases with a fall in temperature

D. Does not change with a change in temperature

Answer: A

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40. 5 amperes of current is passed through a metallic conductor. The charge flowing in one minute in coulombs will be

A. 5

B. 12

C. $1/2$

D. 300

Answer: D

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41. Two wires of the same material are given. The first wire is twice as long as the second and has twice the diameter of the second. The resistance of the first will be

A. Twice of the second

B. Half of the second

C. Equal to the second

D. Four times of the second

Answer: B

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42. An electric wire is connected across a cell of e.m.f. E . The current I is measured by an ammeter of resistance R. According to ohm's law

A. $E = I^2 R$

B. $E = IR$

C. $E = R/I$

D. $E = I/R$

Answer: B

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43. The resistances of a wire at temperatures $t^\circ C$ and $0^\circ C$ are releated by

A. $R_t = R_0(1+\alpha t)$

B. $R_t = R_0(1-\alpha t)$

C. $R_t = R_0^2(1+\alpha t)$

D. $R_t = R_0^2(1-\alpha t)$

Answer: A

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44. An electric wire of length ' l ' and area of cross-section a has a resistance R ohm s. Another wire of the same material having same length and area of cross-section 4a has a resistance of

A. $4R$

B. $R/4$

C. $R/16$

D. $16R$

Answer: B

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45. For which of the following the resistance decreases on increasing the temperature

A. Copper

B. Tungsten

C. Germanium

D. Aluminium

Answer: C

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46. 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. $\frac{ml}{ne^2\tau A}$

B. $\frac{m\tau^2 A}{ne^2 l}$

C. $\dfrac{ne^2\tau A}{2ml}$

D. $\dfrac{ne^2 A}{2m\tau l}$

Answer: A

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47. The relaxation time in conductors

A. Increases with the increase of temperature

B. Decreases with the increase of temperature

C. It does not depend on temperature

D. All of sudden changes at 400 K

Answer: B

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48. Which of the following statement is correct

A. Liquids obey fully the ohm's law

B. Liquids obey partially the ohm's law

C. There is no relation between current and p.d for liquids

D. None of the above

Answer: B

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49. A certain piece of silver of given mass is to be made like a wire. Which of the following combination of length (L) and the area of cross-sectional (A) will lead to the smallest resistance

A. L and A

B. 2L and $A/2$

C. $L/2$ and 2A

D. Any of the above, because volume of silver remains same

Answer: C

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50. The resistance of a wire is 10Ω. Its length is increased by 10% by stretching. The new resistance will now be

A. 12Ω

B. 1.2Ω

C. 13Ω

D. 11Ω

Answer: A

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51. Resistance of tungsten wire at $150^{\circ} C$ is 133Ω. Its resistance temperature coefficient is $0.0045 / ^{\circ} C$. The resistance of this wire at $500^{\circ} C$ will be

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52. A metal wire of resistivity $64 \times 10^{-6} \Omega cm$ and length $198 cm$ has a resistance of 7Ω. Calculate its radius.

A. $2.4 cm$

B. $0.24 cm$

C. $0.024 cm$

D. $24 cm$

Answer: C

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53. 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. $18:1$

B. $9:1$

C. $6:1$

D. $2:3$

Answer: B

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54. For a metallic wire, the ratio $\frac{V}{i}$ ($V =$ applied potential difference and $i =$ current flowing) is

A. Independent of temperature

B. Increases as the temperature rises

C. Decreases as the temperature rises

D. Increases or decreases as temperature rises, depending upon the metal

Answer: B

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55. The resistance of a wire is R . If the length of the wire is doubled by stretching, then the new resistance will be

A. $2R$

B. $4R$

C. R

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

Answer: B

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56. Which of the following has a negative temperature coefficient

A. C

B. Fe

C. Mn

D. Ag

Answer: A

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57. The reciprocal of the reistance is ______

A. Conductance

B. Resistivity

C. Voltage

D. None of the above

Answer: A

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58. A solenoid is at potential difference 60 V and current flows through it is 15 ampere , then the resistance of coil will be

A. 4Ω

B. 8Ω

C. 0.25Ω

D. 2Ω

Answer: A

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59. All of the following statements are true except

A. Conductance is the reciprocal of resistance and is measured in Siemens

B. Ohm's law is not applicable at very low and very high temperatures

C. Ohm 's law is applicable to semiconductors

D. Ohm 's law is not applicable to electron tubes, discharge tubes and electrolytes

Answer: C

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60. A potential difference of V applied at the ends of a copper wire of length l and diameter d. On doubling only d drift velocity.

A. Becomes two times

B. Becomes half

C. Does not change

D. Becomes one fourth

Answer: C

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

A. $0.008 / C$

B. $0.006 / C$

C. $0.004 / C$

D. $0.001 / C$

Answer: A

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62. The resistance of a discharge tube is

A. Ohmic

B. Non-ohmic

C. Both (a) and (b)

D. Zero

Answer: B

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63. We are able to obtain fairly large currents in a conductor because

A. The electron drift speed is usually very large

B. The number density of free electrons is very high and this can compensate for the low values of the electron drift speed and the very small magnitude of the electron charge

C. The number density of free electrons as well as the electron drift speeds are very large and these compensate for the very small magnitude of the electron charge

D. The very small magnitude of the electron charge has to be divided by the still smaller product of the number density and drift speed to get the electric current

Answer: B

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64. A platinum resistance thermometer has a resistance of 50Ω at $20^{\circ} C$. When dipped in a liquid the resistance becomes 76.8Ω . The temperature coefficient of resistance for platinum is $\alpha = 3.92 \times 10^{-3} / {}^{\circ} C$. The temperature of the liquid is

A. $100^{\circ} C$

B. $137^{\circ} C$

C. $167^{\circ} C$

D. $200^{\circ} C$

Answer: C

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65. 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 $2v$?

A. $2I$

B. I

C. $I/2$

D. $I/4$

Answer: C

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66. The resistivity of a wire depends on its

A. Length

B. Area of cross-section

C. Shape

D. Material

Answer: D

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67. The conductivity of a superconductor is

A. Infinite

B. Very large

C. Very small

D. Zero

Answer: A

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68. In a neon discharge tube $2.9 \times 10^{18} Ne^{+}$ ions move to the right each second while 1.2×10^{18} eletrons move to the left per second. Electron charge is $1.6 \times 10^{-9} C$. The current in the discharge tube

A. 1A towards right

B. $0.66 A$ towards right

C. $0.66 A$ towards left

D. Zero

Answer: B

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69. A Steady current flows in a metalic conductor of non uniform cross section. The quantity/quantities which remain constant along the length of the conductor is/are

A. Current, electric field and drift speed

B. Drift speed only

C. Current and drift speed

D. Current only

Answer: D

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70. The resistivity of alloys $= R_{alloy}$, the resistivity of constituent metals R_{metal}. Then, usually

A. $R_{\text{alloy}} = R_{\text{metal}}$

B. $R_{\text{alloy}} < R_{\text{metal}}$

C. There is no simple relation between R_{alloy} and R_{metal}

D. $R_{\text{alloy}} > R_{\text{metal}}$

Answer: D

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71. Two wires A and B of same material and same mass have radius $2r$ and r. If resistance of wire A is 34Ω, then resistance of B will be

A. 544Ω

B. 272Ω

C. 68Ω

D. 17Ω

Answer: A

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72. Two rods of same material and length have their electric resistance in ratio $1:2$. When both rods are dipped in water, the correct statement will be

A. A has more loss of weight

B. B has more loss of weight

C. Both have same loss of weight

D. Loss of weight will be in the ratio $1:2$

Answer: A

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73. $20\mu A$ current flows for 30 seconds in a wire, transfer of charge will be

A. $2 \times 10^{-4} C$

B. $4 \times 10^{-4} C$

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

D. $8 \times 10^{-4} C$

Answer: C

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74. σ_1 and σ_2 are the electrical conductivities of Ge and Na respectively. If these substances are heated, then

A. Both σ_1 and σ_2 increase

B. σ_1 increases and σ_2 decrease

C. σ_1 decreases and σ_2 increases

D. Both σ_1 and σ_2 decrease

Answer: B

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75. $1.6mA$ current is flowing in conducting wire then the number of electrons flowing per second is

A. 10^{11}

B. 10^{16}

C. 10^{19}

D. 10^{15}

Answer: B

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76. A current I is passing through a wire having two sections P and O of uniform diameters d and $d/2$ respectively. If the mean drift velocity of electrons in section P and Q is denoted by v_P and v_Q respectively, then

A. $v = v$

B. $v = \frac{1}{2}v$

C. $v = \frac{1}{4}v$

D. $v = 2v$

Answer: C

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77. If the elctric current is passed through a nerve, the man is excited, why?

A. Begins to laugh

B. Begins to weep

C. Is excited

D. Becomes insensitive to pain

Answer: C

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78. The resistance of a coil is 4.2Ω at $100^{\circ}C$ and the temperature coefficient of resistance of its material is $\frac{0.004}{.^{\circ}C}$. Its resistance at $0^{\circ}C$ is

A. 6.5Ω

B. 5Ω

C. 3Ω

D. 4Ω

Answer: C

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

A. $1:3:5$

B. $5:3:1$

C. $1:15:125$

D. $125:15:1$

Answer: D

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80. Conductivity increases in the order of

A. Al, Ag, Cu

B. Al, Cu, Ag

C. Cu, Al, Ag

D. Ag, Cu, Al

Answer: B

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81. A uniform wire of resistance R is uniformly compressed along its length, until its radius becomes n times the original radius. Now resistance of the wire becomes

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

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

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

D. nR

Answer: A

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82. 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 $0^\circ C$ will be

A. 1 ohm

B. 2 ohm

C. 3 ohm

D. 4 ohm

Answer: D

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83. If an electron revolves in the circular path of radius $0.5 A^\circ$ at a frequency of 5×10^{15} cycles/sec. The equivalent electric current is

A. $0.4 mA$

B. $0.8 mA$

C. $1.2 mA$

D. $1.6 mA$

Answer: B

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84. Equal potentials are applied on an iron and copper wire of same length. In order to have the same current flow in the two wires, the ratio r (iron)/r(copper) of their radii must be (Given that specific resistance of iron $= 1.0 \times 10^{-7} ohm - m$ and specific resistance of copper $= 1.7 \times 10^{-8} ohm - m$)

A. About 1.2

B. About 2.4

C. About 3.6

D. About 4.8

Answer: B

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85. An electron(charge $= 1.6 \times 10^{19}$ coulomb) is moving in a circle of radius $5.1 \times 10^{11} m$ at a freqnecy of 6.8×10^{15} revolution/sec. The equivalent current is approximately

A. 5.1×10^{-3} amp

B. 6.8×10^{-3} amp

C. 1.1×10^{-3} amp

D. 2.2×10^{-3} amo

Answer: C

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86. A rod of certain metal is $1.0m$ long and $0.6cm$ in diameter. Its resistance is $3.0 \times 10\&(-3)$ ohm. Another disc made of the same metal is $2.0cm$ in diameter and $1.0mm$ thick. What is the resistance between the round faces of the disc?

A. 1.35×10^{-8} ohm

B. 2.70×10^{-7} ohm

C. 4.05×10^{-6} ohm

D. 8.10×10^{-5} ohm

Answer: B

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87. At what temperature will the resistance of a copper wire become three times its value at $0^{\circ} C$ (Temperature coefficient of resistance for copper $= 4 \times 10^{-3}$ per C)

A. $400^{\circ} C$

B. $450^{\circ} C$

C. $500^{\circ} C$

D. $550^{\circ} C$

Answer: C

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88. An electron revolves 6×10^{1} times/sec in circular loop. The current in the loop is

A. $0.96mA$

B. $0.06\mu A$

C. $28.8A$

D. None of these

Answer: A

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89. The charge of an electron is $1.6 \times 10^{19} C$. How many electrons strike the screen of a cathode ray tube each second when the beam current is 16 mA

A. 10^{17}

B. 10^{19}

C. 10^{19}

D. 10^{17}

Answer: A

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90. If potential $V = 100 \pm 0.5$ Volt and current $I = 10 \pm 0.2$ amp are given to us. Then what will be the value of resistance

A. 10 ± 0.7 ohm

B. 5 ± 2 ohm

C. 0.1 ± 0.2 ohm

D. None of these

Answer: D

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91. A nichrome wire 50 cm long and one square millimetre cross- section carries a current of 4 A when connected to a 2 V battery. The resistivity of nichrome wire in ohm metre is

A. 1×10^{-6}

B. 4×10^{-7}

C. 3×10^{-7}

D. 2×10^{-7}

Answer: A

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92. If an observer is moving with respect to a stationary electron, then he observes

A. Only magnetic field

B. Only electric field

C. Both (a) and (b)

D. None of the above

Answer: C

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93. Calculate the amount of charge flowing in 2 minutes in a wire of resistance 10Ω when a potential difference of 20 V is applied between its ends

A. $120C$

B. $240C$

C. $20C$

D. $4C$

Answer: B

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

A. $R/4$

B. $R/2$

C. R

D. $2R$

Answer: A

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95. The drift velocity does not depend upon

A. Cross-section of the wire

B. Length of the wire

C. Number of free electrons

D. Magnitude of the current

Answer: B

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96. There is a current of 40 ampere in a wire of $10^{-6}m^2$ are of cross-section. If the number of free electron per m^3 is 10^{29} then the drift velocity will be

A. $1.25 \times 10^3 m/s$

B. $2.50 \times 10^{-3} m/s$

C. $25.0 \times 10^{-3} m/s$

D. $250 \times 10^{-3} m / s$

Answer: B

Watch Video Solution

97. At room temperature copper has free electron density of $8.4 \times 10^{28} per m^3$. The copper conductor has a cross-section of $10^{-6} m^2$ and carries a current of 5.4 A. What is the electron drift velocity in copper?

A. $400 m / s$

B. $0.4 m / s$

C. $0.4 mm / s$

D. $72 m / s$

Answer: C

Watch Video Solution

98. The resistance of a 5 cm long wire is 10Ω . It is uniformly stretched so that its length becomes 20 cm . The resistance of the wire is

A. 160Ω

B. 80Ω

C. 40Ω

D. 20Ω

Answer: A

Watch Video Solution

99. The resistance of an incandescent lamp is

A. Greater when switched off

B. Smaller when switched on

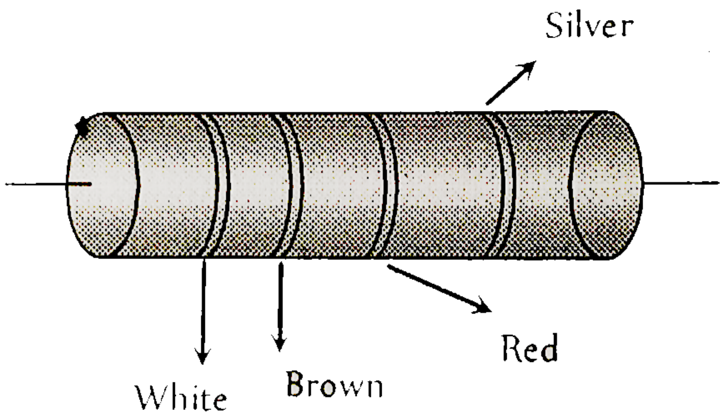
C. Greater when switched on

D. The same whether it is switched off or switched on

Answer: C

Watch Video Solution

100. In the figure a carbon resistor has bands of different colours on its body as mentioned in the figure. The value of the resistance is



A. $2.2k\Omega$

B. $3.3k\Omega$

C. $5.6k\Omega$

D. $9.1k\Omega$

Answer: D

Watch Video Solution

101. By increasing the temperature , the specific resistance of a conductor and a semiconductor

A. Increases for both

B. Decreases for both

C. Increases, decreases

D. Decreases, increases

Answer: C

Watch Video Solution

102. Which of the following is vector quantity

A. Current density

B. Current

C. Wattless current

D. Power

Answer: A

Watch Video Solution

103. Masses of 3 wires of same metal are in the ratio $1:2:3$ and their lengths are in the ratio $3:2:1$. The electrical resistances are in ratio

A. $1:4:9$

B. $9:4:1$

C. $1:2:3$

D. $27 : 6 : 1$

Answer: D

Watch Video Solution

104. A current of 1 mA is flowing through a copper wire. How many electrons will pass a given point in one second $[e = 1.6 \times 10^{19}$Coulomb]

A. 6.25×10^{19}

B. 6.25×10^{15}

C. 6.25×10^{31}

D. 6.25×10^{8}

Answer: B

Watch Video Solution

105. The drift velocity of free elecrons in a conductor is v, when a current i is flowing in it. If both the radius and current are doubled, then the drift velocity wil be

A. v

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

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

D. $\frac{v}{8}$

Answer: B

Watch Video Solution

106. A wire of radius r has resistance R. If it is stretched to a radius of $\frac{3r}{4}$, its resistance becomes

A. $\frac{9R}{16}$

B. $\frac{16R}{9}$

C. $\frac{81R}{256}$

D. $\frac{256R}{81}$

Answer: D

Watch Video Solution

107. The resistance of a conductor increases with

A. Increase in length

B. Increase in temperature

C. Decrease in cross–sectional area

D. All of these

Answer: D

Watch Video Solution

108. A copper wire has a square cross-section, 2.0 mm on a side. It carries a current of 8 A and the density of free electrons is $8 \times 10^{28} m^{-3}$. The drift speed of electrons is equal to

A. $0.156 \times 10^{-3} ms$

B. $0.156 \times 10^{-2} ms$

C. $3.12 \times 10^{-3} ms$

D. $3.12 \times 10^{-2} ms$

Answer: A

Watch Video Solution

109. Two wires of same material have length L and 2 L and cross– sectional areas 4 A and A respectively. The ratio of their specific resistance would be

A. $1:2$

B. $8:1$

C. $1:8$

D. $1:1$

Answer: D

Watch Video Solution

110. When a current flows through a conductor its temperature

A. May increase or decrease

B. Remains same

C. Decreases

D. Increases

Answer: D

Watch Video Solution

111. What length of the wire of specific resistance $48 \times 10^{-8} \Omega m$ is needed to make a resistance of 4.2Ω (diameter of wire $= 0.4mm$)

A. $4.1m$

B. $3.1m$

C. $2.1m$

D. $1.1m$

Answer: D

Watch Video Solution

112. A strip of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

A. Each of these increases

B. Each of these decreases

C. Copper strip increases and that of germanium decreases

D. Copper strip decreases and that of germanium increases

Answer: D

Watch Video Solution

113. The length of a given cylindrical wire is increased by 100%. Due to the consequent decrease in diameter the change in the resistance of the wire will be

A. $300\ \%$

B. $200\ \%$

C. $100\ \%$

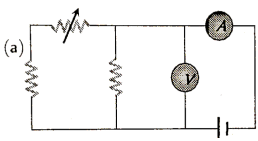
D. $50\ \%$

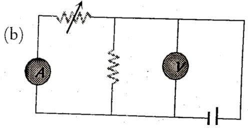
Answer: A

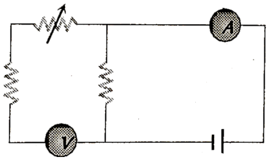
Watch Video Solution

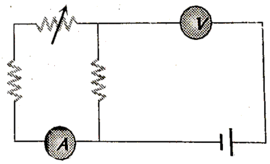
114. Express which of the following set ups can be used to verify

ohm's law?

A. 

B. 

C. 

D. 

Answer: A

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115. We have two wire A and B of the same mass and the same material. The diameter of the wire A is half of that B. If the resistance of wire A is $24 ohm$ them the resistance of wire B will be

A. 12 ohm

B. 3.0 ohm

C. 1.5 ohm

D. None of the above

Answer: C

Watch Video Solution

116. In a hydrogen atube it is observed that through a given cross-section 3.13×10^{15} electrons per sec, moving from right to left and3.12×10^{15} protons per sec are moving from left to right. The electric current in the discharge tube ad its direction is

A. 1mA towards right

B. 1mA towards left

C. 2mA towards left

D. 2mA towards right

Answer: A

Watch Video Solution

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

A. Zero charge

B. Only positive charge

C. Only negative charge

D. Charge proportional to current i

Answer: A

Watch Video Solution

118. The length of the wire is doubled. Its conductance will be

A. Unchanged

B. Halved

C. Quadrupled

D. $1/4$ of the original value

Answer: B

Watch Video Solution

119. A source of e.m.f. $E = 15V$ and having negligible internal resistance is connected to a variable resistance so that the current in the circuit increases with time as $i = 1.2t + 3$ Then, the total charge that will flow in first five second will be

A. $10C$

B. $20C$

C. $30C$

D. $40C$

Answer: C

Watch Video Solution

120. The new resistance of wire of $R\Omega$, whose radius is reduced half, is

A. $16R$

B. $3R$

C. $2R$

D. R

Answer: A

Watch Video Solution

121. A resistance R is stretched to four times its length. Its new resistance will be

A. 4R

B. 64R

C. $R/4$

D. $16R$

Answer: D

Watch Video Solution

122. What is the resistance of a carbon resistance which has bands of colours brown, black and brown

A. 100Ω

B. 1000Ω

C. 10Ω

D. 1Ω

Answer: A

Watch Video Solution

123. The lead wires should have

A. Larger diameter and low resistance

B. Smaller diameter and high resistance

C. Smaller diameter and low resistance

D. Larger diameter and high resistance

Answer: A

Watch Video Solution

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

A. Low resistivity

B. High resistivity

C. Low temperature coefficient of resistance

D. Both (b) and (c)

Answer: D

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125. When a potential difference is applied across the ends of a linear metallic conductor

A. The free electrons are accelerated continuously from the lower potential end to the higher potential end of the conductor

B. The free electrons are accelerated continuously from the higher potential end to the lower potential end of the conductor

C. The free electrons acquire a constant drift velocity from the lower potential end to the higher potential end of the conductor

D. The free electrons are set in motion from their position of rest

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: B

Watch Video Solution

127. A wire of diameter 0.02 metre contains 1028 free electrons per cubic metre. For an electrical current of 100 A , the drift velocity of the free electrons in the wire is nearly

A. $1 \times 10^{-19} m / s$

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

C. $2 \times 10^{-4} m / s$

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

Answer: C

Watch Video Solution

128. The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied?

A. Length = 50 cm, diamter = 0.5 mm

B. Length = 100 cm, diameter = 1mm

C. Length = 200 cm, diameter = 2mm

D. Length = 300 cm, diameter = 3mm

Answer: A

Watch Video Solution

129. The colour sequence in a carbon resistor is red, brown, orange and silver. The resistance of the resistor is

A. $21 \times 10^3 \pm 10\,\%$

B. $23 \times 10^1 \pm 10$

C. $21 \times 10^3 \pm 5\,\%$

D. $12 \times 10^3 \pm 5\,\%$

Answer: A

Watch Video Solution

130. A thick wire is stretched so that its length become two times. Assuming that there is no change in its density, then what is the ratio of change in resistance of wire to the initial resistance of wire

A. $2:1$

B. $4:1$

C. $3:1$

D. $1:4$

Answer: C

Watch Video Solution

131. The length of the resistance wire is increased by 10%. What is the corresponding change in the resistance of wire

A. $10\,\%$

B. $25\,\%$

C. $21\,\%$

D. $9\,\%$

Answer: C

Watch Video Solution

132. The electric field E, current density j and conductivity σ of a conductor are related as

A. $\sigma = E/j$

B. $\sigma = j/E$

C. $\sigma = jE$

D. $\sigma = 1/jE$

Answer: B

Watch Video Solution

133. Two wires that are made up of two different materials whose specific resistance are in the ratio 2 : 3, length 3 : 4 and area 4 : 5. The ratio of their resistances is

A. $6:5$

B. $6:8$

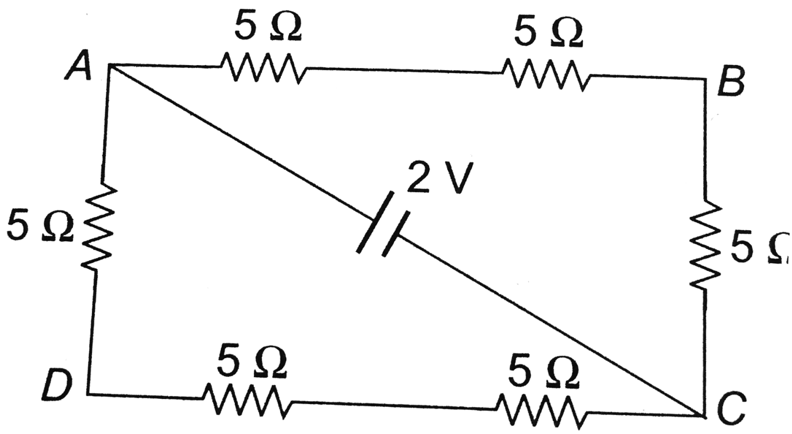
C. $5:8$

D. $1:2$

Answer: C

Watch Video Solution

134. The potential difference between points A and B adjoining figure is



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

B. $\frac{8}{9}V$

C. $\frac{4}{3}V$

D. $2V$

Answer: C

Watch Video Solution

135. Two resistors of resistance R_1 and R_2 having $R_1 > R_2$ are connected in parallel. For equivalent resistance R, the correct statement is

A. $R > R_1 + R_2$

B. $R_1 < R < R_2$

C. $R_2 < R < (R_1 + R_2)$

D. $R < R_1$

Answer: D

Watch Video Solution

136. A wire of resistance R is divided in 10 equal parts. These parts are connected in parallel, the equivalent resistance of such connection will be

A. $0.01R$

B. $0.1R$

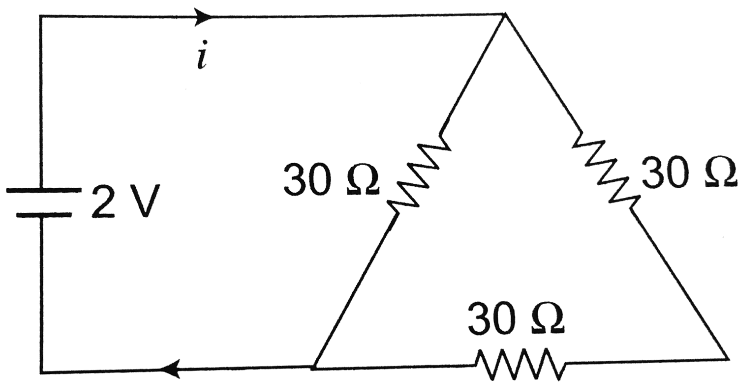
C. $10R$

D. $100R$

Answer: A

Watch Video Solution

137. The current in the adjoining circuit will be



A. $\frac{1}{45}$ ampere

B. $\frac{1}{15}$ ampere

C. $\frac{1}{10}$ ampere

D. $\frac{1}{5}$ ampere

Answer: C

Watch Video Solution

138. There are 8 equal resistances R . Two are connected in parallel, such four groups are connected in series, the total resistance of the system will be

A. $R/2$

B. $2R$

C. $4R$

D. $8R$

Answer: B

Watch Video Solution

139. Three resistance of one ohm each are connected in parallel. Such connection is again connected with $2/3\Omega$

resistor in series. The resultant resistance will be

A. $\frac{5}{3}\Omega$

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

C. 1Ω

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

Answer: C

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140. The lowest resistance which can be obtained by connecting 10 resistors each of $1/10 ohm$ is

A. $1/250\Omega$

B. $1/200\Omega$

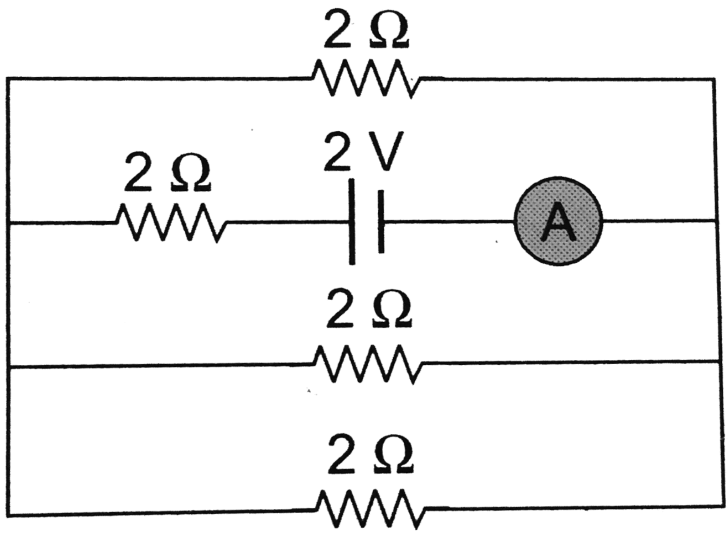
C. $1/100\Omega$

D. $1/10\Omega$

Answer: C

Watch Video Solution

141. The reading of the ammeter as per figure shown is



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

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

C. $\frac{1}{2}A$

D. $2A$

Answer: B

Watch Video Solution

142. Three resistors each of 2 ohm are connected together in a triangular shape. The resistance between any two vertices will be

A. $4/3$ ohm

B. $3/4$ ohm

C. 3 ohm

D. 6 ohm

Answer: A

Watch Video Solution

143. 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. x / n^2

B. $n^2 x$

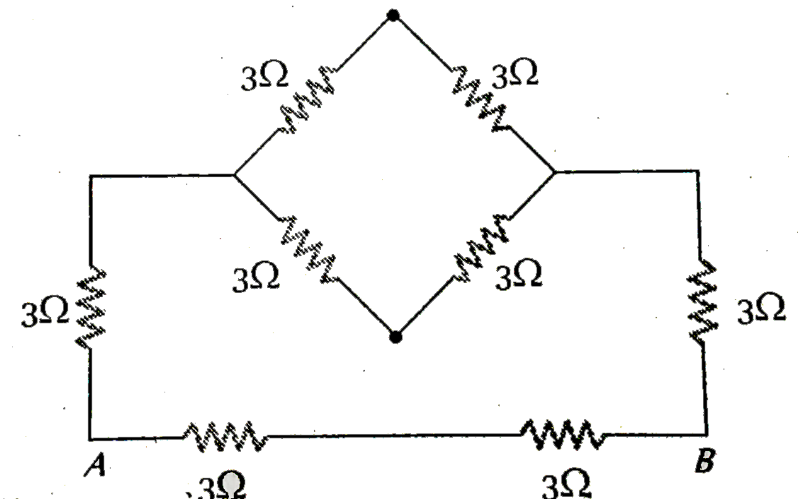
C. x / n

D. nx

Answer: B

Watch Video Solution

144. Equivalent resistance between A and B will be



A. 2 ohm

B. 18 ohm

C. 6 ohm

D. 3.6 ohm

Answer: D

Watch Video Solution

145. A wire has resistance 12 ohms. If it is bent in the form of a equilateral triangle. The resistance between any two terminals in ohms is:

A. 9 ohms

B. 12 ohms

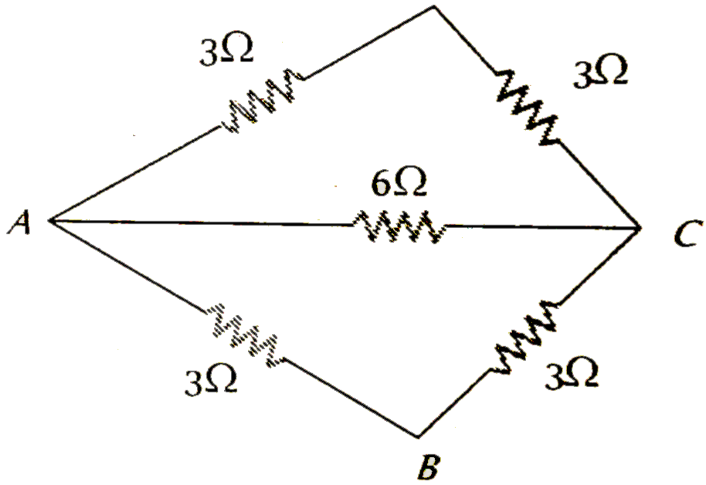
C. 6 ohms

D. $8/3$ ohms

Answer: D

Watch Video Solution

146. The effective resistance between the points A and B in the figure is



A. 5Ω

B. 2Ω

C. 3Ω

D. 4Ω

Answer: B

Watch Video Solution

147. Three resistances of magnitude 2, 3 and 5 ohm are connected in parallel to a battery of 10 volts and of negligible resistance. The potential difference across 3Ω resistance will be

A. 2 volts

B. 3 volts

C. 5 volts

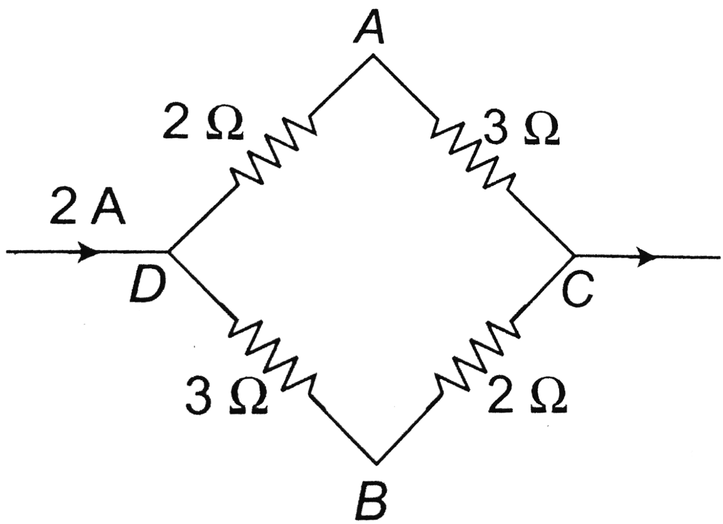
D. 10 volts

Answer: D

Watch Video Solution

148. A current of $2A$ flows in a system of conductor as shown.

The potential difference $(V_A - V_B)$



A. $+2V$

B. $+1V$

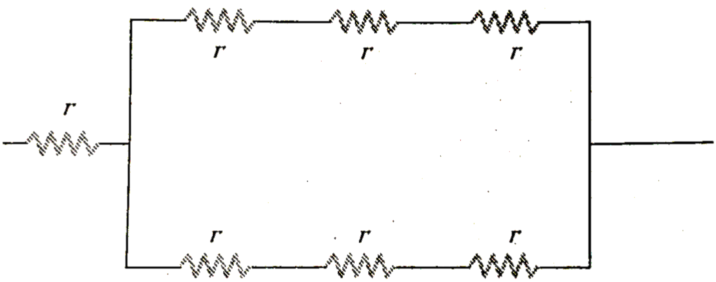
C. $-1V$

D. $-2V$

Answer: B

Watch Video Solution

149. Referring to the figure below, the effective resistance of the network is



A. $2r$

B. $4r$

C. $10r$

D. $5r/2$

Answer: D

Watch Video Solution

150. Two resistances are joined in parallel whose resultant is $6/8 ohm$. One of the resistance wire is broken and the effective resistance becomes 2Ω . Then the resistance in ohm of the wire that got broken was

A. $3/5$

B. 2

C. $6/5$

D. 3

Answer: C

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151. Given three equal resistors, how many different combination of all the three resistor can be made

A. Six

B. Five

C. Four

D. Three

Answer: C

Watch Video Solution

152. Lamps used for household lighting are connected in

A. Series

B. Parallel

C. Mixed circuit

D. None of the above

Answer: B

Watch Video Solution

153. The equivalent resistance of resistors connected in series is always

A. Equal to the mean of component resistors

B. Less than the lowest of component resistors

C. In between the lowest and the highest of component resistors

D. Equal to sum of component resistors

Answer: D

Watch Video Solution

154. A cell of negligible resistance and e.m.f. 2 volts is connected to series combination of 2, 3 and 5 ohm . The potential difference in volts between the terminals of 3 ohm resistance will be

A. 0.6

B. $2/3$

C. 3

D. 6

Answer: A

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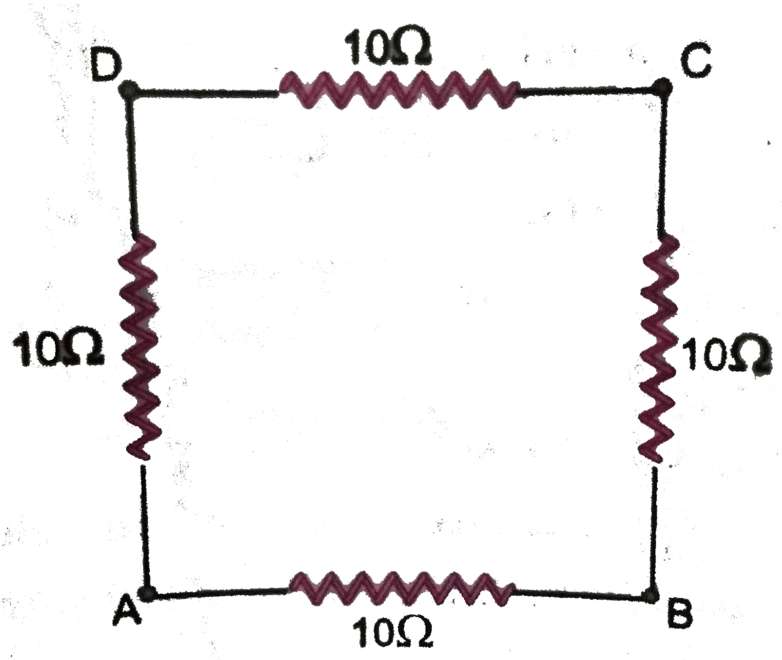
155. Four resistances, each of 10Ω, are connected to form a square as shown in (Fig. 3.52), find the equivalent resistance between the opposite corners A and C.



A. 10 ohm

B. 40 ohm

C. 20 ohm

D. $10/4$ ohm

Answer: A

Watch Video Solution

156. Two resistors are connected (a) in series (b) in parallel The equivalent resistance in the two cases are $9ohm$ and $2ohm$ respectively. Then the resistances of the component resistor are

A. 2 ohm and 7 ohm

B. 3 ohm and 6 ohm

C. 3 ohm and 9 ohm

D. 5 ohm and 4 ohm

Answer: B

Watch Video Solution

157. 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. 0.25 amp

B. 0.5 amp

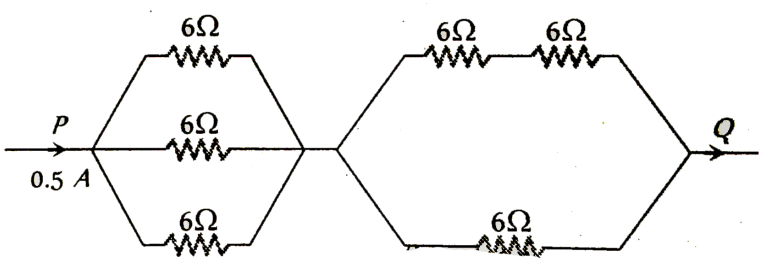
C. 1.0 amp

D. 1.5 amp

Answer: B

Watch Video Solution

158. Resistances of 6 ohm each are connected in the manner shown in adjoining figure. With the current 0.5 ampere as shown in figure, the potential difference $V_P - V_Q$ is



A. $3.6V$

B. $6.0V$

C. $3.0V$

D. $7.2V$

Answer: C

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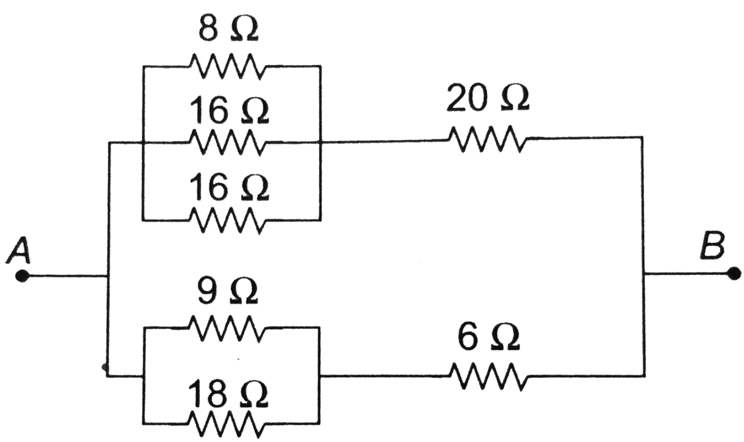
159. The equivalent resistance of the arrangement of resistances shown in adjoining figure between the points A and B is



A. 54 ohm

B. 18 ohm

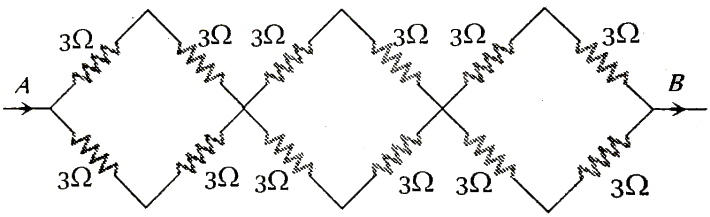
C. 36 ohm

D. 9 ohm

Answer: B

Watch Video Solution

160. In the network of resistors shown in the adjoining figure, the equivalent resistance between A and B is



A. 54 ohm

B. 18 ohm

C. 36 ohm

D. 9 ohm

Answer: D

Watch Video Solution

161. A wire is broken in four equal parts. A packet is formed by keeping the four wires together. The resistance of the packet in comparison to the resistance of the wire will be

A. Equal

B. One fourth

C. One eight

D. $\frac{1}{16}$ th

Answer: D

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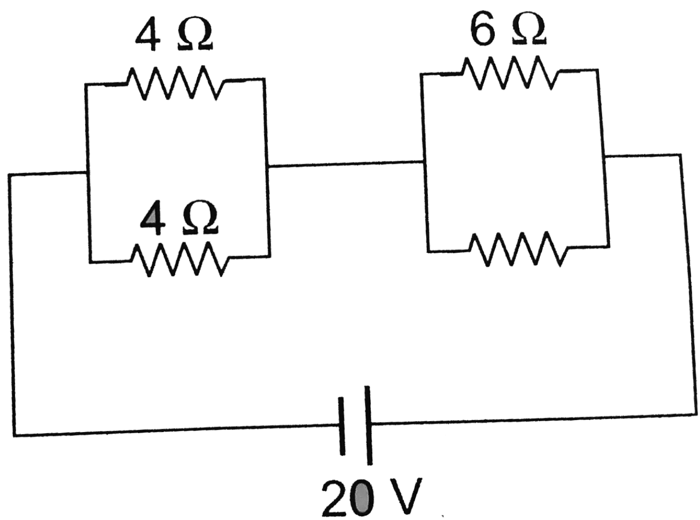
162. Four resistances are connected in a circuit in the given figure. The electric current flowing through $4 ohm$ and $6 ohm$ resistance is respectively



A. 2 amp and 4 amp

B. 1 amp and 2 amp

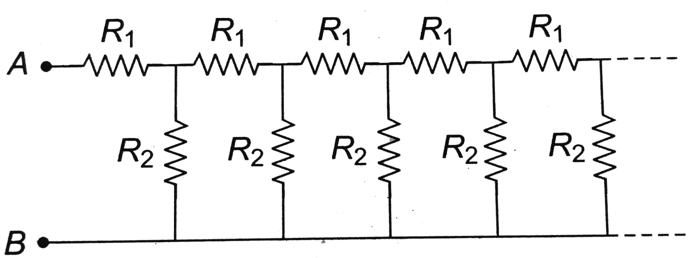
C. 1 amp and 1 amp

D. 2 amp and 2 amp

Answer: D

Watch Video Solution

163. An infinite sequence of resistance is shown in the figure. The resultant between A and B will be, when $R_1 = ohm$ and $R_2 = 2ohm$



A. Infinity

B. 1Ω

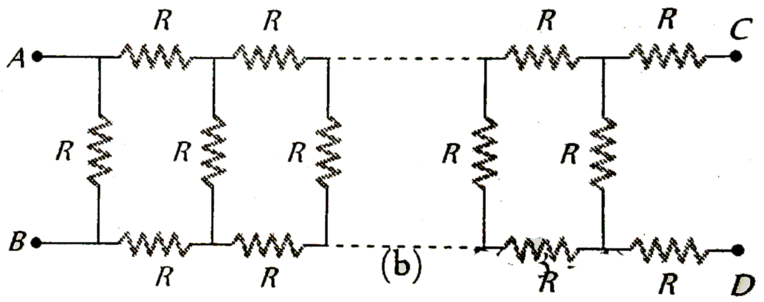
C. 2Ω

D. 1.5Ω

Answer: C

Watch Video Solution

164. In the figure, the value of resistors to be connected between C and D so that the resistance of the entire circuit between A and B does not change with the number of elementary sets used is



A. R

B. $R(\sqrt{3}-1)$

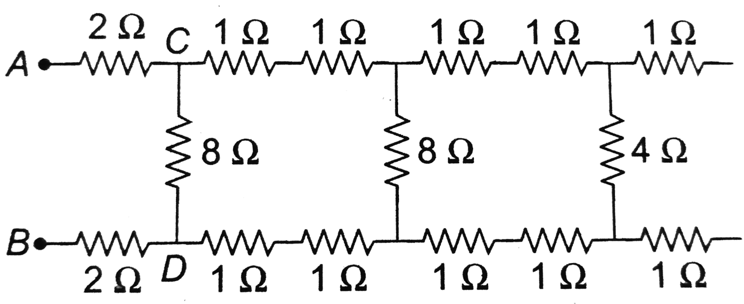
C. 3R

D. $R(\sqrt{3}+1)$

Answer: B

Watch Video Solution

165. In the figure shown, the total resistance between A and B is



A. 12Ω

B. 4Ω

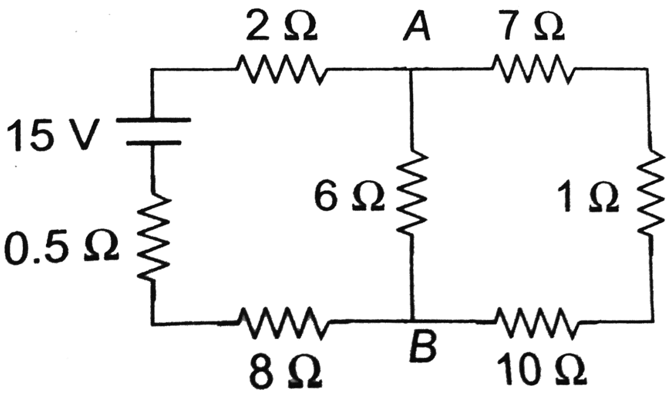
C. 6Ω

D. 8Ω

Answer: D

Watch Video Solution

166. The current from the battery in circuit diagram shown is



A. 1A

B. 2A

C. 1.5 A

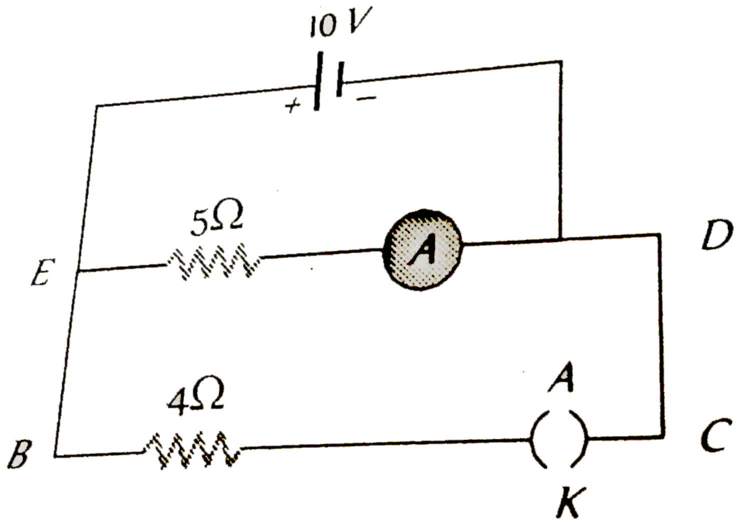
D. 3A

Answer: A

Watch Video Solution

167. In the figure shown, the total resistance between A and B

is



A. 50 A

B. 2A

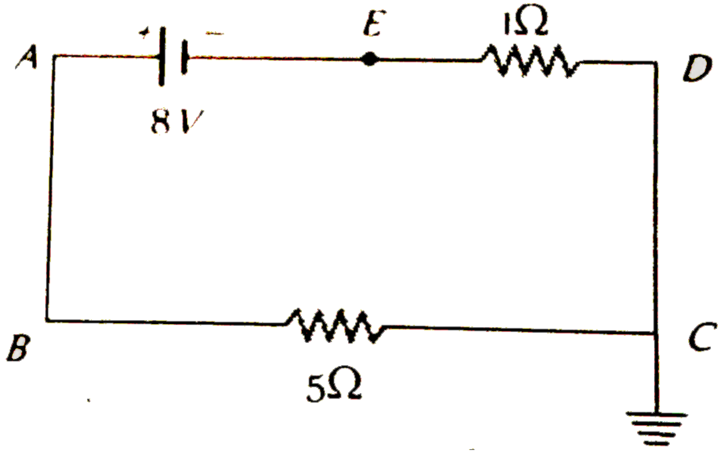
C. $0.5A$

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

Answer: B

Watch Video Solution

168. In the given circuit, the potential of the point E is



A. Zero

B. $-8V$

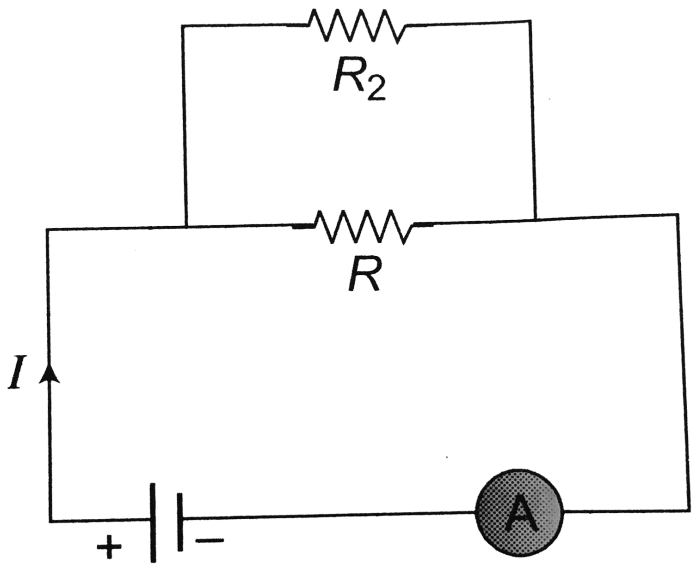
C. $-4/3V$

D. $4/3V$

Answer: C

Watch Video Solution

169. If a resistanceR_2 is connected in parallel with the resistance R in the circuit shown, then possible value of current through R and the possible value of R_2 will be



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

B. I, $2B$

C. $\frac{I}{3}$, $2B$

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

Answer: D

Watch Video Solution

170. Four wires AB , BC , CD , DA of resistance 4 ohm each and a fifth wire BD of resistance 8 ohm are joined to form a rectangle ABCD of which BD is a diagonal. The effective resistance between the points A and B is

A. 24 ohm

B. 16 ohm

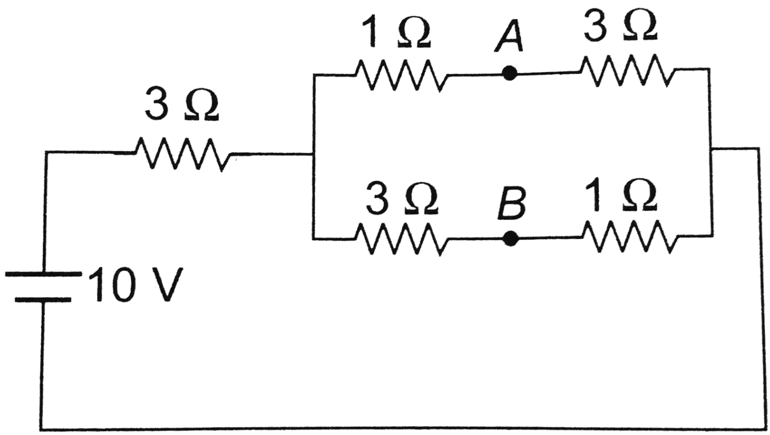
C. $\frac{4}{3}$ ohm

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

Answer: D

Watch Video Solution

171. A battery of e.m.f. $10V$ is connected to resistance as shown in figure. The potential difference $V_A - V_B$ between the point A and B is



A. $-2V$

B. $2V$

C. $5V$

D. $\frac{20}{11}V$

Answer: B

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172. Three resistances, each of 1 ohm , are joined in parallel. Three such combinations are put in series, then the resultant resistance will be

A. 9 ohm

B. 3 ohm

C. 1 ohm

D. $\frac{1}{3}$ ohm

Answer: C

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173. A student has 10 resistors of resistance ' r '. The minimum resistance made by him from given resistors is

A. $10r$

B. $\frac{r}{10}$

C. $\frac{r}{100}$

D. $\frac{r}{3}$

Answer: B

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

A. 40Ω

B. $\frac{40}{3}\Omega$

C. $\frac{5}{2}\Omega$

D. 100Ω

Answer: A

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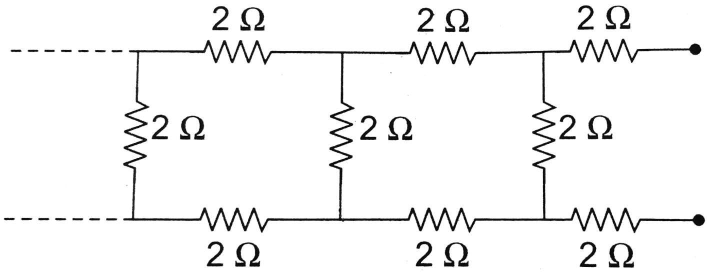
175. The equivalent resistance of the following infinite network of resistance is



A. Less than 4Ω

B. 4Ω

C. More than 4Ω but than 12Ω

D. 12Ω

Answer: C

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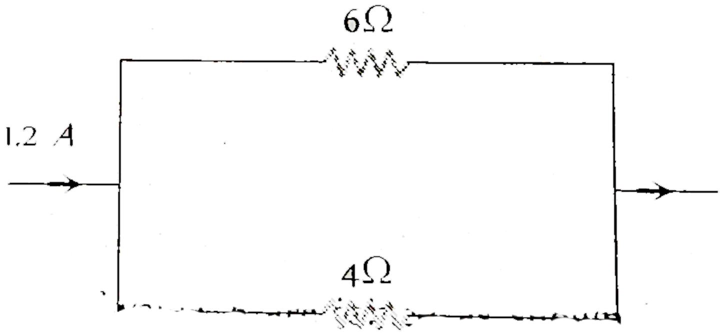
176. In the figure given below, the current passing through 6Ω resistor is



A. 0.40 ampere

B. 0.48 ampere

C. 0.72 ampere

D. 0.80 ampere

Answer: B

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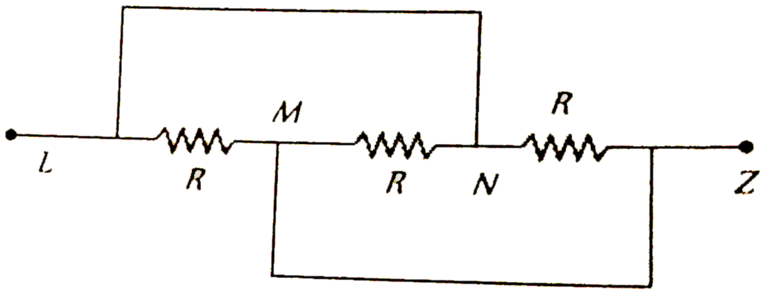
177. Three equal resistances each of value R are joined as shown in the figure. The equivalent resistance between M and

N is



A. R

B. 2R

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

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

Answer: D

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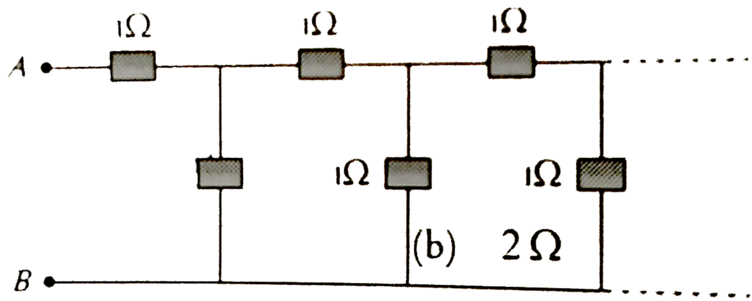
178. The equivalent resistance between points A and B of an infinite network of resistances each of 1Ω connected as shown, is



A. Infinite

B. 2Ω

C. $\dfrac{1+\sqrt{5}}{2}\Omega$

D. Zero

Answer: C

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179. A copper wire of resistance R is cut into ten parts of equal length. Two pieces each are joined in series and then five such combination are joined in parallel. The new combination will have resistance

A. R

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

C. $\frac{R}{5}$

D. $\frac{R}{25}$

Answer: D

Watch Video Solution

180. A wire has resistance 12Ω. It is bent in the form of a circle. The effective resistance between two points across a diameter is.

A. 12Ω

B. 6Ω

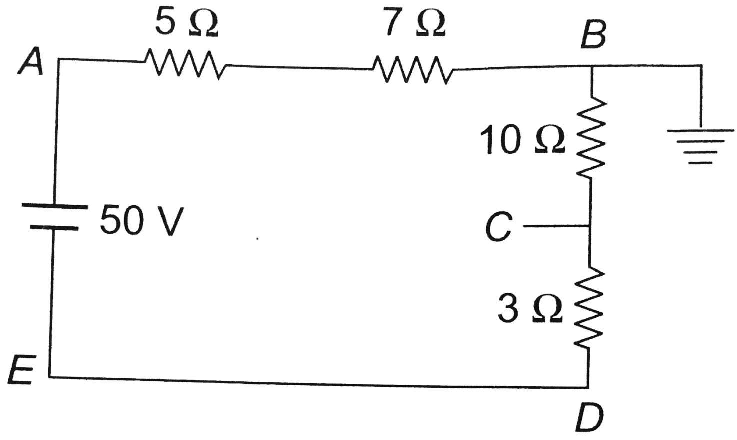
C. 3Ω

D. 24Ω

Answer: C

Watch Video Solution

181. In the circuit shown, the point B is earthed. The potential at the point $'A'$ is



A. $14V$

B. $24V$

C. $26V$

D. $50V$

Answer: B

Watch Video Solution

182. Three resistors each of 4Ω are connected together to form a network. The equivalent resistance of the network cannot be

A. 1.33Ω

B. 3.0Ω

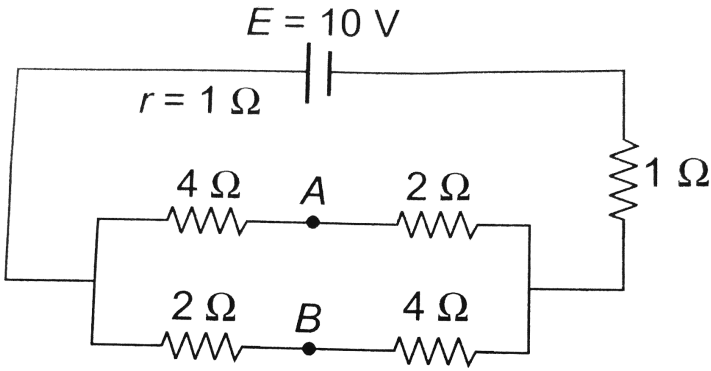
C. 6.0Ω

D. 12.0Ω

Answer: B

Watch Video Solution

183. In the circuit shown below, the cell has an e.m.f. of $10V$ and internal resistance of $1ohm$. The other resistances are shown in the figure. The potential difference $V_A - V_B$ is



A. $6V$

B. $4V$

C. $2V$

D. $-2V$

Answer: D

Watch Video Solution

184. A wire of resistance R is cut into ' n ' equal parts. These parts are then connected in parallel. The equivalent resistance of the combination will be

A. nR

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

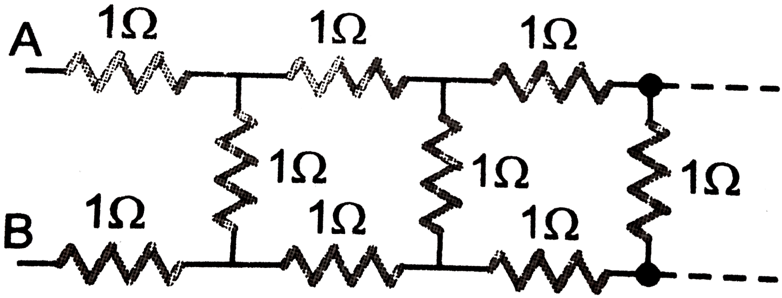
C. $\frac{n}{R}$

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

Answer: D

Watch Video Solution

185. The resistance between the terminal point A and B of the given infinitely long circuit will be



A. $(\sqrt{3}-1)$

B. $(1-\sqrt{3})$

C. $(1+\sqrt{3})$

D. $(2+\sqrt{3})$

Answer: C

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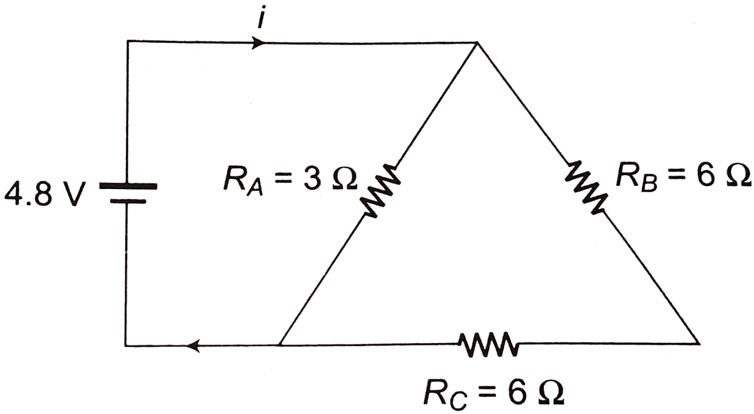
186. The current in the given circuit is.



A. $8.31A$

B. $682A$

C. $4.92A$

D. $2A$

Answer: D

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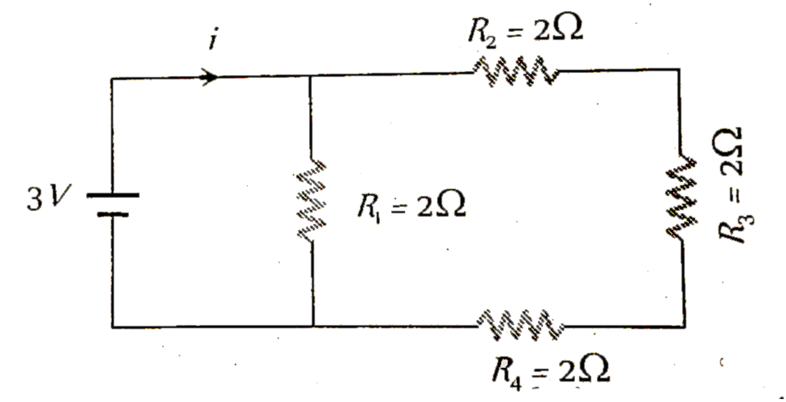
187. What is the current (i) in the circuit as shown in figure



A. $2A$

B. $1.2A$

C. $1A$

D. $0.5A$

Answer: A

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

A. n

B. $\frac{1}{n^2}$

C. n^2

D. $\frac{1}{n}$

Answer: C

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189. A uniform wire of 16Ω is made into the form of a square. Two opposite corners of the square are connected by a wire of resistance 16Ω . The effective resistance between the other two opposite corners is

A. 32Ω

B. 20Ω

C. 8Ω

D. 4Ω

Answer: D

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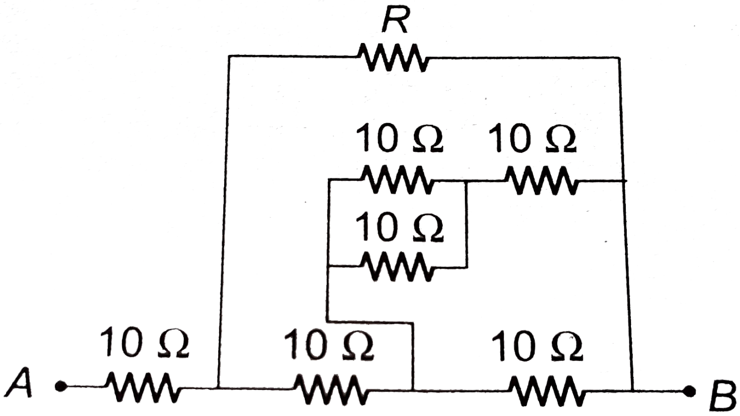
190. For what valve of R the net resistance of the circuit will be 18 ohms.



A. 8Ω

B. 10Ω

C. 16Ω

D. 24Ω

Answer: C

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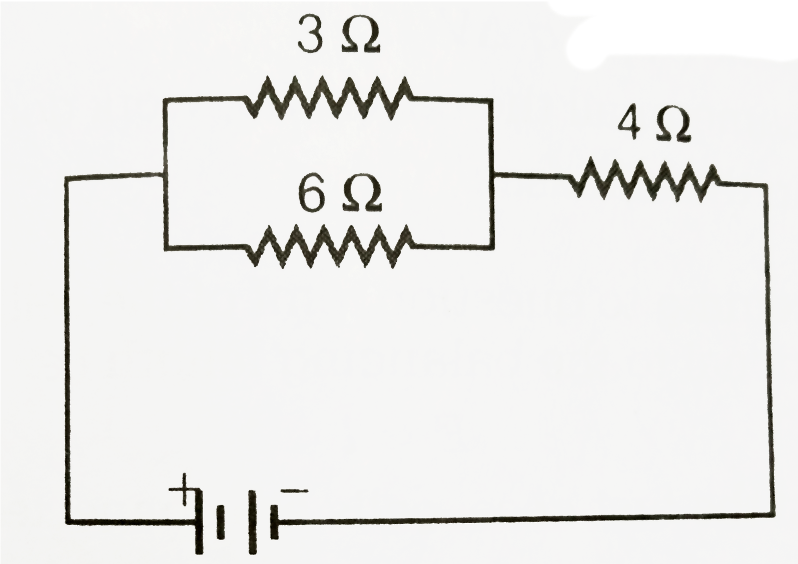
191. Current through 3Ω resistor is 0.8A, then potential drop through 4Ω resistor is



A. $9.6V$

B. $2.6V$

C. $4.8V$

D. $1.2V$

Answer: C

Watch Video Solution

192. Three resistances 4Ω each of are connected in the form of an equilateral triangle. The effective resistance between two corners is

A. 8Ω

B. 12Ω

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

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

Answer: D

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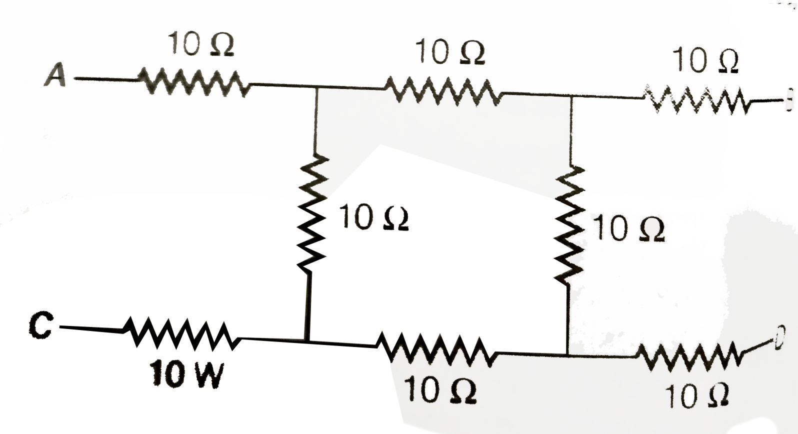
193. What will be the equivalent resistance fo circuit shown in figure between two points A and D?



A. 10Ω

B. 20Ω

C. 30Ω

D. 40Ω

Answer: C

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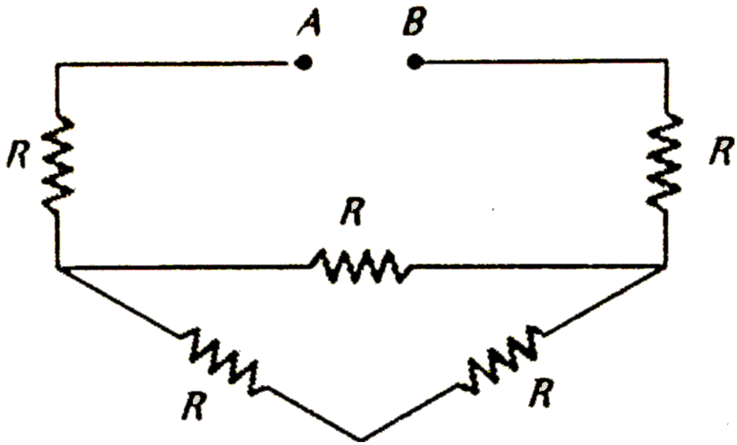
194. What is the equivalent resistance between A and B in the figure below if $R = 3\Omega$



A. 9Ω

B. 12Ω

C. 15Ω

D. None of these

Answer: D

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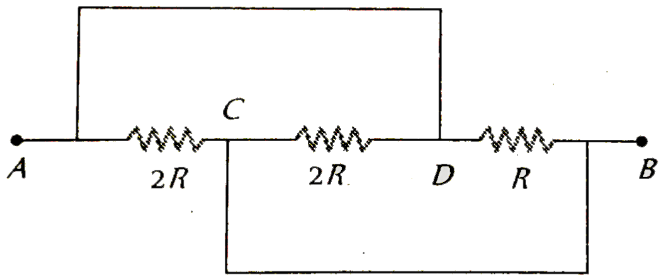
195. What is the equivalent resistance between A and B



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

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

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

D. $2R$

Answer: C

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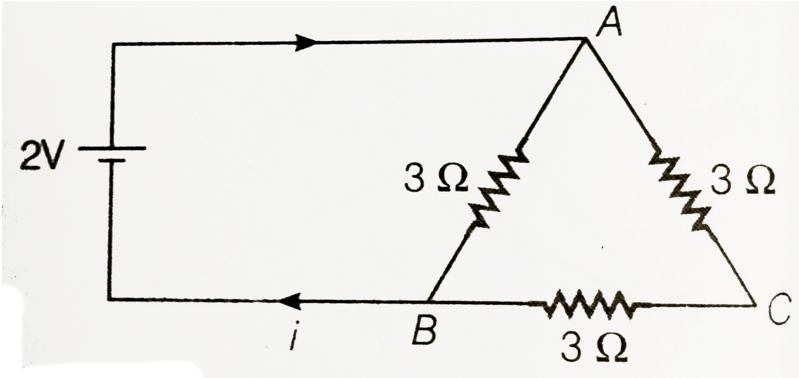
196. The current in the following circuit is



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

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

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

D. 1A

Answer: D

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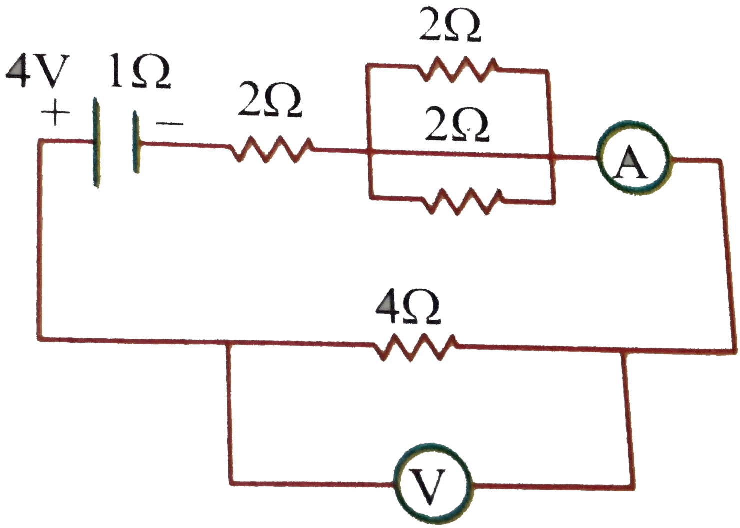
197.



What is the equivalent resistance of the circuit

A. 6Ω

B. 7Ω

C. 8Ω

D. 9Ω

Answer: C

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198. 10 wires (same length, same area, same material) are connected in parallel and each has 1Ω resistance, then the equivalent resistance will be

A. 10Ω

B. 1Ω

C. 0.1Ω

D. 0.001Ω

Answer: C

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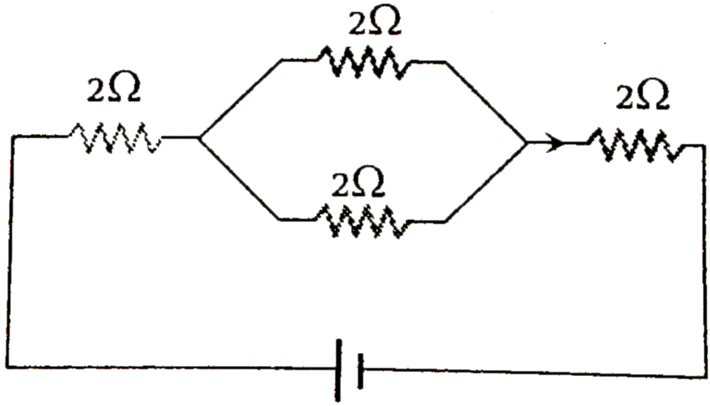
199. The equivalent resistance of the circuit shown in the figure is



A. 8Ω

B. 6Ω

C. 5Ω

D. 4Ω

Answer: C

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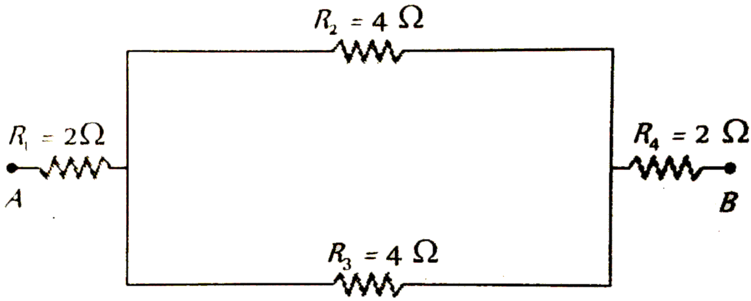
200. In the given figure, the equivalent resistance between the points A and B is



A. 8Ω

B. 6Ω

C. 4Ω

D. 2Ω

Answer: B

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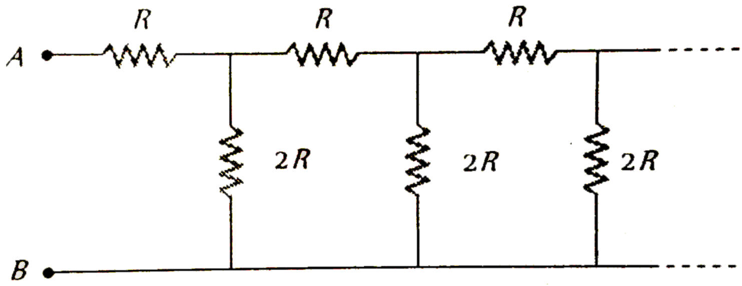
201. An infinite ladder network is arranged with resistances R and 2 R as shown. The effective resistance between terminals A and B is



A. ∞

B. R

C. 2R

D. 3R

Answer: C

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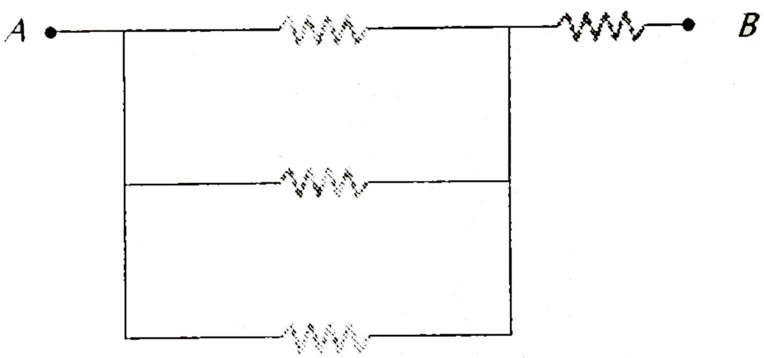
202. If all the resistors shown have the value 2 ohm each, the equivalent resistance over AB is



A. 2ohm

B. 4 ohm

C. $1\frac{1}{3}$ ohm

D. $2\frac{2}{3}$ohm

Answer: D

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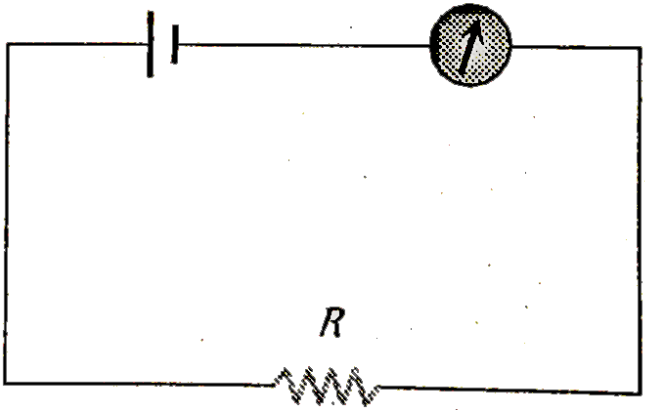
203. A battery of e mf 10 V and internal resistance 3Ω is connected to a resistor as shown in the figure. If the current in the circuit is 0.5 A . then the resistance of the resistor will be



A. 19Ω

B. 17Ω

C. 10Ω

D. 12Ω

Answer: B

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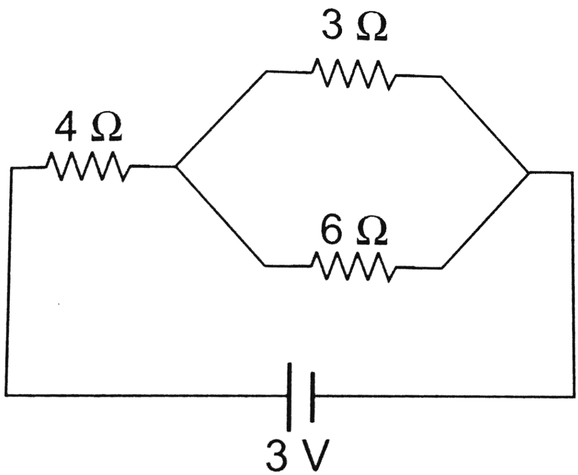
204. The potential drop across the 3Ω resistor is



A. 1V

B. 1.5V

C. 2V

D. 3V

Answer: A

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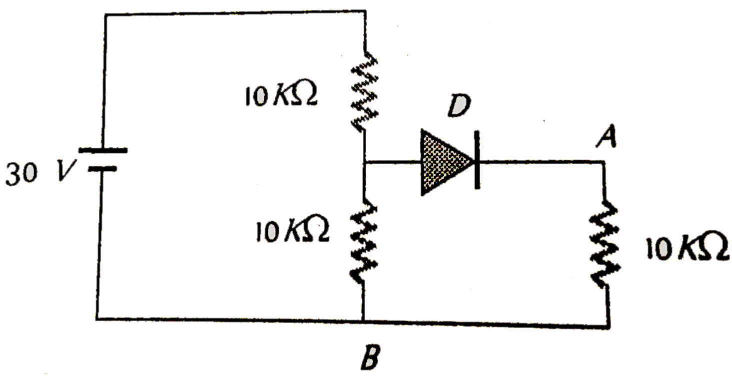
205. In the given figure, potential difference between A and B is



A. 0

B. 5 volt

C. 10 volt

D. 15 volt

Answer: C

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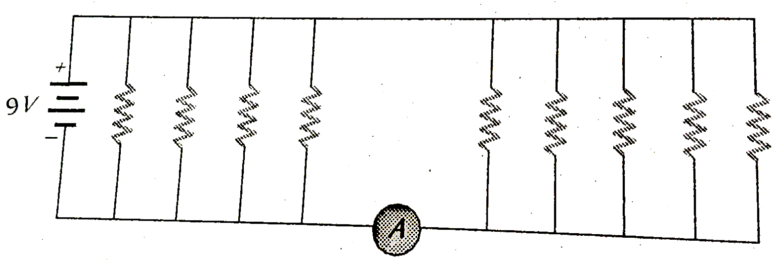
206. If each resistance in the figure is of 9Ω then reading of ammeter is



A. 5A

B. 8A

C. 2A

D. 9A

Answer: A

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207. Four resistances 10Ω, 5Ω, 7Ω and 3Ω are connected so that they form the sides of a rectangle AB, BC, CD and DA respectively. Another resistance of 10Ω is connected across the diagonal AC. The equivalent resistance between A and B is

A. 2Ω

B. 5Ω

C. 7Ω

D. 10Ω

Answer: B

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208. Two wires of equal diameters of resistivies ρ_1 and ρ_2 and lengths l and l respectively are joined in series. The equivalent resistivity of the combination is

A. $\dfrac{\rho_1 l_1 + \rho_2 l_2}{l_1 + l_2}$

B. $\dfrac{\rho_1 l_2 + \rho_2 l_1}{l_1 - l_2}$

C. $\dfrac{\rho_1 l_2 + \rho_2 l_1}{l_1 + l_2}$

D. $\dfrac{\rho_1 l_1 - \rho_2 l_2}{l_1 - l_2}$

Answer: A

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209. Four resistances of 100Ω each are connected in the form of square. Then, the effective resistance along the diagonal points is

A. 200Ω

B. 400Ω

C. 100Ω

D. 150Ω

Answer: C

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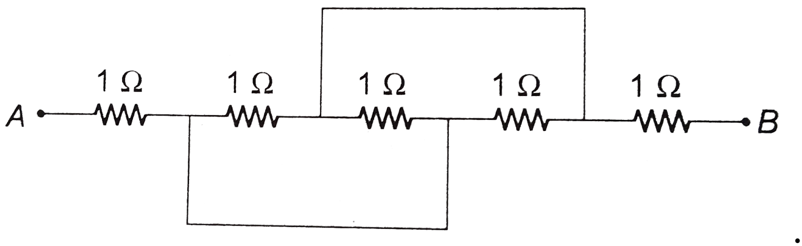
210. Equivalent resistance between the points A and B (in Ω)



A. $\frac{1}{5}$

B. $1\frac{1}{4}$

C. $2\frac{1}{3}$

D. $3\frac{1}{2}$

Answer: C

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211. Two wires of the same material and equal length are joined in parallel combination. If one of them has half the thickness of the other and the thinner wire has a resistance of 8 ohms , the resistance of the combination is equal to

A. $\frac{5}{8}$ ohms

B. $\frac{8}{5}$ ohms

C. $\frac{3}{8}$ ohms

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

Answer: B

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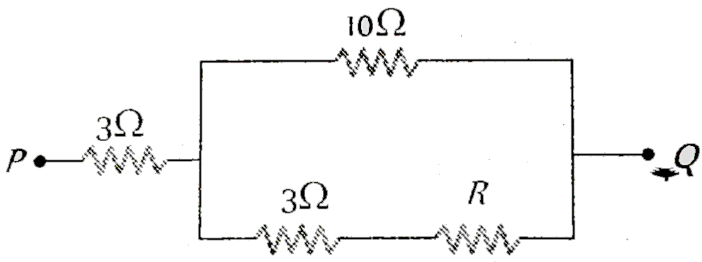
212. In the circuit shown here, what is the value of the unknown resistor R so that the total resistance of the circuit between points P and Q is also equal to R



A. 3 ohms

B. $\sqrt{39}$ ohms

C. $\sqrt{69}$ ohms

D. 10 ohms

Answer: C

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213. A uniform wire of resistance 9Ω is cut into 3 equal parts. They are connected in form of equilateral triangle ABC. A cell of e.m.f. $2V$ and negligible internal resistance is connected across B and C. Potential difference across AB is

A. 1V

B. 2V

C. 3V

D. 0.5V

Answer: A

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214. The resistors of resistances 2Ω, 4Ω and 8Ω are connected in parallel, then the equivalent resistance of the combination will be

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

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

C. $\frac{7}{4}\Omega$

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

Answer: A

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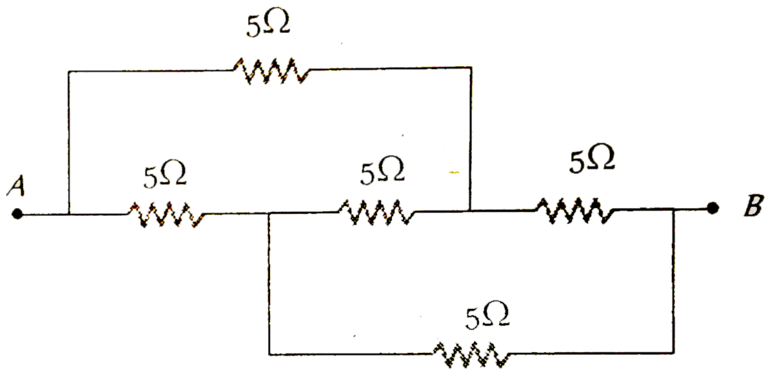
215. Effective resistance between A and B is



A. 15Ω

B. 5Ω

C. $\frac{5}{2}\Omega$

D. 20Ω

Answer: B

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216. The effective resistance of two resistors in parallel is $\frac{12}{7}\Omega$. If one of the resistors is disconnected the resistance becomes 4Ω. The resistance of the other resistor is

A. 4Ω

B. 3Ω

C. $\frac{12}{7}\Omega$

D. $\frac{7}{12}\Omega$

Answer: B

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217. Two resistance wires on joining in parallel the resultant resistance is ohms $\frac{6}{5}$ ohms. One of the wire breaks, the effective resistance is 2 ohms . The resistance of the broken wire is

A. $\frac{3}{5}$ ohm

B. 2 ohm

C. $\frac{6}{5}$ ohm

D. 3 ohm

Answer: D

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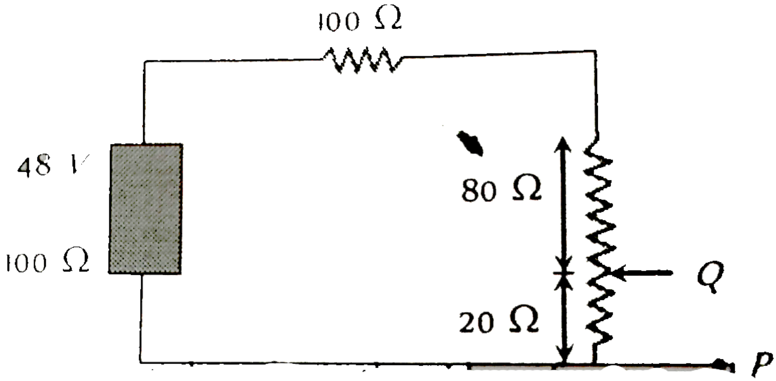
218. In the circuit, the potential difference across PQ will be nearest to



A. $9.6V$

B. $6.6V$

C. $4.8V$

D. $3.2V$

Answer: D

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219. Three resistors are connected to form the sides of a triangle ABC , the resistance of the sides AB, BC and CA are 40 ohms , 60 ohms and 100 ohms respectively. The effective resistance between the points A and B in ohms will be

A. 32

B. 64

C. 50

D. 200

Answer: A

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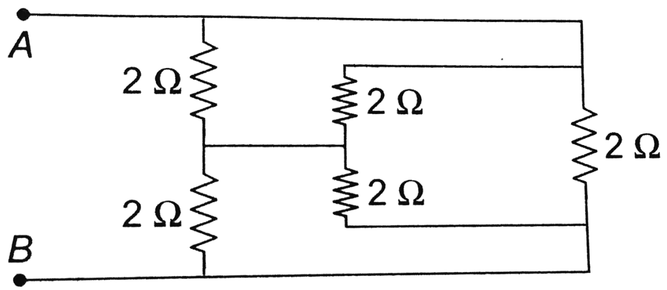
220. Find the equivalent resistance across AB :



A. 1Ω

B. 2Ω

C. 3Ω

D. 4Ω

Answer: A

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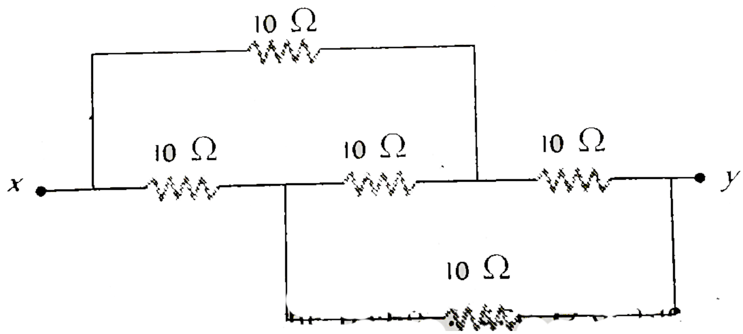
221. The equivalent resistance between x and y in the circuit shown is



A. 10Ω

B. 40Ω

C. 20Ω

D. $\frac{5}{2}\Omega$

Answer: A

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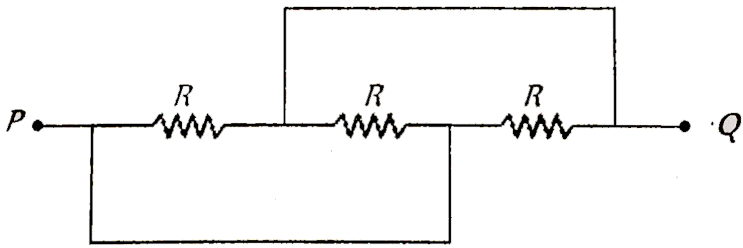
222. The equivalent resistance between the points P and Q of the circuit given is



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

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

C. 4R

D. 2R

Answer: B

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223. Two wires of the same dimensions but resistivities ρ_1 and ρ_2 are connected in series. The equivalent resistivity of the combination is

A. $\rho_1 + \rho_2$

B. $\dfrac{\rho_1 + \rho_2}{2}$

C. $\sqrt{\rho_1 \rho_2}$

D. $2(\rho_1 + \rho_2)$

Answer: B

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

A. 4

B. 6

C. 8

D. 12

Answer: B

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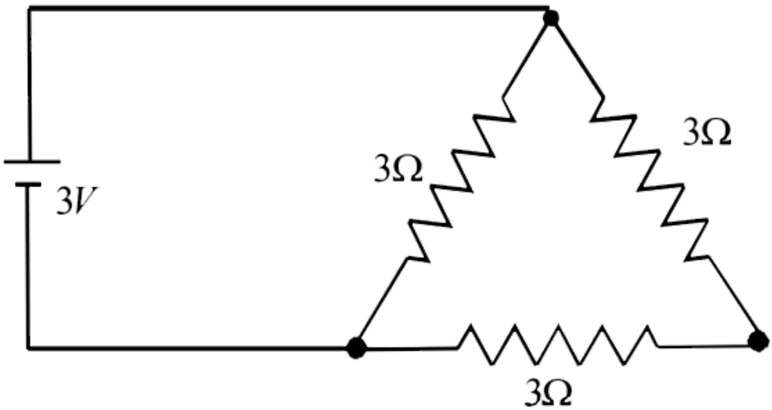
225. A 3 volt battery with negligible internal resistance is connected in a circuit as shown in the figure. The current I, in the circuit will be



A. $1/3A$

B. $1A$

C. $1.5A$

D. $2A$

Answer: C

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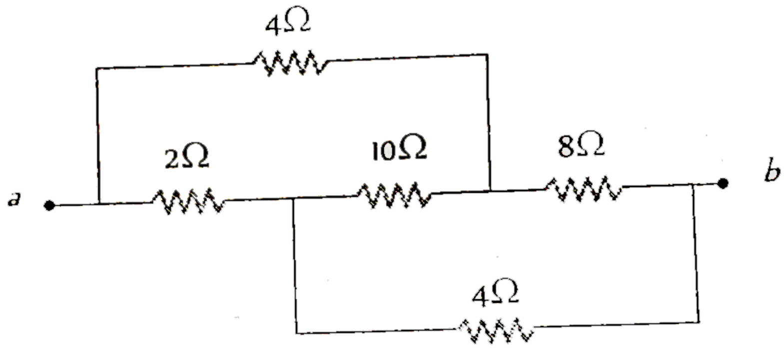
226. Find the equivalent resistance between the points a and b



A. 2Ω

B. 4Ω

C. 8Ω

D. 16Ω

Answer: B

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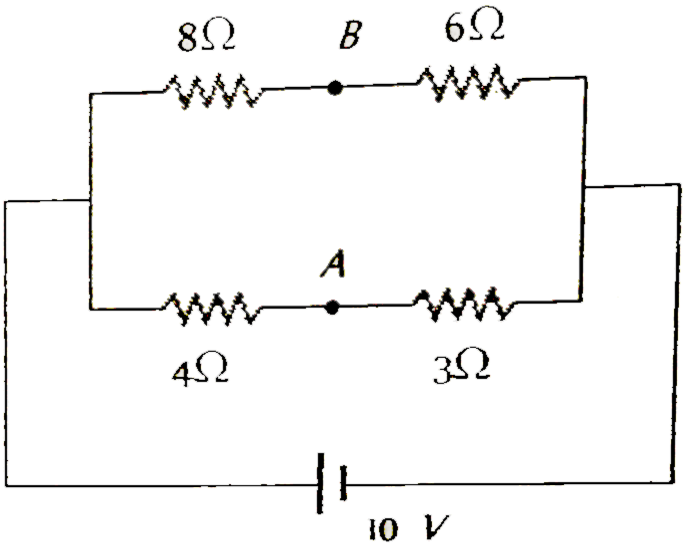
227. The potential difference between point A & B is



A. $\frac{20}{7}V$

B. $\frac{40}{7}V$

C. $\frac{10}{7}V$

D. 0

Answer: D

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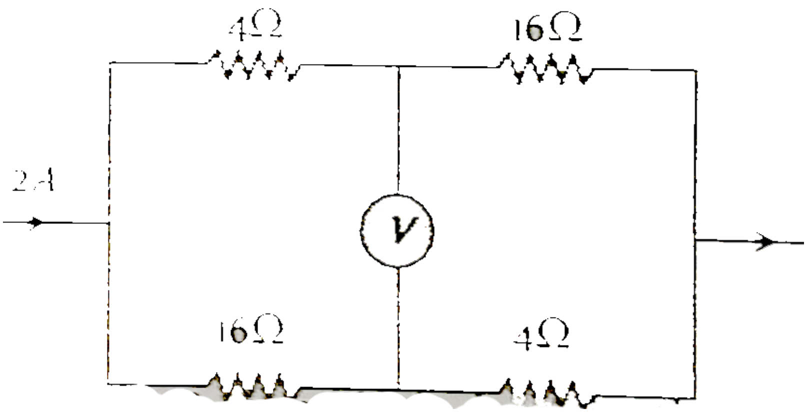
228. In the circuit shown below. The reading of the voltmeter V is



A. 12V

B. 8V

C. 20V

D. 16V

Answer: A

Watch Video Solution

229. A wire has a resistance of 12 ohm . It is bent in the form of equilateral triangle. The effective resistance between any two corners of the triangle is

A. 9 ohms

B. 12 ohms

C. 6 ohms

D. $8/3$ ohms

Answer: D

Watch Video Solution

230. 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. $3.5A$

B. $5A$

C. $6A$

D. $10A$

Answer: B

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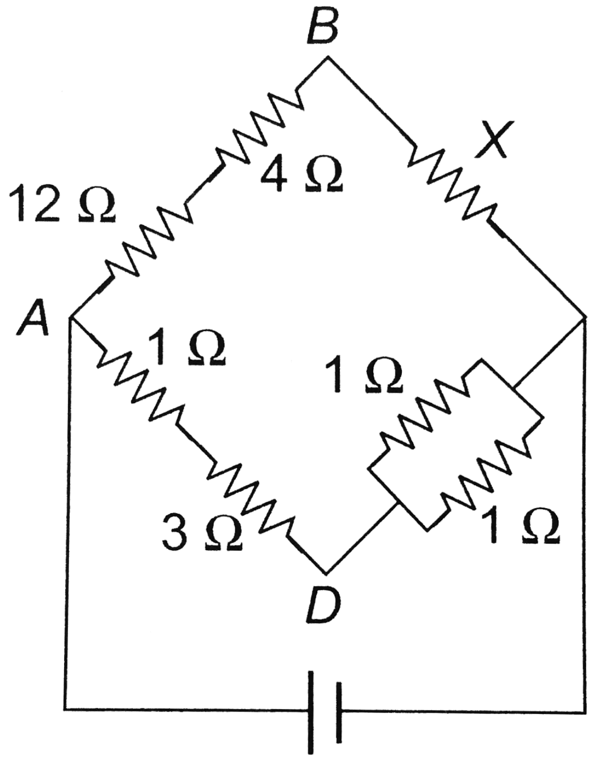
231. In the circuit shown in the adjoining figure, the current between B and D is zero, the unknown resistance of



A. 4Ω

B. 2Ω

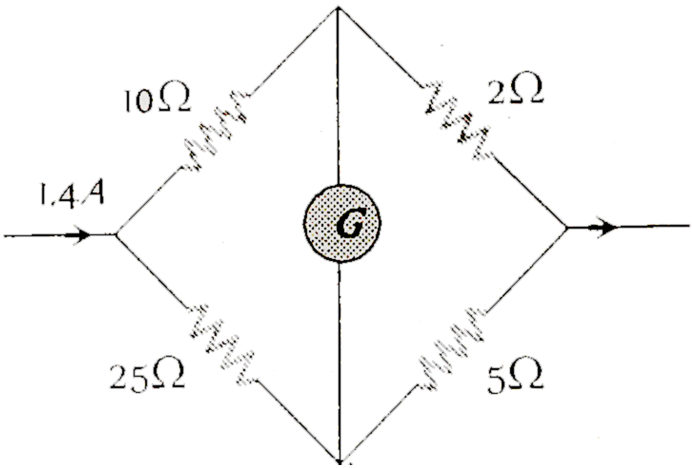
C. 3Ω

D. e.m.f of a cell is required to find the value of X

Answer: B

Watch Video Solution

232. In the circuit shown in the figure, the current flowing in 2Ω resistance



A. $1.4A$

B. $1.2A$

C. $0.4A$

D. $1.0A$

Answer: D

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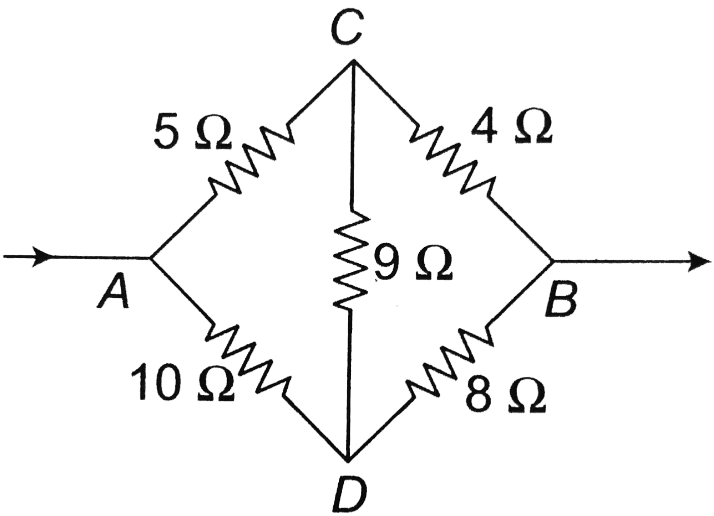
233. Five resistor are connected as shown in the diagram. The equivalent resistance between A and B is



A. 6 ohm

B. 9 ohm

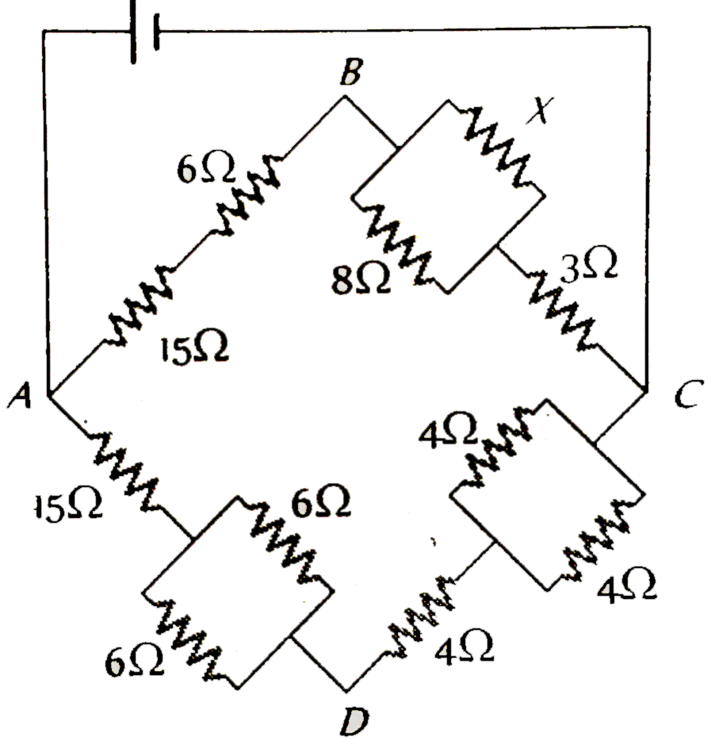
C. 12 ohm

D. 15 ohm

Answer: A

Watch Video Solution

234. In the figure given the value of X resistance will be, when the p.d. between B and D is zero



A. 4 ohm

B. 6 ohm

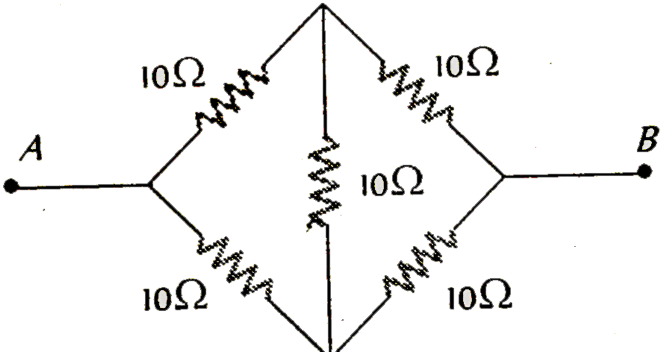
C. 8 ohm

D. 9 ohm

Answer: C

Watch Video Solution

235. The effective resistance between points A and B is



A. 10Ω

B. 20Ω

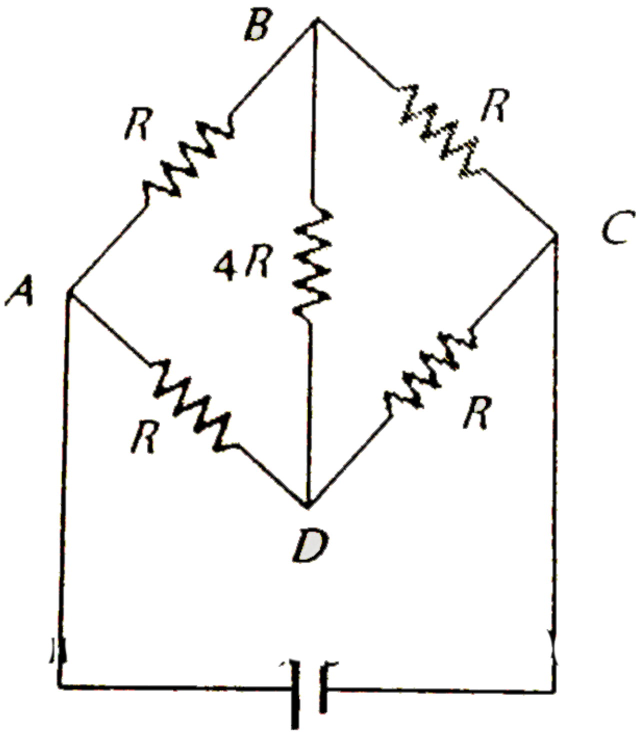
C. 40Ω

D. None of the above three values

Answer: A

Watch Video Solution

236. Five resistors of given values are connected together as shown in the figure. The current in the arm BD will be



A. Half the current in the arm ABC

B. Zero

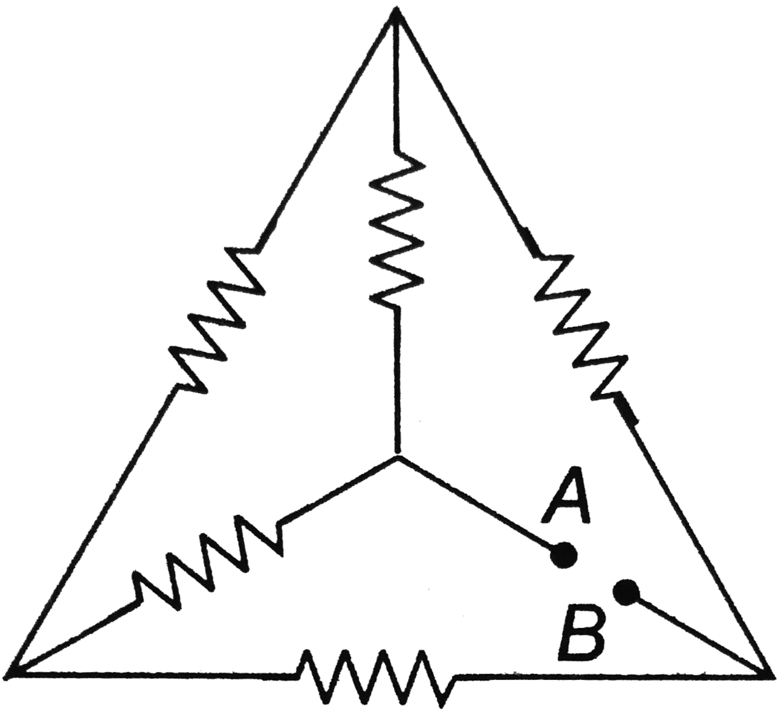
C. Twice the current in the arm ABC

D. Four times the current in the arm ABC

Answer: B

Watch Video Solution

237. In the network shown in the figure, each of the resistance is equal to 2Ω. The resistance between the points and B is



A. 1Ω

B. 4Ω

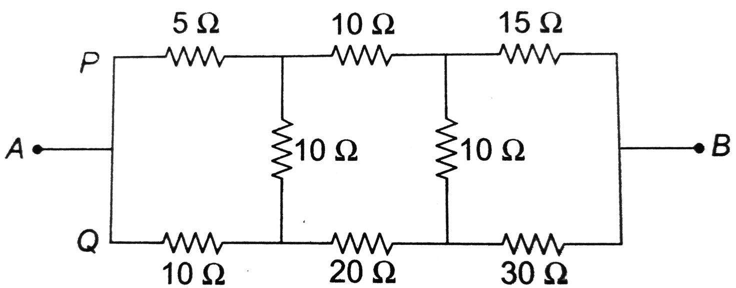
C. 3Ω

D. 2Ω

Answer: D

Watch Video Solution

238. In the arrangement of resistances shown below, the effective resistance between point A and B is



A. 20Ω

B. 30Ω

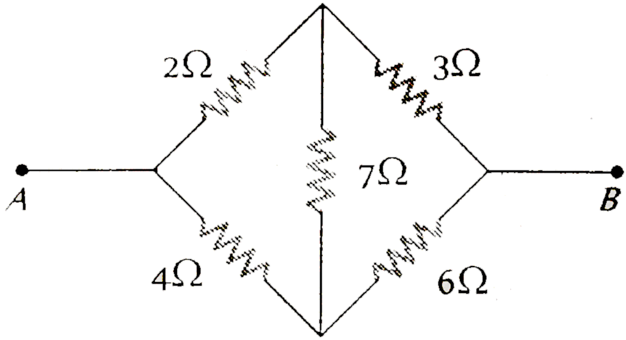
C. 90Ω

D. 110Ω

Answer: A

Watch Video Solution

239. Five resistances are connected as shown in the figure. The effective resistance between the points A and B is



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

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

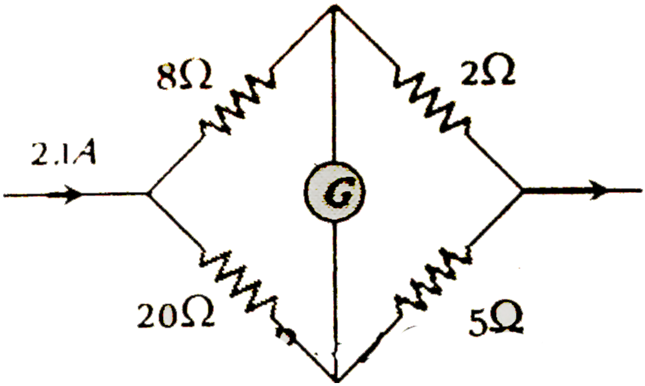
C. 15Ω

D. 6Ω

Answer: A

Watch Video Solution

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



A. 0.5

B. 0.6

C. 0.9

D. 1.5

Answer: B

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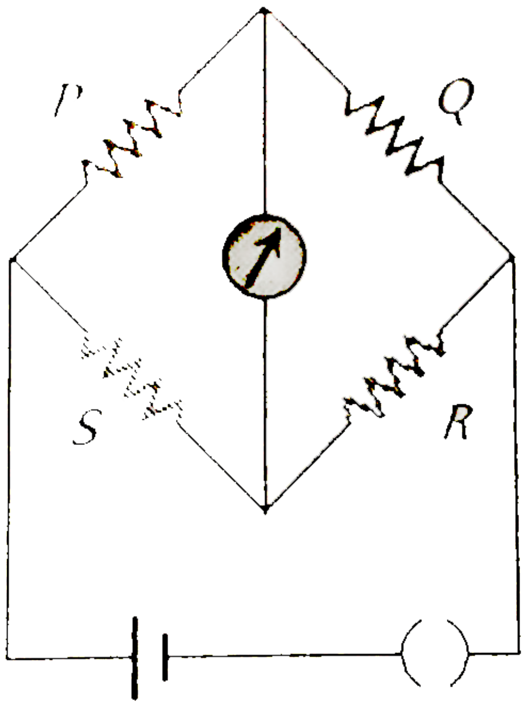
241. In the Wheatstone's bridge shown, $P = 2\Omega$, $Q = 3\Omega$, $R = 6\Omega$ and $S = 8\Omega$. In order to obtain balance, shunt resistance across S must be



A. 2Ω

B. 3Ω

C. 6Ω

D. 8Ω

Answer: D

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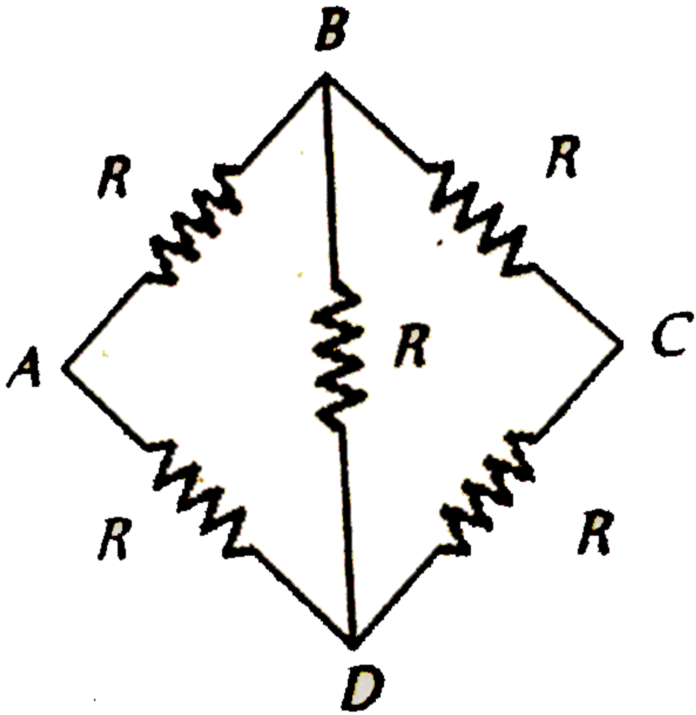
242. Five equal resistances each of value R are connected in a form shown alongside. The equivalent resistance of the network



A. Between the points B and D is R

B. Between the points B and D is $\frac{R}{2}$

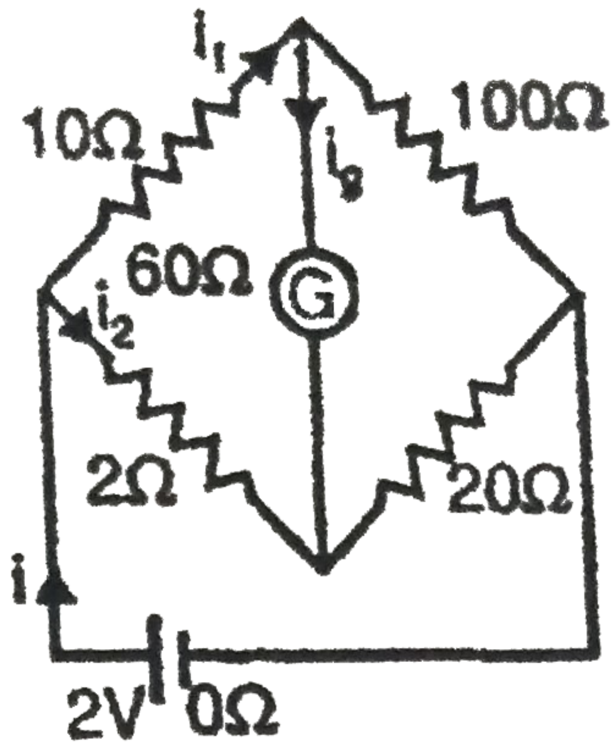
C. Between the points A and C is R

D. Between the points A and C is $\frac{R}{2}$

Answer: B::C

Watch Video Solution

243. In the circuit shown below the resistance of the galvanometer is 60Ω. In which case of the following alternatives are the currents arranged strictly in the decreasing order



A. i,i,i,i

B. i,i,i,i

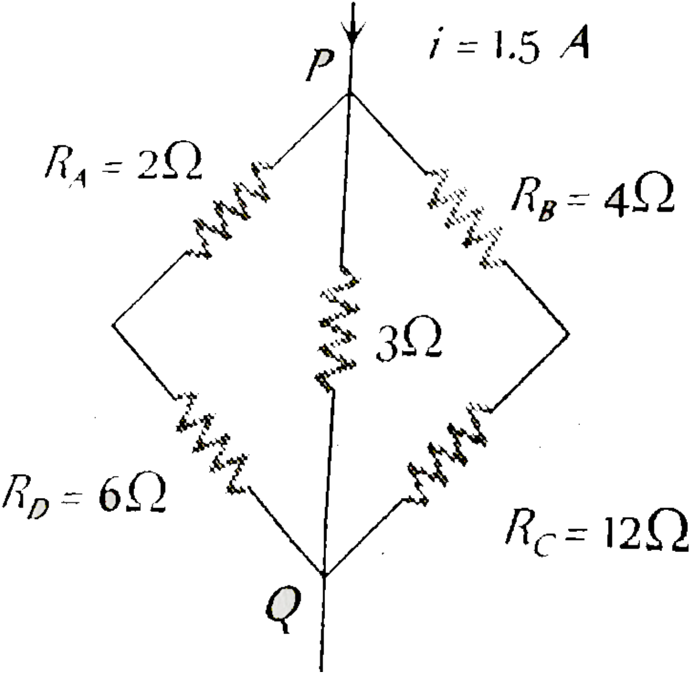
C. i,i,i,i

D. i,i,i,i

Answer: B

Watch Video Solution

244. Potential difference between the points P and Q in the electric circuit shown is



A. $4.5V$

B. $1.2V$

C. $2.4V$

D. $2.88V$

Answer: D

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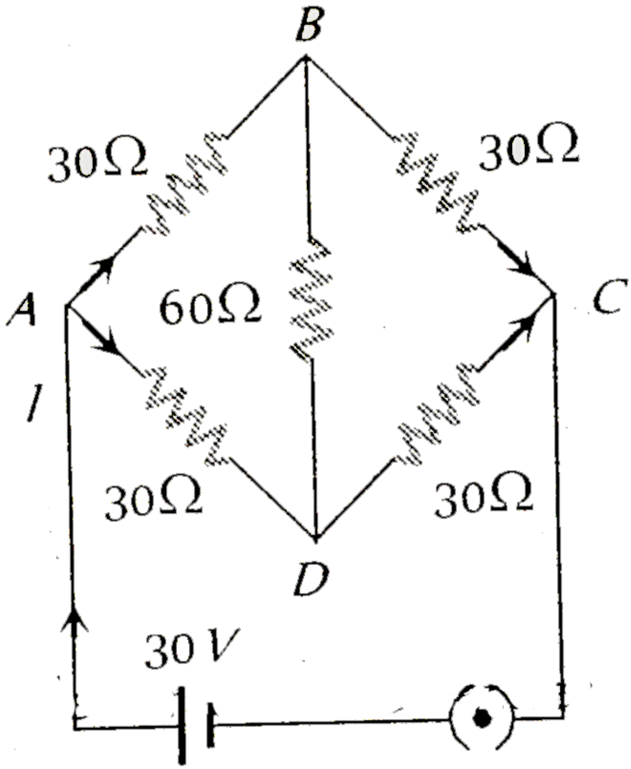
245. The current between B and D in the given figure is



A. 1 amp

B. 2 amp

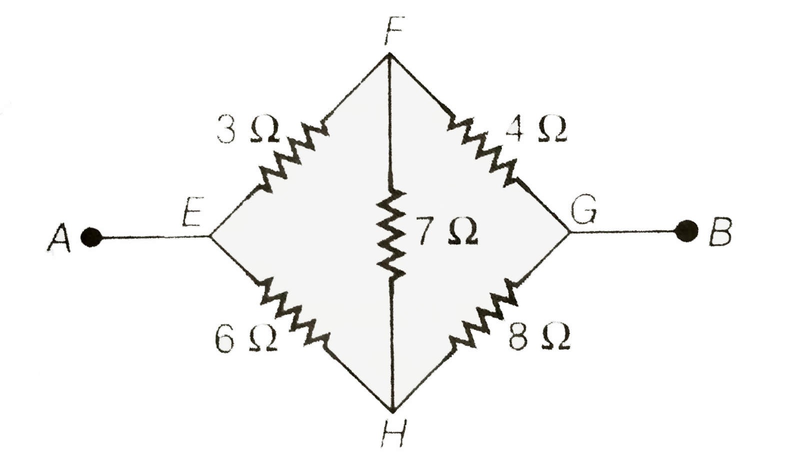
C. Zero

D. 0.5 amp

Answer: C

Watch Video Solution

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



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

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

C. $\frac{9}{14}\Omega$

D. $\frac{14}{9}\Omega$

Answer: A

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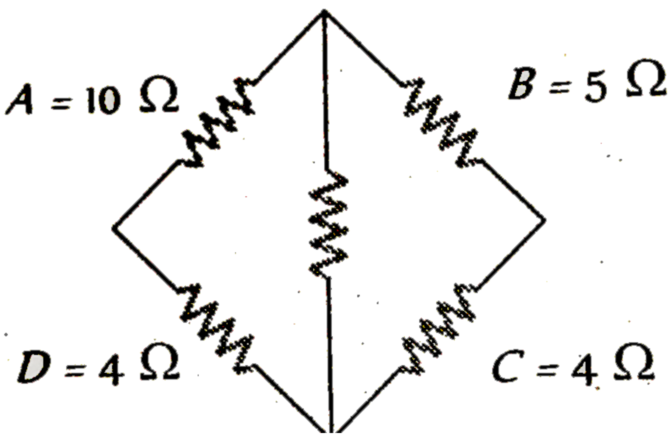
247. In a typical Wheatstone network, the resistances in cyclic order are $A = 10\Omega$, $B = 5\Omega$, $C = 4\Omega$ $D = 4\Omega$ for the bridge to be balanced



A. 10Ω should be connected in parallel with A

B. 10Ω should be connected in series with A

C. 5Ω should be connected in series with B

D. 5Ω should be connected in parallel with B

Answer: A

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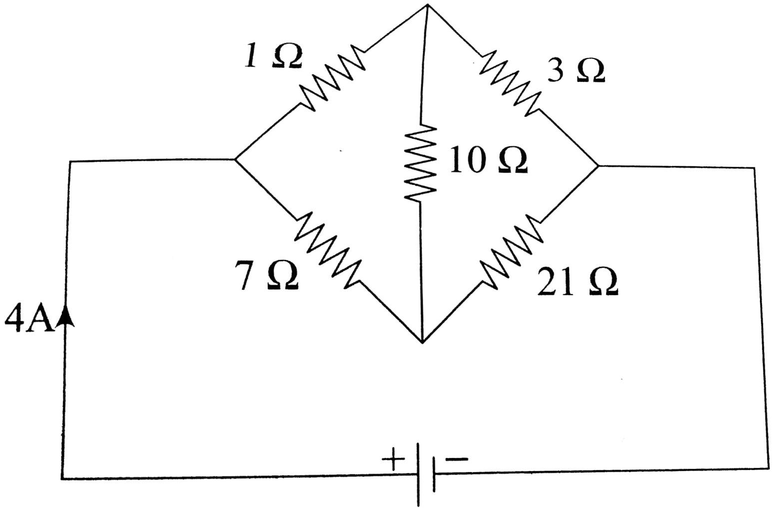
248. In the circuit shown in the figure, the current drawn from the battery is $4A$. If 10Ω resistor is replaced by 20Ω resistor, then current drawn from the circuit will be



A. 1A

B. 2A

C. 3A

D. 0A

Answer: D

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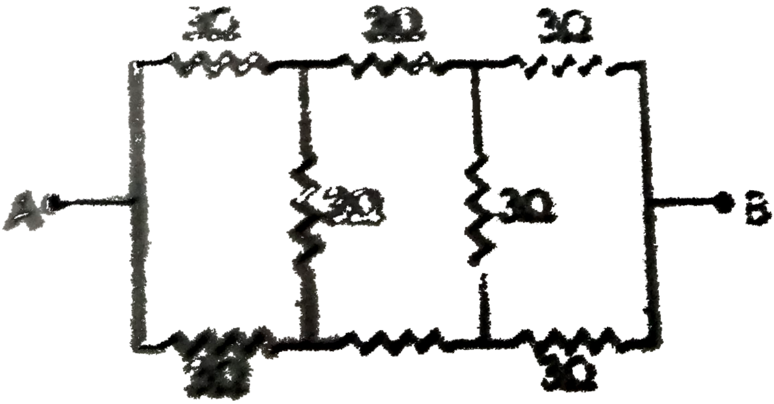
249. Calculate the equivalent resistance between A and B



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

B. 3Ω

C. 6Ω

D. $\frac{5}{3}\Omega$

Answer: A

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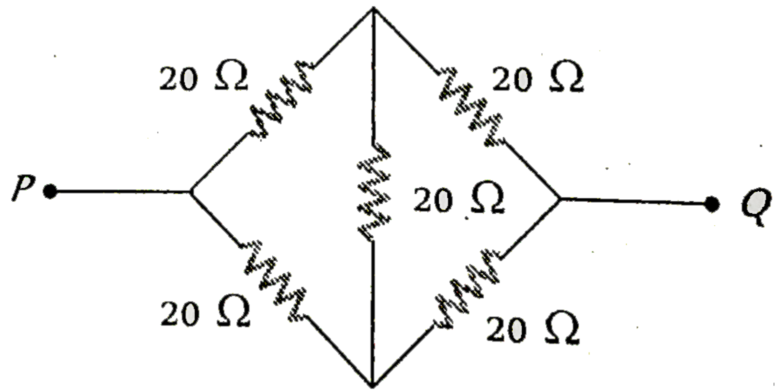
250. The equivalent resistance between P and Q in the given figure is



A. 50Ω

B. 40Ω

C. 30Ω

D. 20Ω

Answer: D

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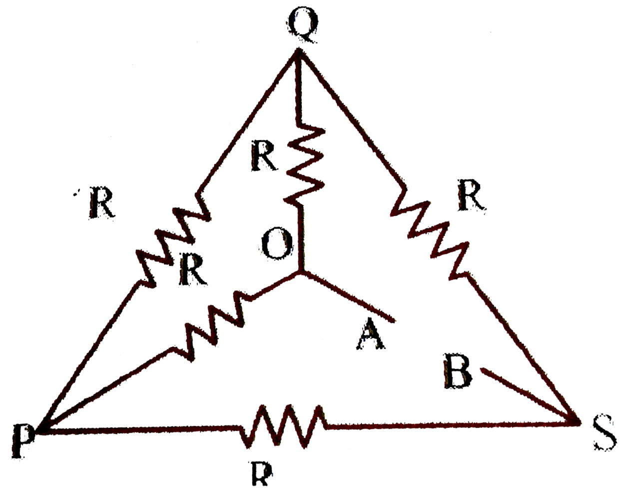
251. If each of the resistance in the network in figure R,

the equivalent resistance between terminals A and B is



A. $5R$

B. $3R$

C. R

D. $R/2$

Answer: C

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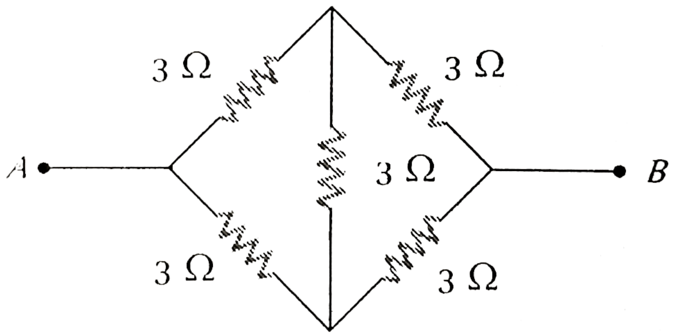
252. The equivalent resistance of the following diagram A and B is



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

B. 9Ω

C. 6Ω

D. None of these

Answer: D

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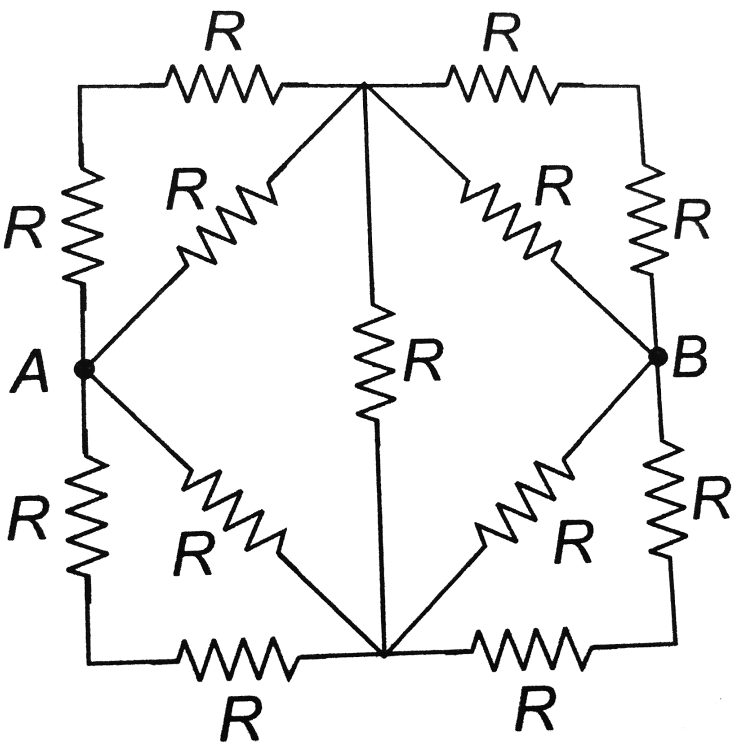
253. Thirteen resistances each of resistance R ohm are connected in the circuit as shown in the figure below. The effective resistance between A and B is



A. $2R\Omega$

B. $\frac{4R}{3}\Omega$

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

D. $R\Omega$

Answer: C

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

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

B. R

C. 2R

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

Answer: B

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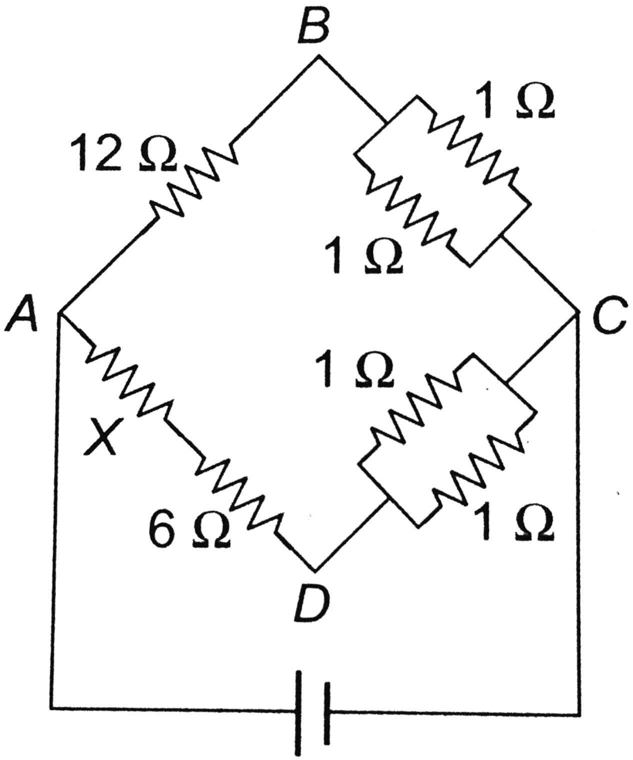
255. For what value of unknown resistance X, the potential difference between B and D will be zero in the circuit shown in the figure ?



A. 4Ω

B. 6Ω

C. 2Ω

D. 5Ω

Answer: B

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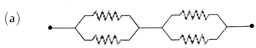
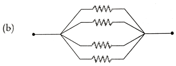
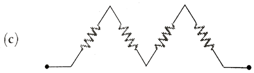
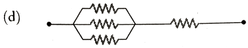
256. Which arrangement of four identical resistances should be sued to draw maximum energy from cell of voltage V

A. 

B. 

C. 

D. 

Answer: B

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257. An unknown resistance R_1 is connected is series with a resistance of 10Ω. This combination is connected to one gap of a meter bridge, while other gap is connected to another resistance R_2. The balance point is at $50cm$ Now , when the 10Ω resistance is removed, the balanced point shifts to $40cm$ Then the value of R_1 is.

A. 60

B. 40

C. 20

D. 10

Answer: C

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258. A wire has a resistance of 6Ω. It is cut into two parts and both half values are connected in parallel. The new resistance is ....

A. 12Ω

B. 1.5Ω

C. 3Ω

D. 6Ω

Answer: C

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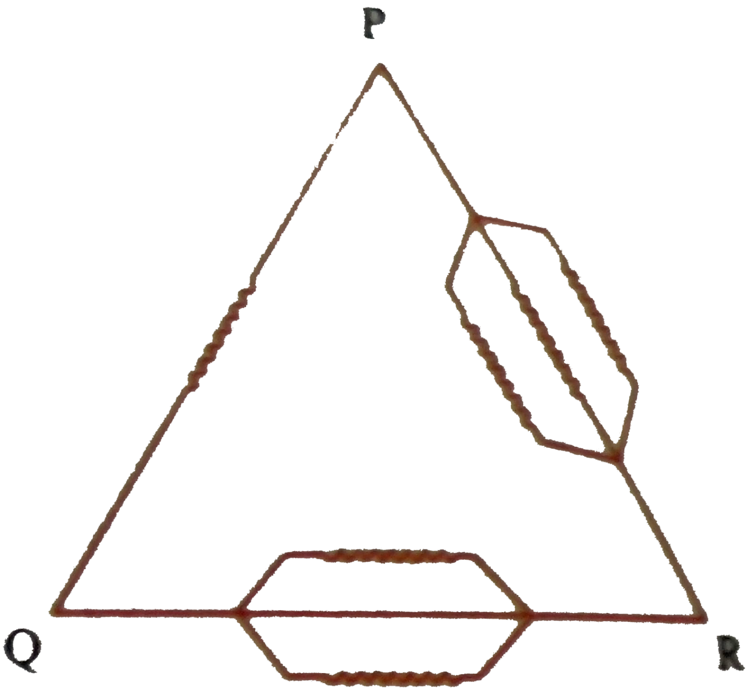

259.

Six equal resistances are connected between points P, Q and R as shown in the figure. Then the net resistance will be maximum between

A. P and Q

B. Q and R

C. P and R

D. Any two points

Answer: A

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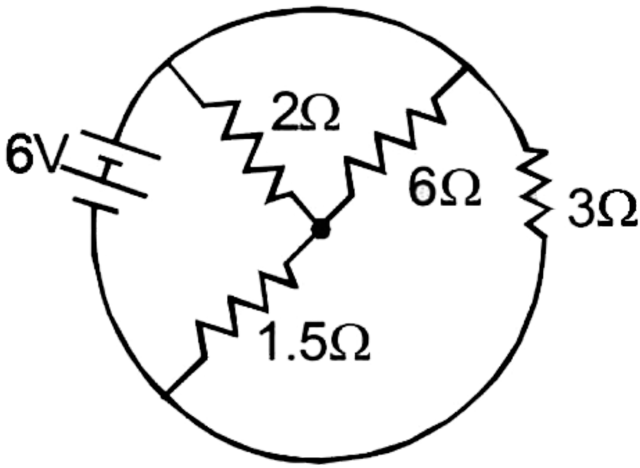
260. The total current supplied to the circuit by the battery is



A. 1A

B. 2A

C. 4A

D. 6A

Answer: C

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261. An electric current is passed through a circuit containing two wires of the same material connected in parallel. If the lengths and radii of the wire are in the ratio $\frac{4}{3}$ and $\frac{2}{3}$, then the ratio of the currents passing through the wires will be

A. 3

B. $1/3$

C. $8/9$

D. 2

Answer: B

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262. If a rod has resistance 4Ω and if rod is turned as half cycle then the resistance along diameter

A. 1.56Ω

B. 2.44Ω

C. 4Ω

D. 2Ω

Answer: C

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263. If three resistors of resistance $2\Omega, 4\Omega$ and 5Ω are connected in parallel then the total resistance of the combination will be

A. $\frac{20}{19}\Omega$

B. $\frac{19}{20}\Omega$

C. $\frac{19}{10}\Omega$

D. $\frac{10}{19}\Omega$

Answer: A

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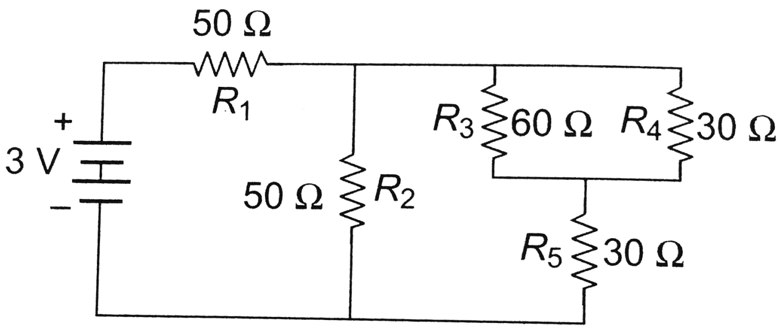
264. In circuit shown below, the resistance are given in ohms and the battery is assumed ideal with emf equal to 3 volt The voltage across the resistance R_4 is



A. $0.4V$

B. $0.6V$

C. $1.2V$

D. $1.5V$

Answer: A

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265. A parallel combination of two resistors, of 1Ω each, is connected in series with a 1.5Ω resistor. The total combination is connected across a 10 V battery. The current flowing in the circuit is

A. 5A

B. 20A

C. 0.2A

D. 0.4A

Answer: A

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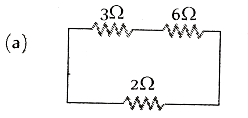
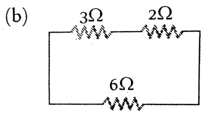
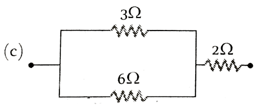
266. If you are provided three resistance 2Ω, 3Ω and 6Ω. How will you connect them so as to obtain the equivalent resistance of 4Ω

A. 

B. 

C. 

D. None of these

Answer: C

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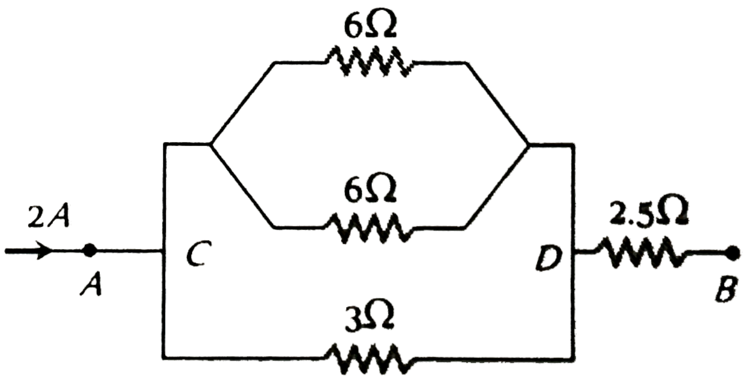
267. The equivalent resistance and potential difference between A and B for the circuit is respectively



A. $4\Omega,\ 8V$

B. $8\Omega,\ 4V$

C. $2\Omega,\ 2V$

D. $16\Omega,\ 8V$

Answer: A

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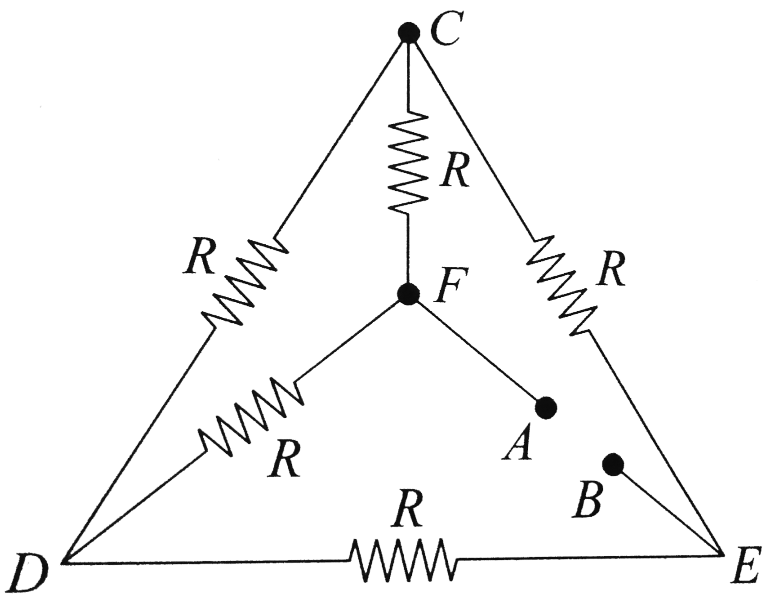
268. Five equal resistances each of resistance R are connected as shown in the figure. A battery of V volts is connected between A and B. The current flowing in $AFCEB$ will be



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

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

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

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

Answer: B

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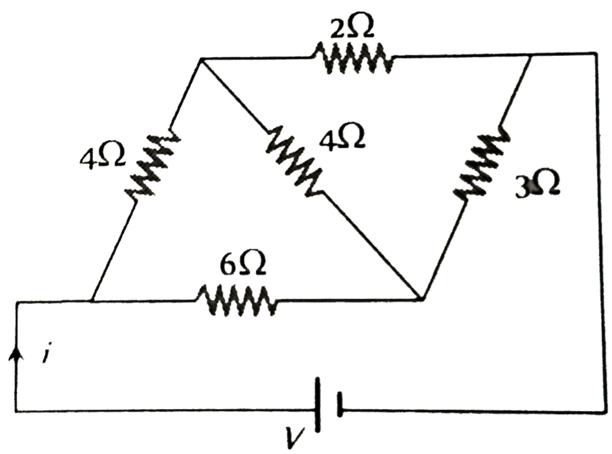
269. For the network shown in the figure the value of the current i is



A. $\frac{9V}{35}$

B. $\frac{5V}{18}$

C. $\frac{5V}{9}$

D. $\frac{18V}{5}$

Answer: B

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

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

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

C. $4R$

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

Answer: A

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271. The current in a simple series circuit is 5.0 amp . When an additional resistance of 2.0 ohms is inserted, the current drops to 4.0 amp . The original resistance of the circuit in ohms was

A. 1.25

B. 8

C. 10

D. 20

Answer: B

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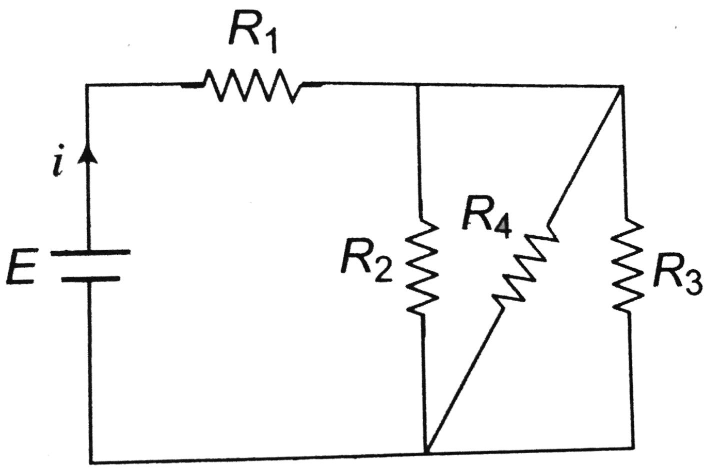
272. In the circuit given $E = 6.0V, R_1 = 100 ohms, R_2 = R_3 = 50 ohms, R_4 = 75 ohms$. The equivalent resistance of the circuit, in ohms, is



A. 11.875

B. 26.31

C. 118.75

D. None of these

Answer: C

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273. By using only two resistance coils-singly, in series, or in parallel one should be able to obtain resistances of 3, 4, 12 and 16 ohms . The separate resistances of the coil are

A. 3 and 4

B. 4 and 12

C. 12 and 16

D. 16 and 3

Answer: B

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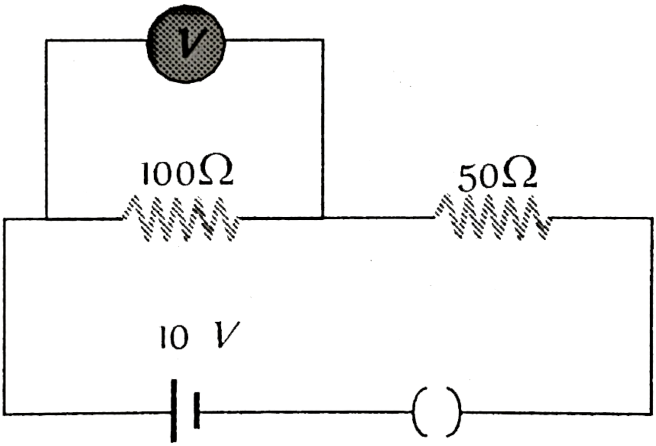
274. In the given circuit, the voltmeter records 5 volts. The resistance of the voltmeter in ohms is



A. 200

B. 100

C. 10

D. 50

Answer: B

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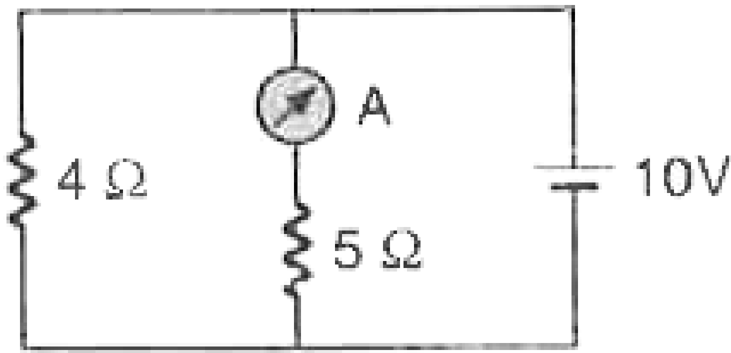
275. चित्र 11.13 में ऐमीटर का पाठ्यांक (जब बैटरी का आन्तरिक प्रतिरोध शून्य हो) है



A. 10

B. 100

C. 500

D. 200

Answer: B

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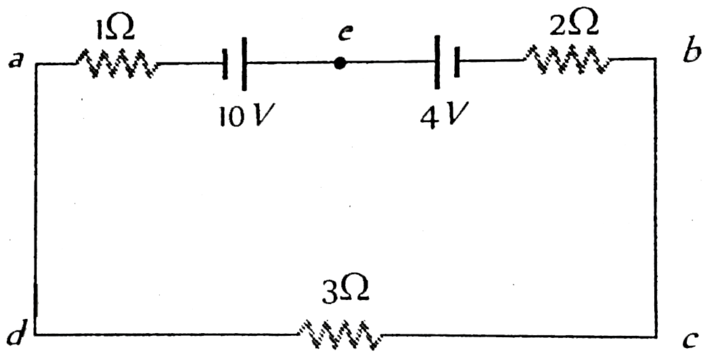
276. The magnitude and direction of the current in the circuit shown will be



A. $\frac{7}{3}A$ from a to b through e

B. $\frac{7}{3}A$ from b to a through e

C. 1A from b to a through e

D. 1A from a to b through e

Answer: D

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277. A cell of e. m.f me $5.1V$ having a finite internal resistance is connected to a load resistance of 2Ω . For maximum power transfer the internal resistance of the cell should be

A. 4 ohm

B. 0.5 ohm

C. 2 ohm

D. None of these

Answer: C

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278. By a cell a current of 0.9 A flows through 2 ohm resistor and $0.3A$ through 7 ohm resistor. The internal resistance of the cell is

A. 0.5Ω

B. 1.0Ω

C. 1.2Ω

D. 2.0Ω

Answer: A

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279. The e.m.f. of a cell is E volts and internal resistance is r ohm. The resistance in exteral circuit is also r ohm. The p.d across the cell will be

A. $E/2$

B. $2E$

C. $4E$

D. $E/4$

Answer: A

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280. A cell of e.m.f. E is connected with an external resistance R , then p.d. across cell is V . The internal resistance of cell will be

A. $\dfrac{(E-V)R}{E}$

B. $\frac{(E-V)R}{V}$

C. $\frac{(V-E)R}{V}$

D. $\frac{(V-E)R}{E}$

Answer: B

Watch Video Solution

281. Two cells , each of $emfE$ 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. $R=r/2$

B. $R=r$

C. $R=2r$

D. $R = 0$

Answer: A

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

A. Charge

B. Energy

C. Momentum

D. Angular momentum

Answer: A

Watch Video Solution

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

A. Charge

B. Energy

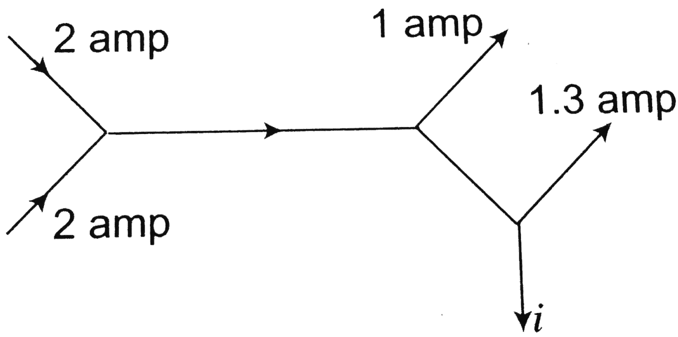
C. Momentum

D. Sum of mass and energy

Answer: B

Watch Video Solution

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



A. 1.7 amp

B. 3.7 amp

C. 1.3 amp

D. 1 amp

Answer: A

Watch Video Solution

285. What is terminal potential differnce of a cell? Can its value be greater than the emf of a cell? Explian.

A. Being discharged

B. In open circuit

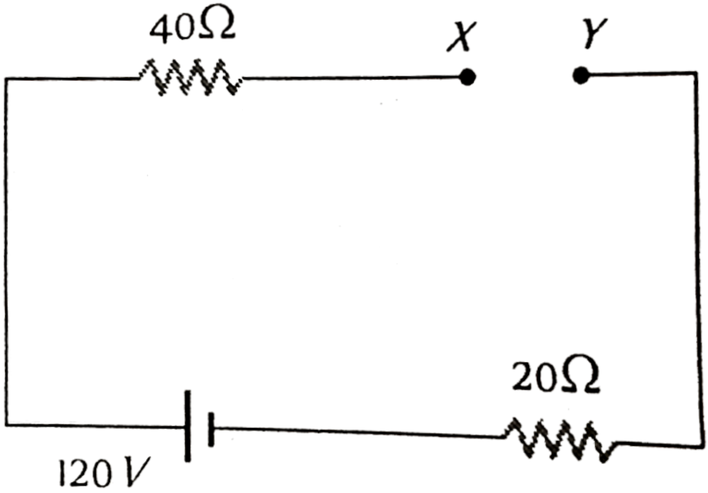
C. Being charged

D. Being either charged or discharged

Answer: C

Watch Video Solution

286. In the circuit shown, potential difference between X and Y will be



A. Zero

B. 20V

C. 60V

D. 120V

Answer: D

Watch Video Solution

287. In the above question, potential difference across the 40Ω resistance will be

A. Zero

B. $80V$

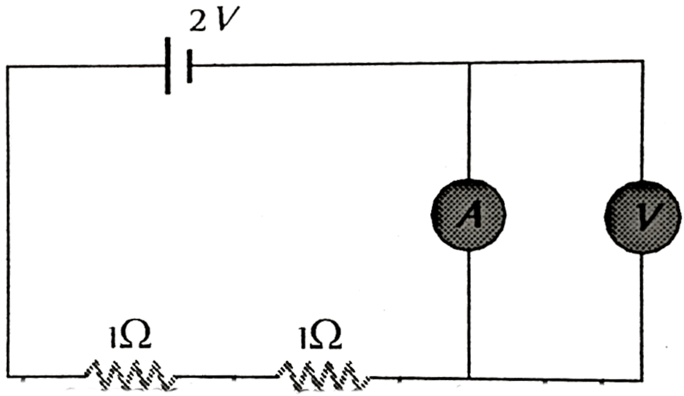
C. $40V$

D. $120V$

Answer: A

Watch Video Solution

288. In the circuit shown, A and V are ideal ammeter and voltmeter respectively. Reading of the voltmeter will be



A. 2V

B. 1V

C. 0.5V

D. Zero

Answer: D

Watch Video Solution

289. When a resistance of 2 ohm is connected across terminals of a cell, the current is $0.5A$. When the resistance is increased to 5 ohm, the current is $0.25A$ The e.m.f. of the cell is

A. 0.5 ohm

B. 1.0 ohm

C. 1.5 ohm

D. 2.0 ohm

Answer: B

Watch Video Solution

290. The terminal potential difference of a cell when short-circuited is (E = E.M.F. of the cell)

A. E

B. $E/2$

C. Zero

D. $E/3$

Answer: C

Watch Video Solution

291. A primary cell has an e.m.f. of 1.5 volts, when short-circuited it gives a current of 3 amperes. The internal resistance of the cell is

A. 4.5 ohm

B. 2 ohm

C. 0.5 ohm

D. $1/4.5$ ohm

Answer: C

Watch Video Solution

292. A $50V$ battery is connected across a 10 ohm resistor. The current is 4.5 amperes. The internal resistance of the battery is

A. Zero

B. 0.5 ohm

C. 1.1 ohm

D. 5.0 ohm

Answer: C

Watch Video Solution

293. The potential difference in open circuit for a cell is 2.2 volts. When a 4 ohm resistor is connected between its two electrodes the potential difference becomes 2 volts. The internal resistance of the cell will be

A. 1ohm

B. 0.2 ohm

C. 2.5 ohm

D. 0.4 ohm

Answer: D

Watch Video Solution

294. A new flashlight cell of e.m.f. 1.5 volts given a current of 15 amps. When connected directly to an ammeter of resistance 0.04Ω. The internal resistance of cell is

A. 0.04Ω

B. 0.06Ω

C. 0.10Ω

D. 10Ω

Answer: B

Watch Video Solution

295. The cell has an emf of $2V$ and the internal resistance of this cell is 0.1Ω, it is connected to resistance of 3.9Ω, the voltage across the cell will be

A. $0.50V$

B. $1.90V$

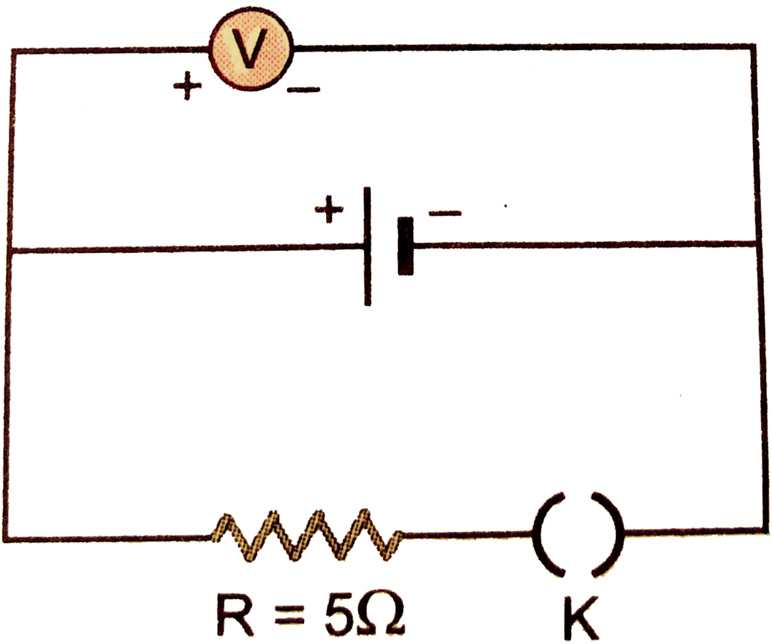
C. $1.95V$

D. $2.00V$

Answer: C

Watch Video Solution

296. The reading on a high resistance voltmeter. When a cell is connected across it is $2.2V$. When the terminals of the cell are connected to a resistance of 5Ω the voltmeter reading drop to $1.8V$. Find the internal resistance of the cell.



A. 1.2Ω

B. 1.3Ω

C. 1.1Ω

D. 1.4Ω

Answer: C

Watch Video Solution

297. When cells are connected in parallel then

A. The current decreases

B. The curretn increases

C. The e.m.f. increases

D. The e.m.f decreases

Answer: B

Watch Video Solution

298. Internal resistance of a cell depends on

A. The distance between the plates

B. The area of the plantes immersed

C. The concentration of the electrolyte

D. All of the above

Answer: D

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299. n identical cells each of e.m.f. E and internal resistance r are connected in series. An external resistance R is connected in series to this combination. The current through R is

A. $\frac{nE}{R+nr}$

B. $\frac{nE}{nR+r}$

C. $\frac{E}{R+nr}$

D. $\frac{nE}{R+r}$

Answer: A

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300. An total resistance R is connected to a cell of internal resistance r the maximum current flows in the external resistance, when

A. $R=r$

B. $R<r$

C. $R > r$

D. $R = r/2$

Answer: A

Watch Video Solution

301. To get the maximum current from a parallel combination of n identical cells each of internal resistance r in an external resistance R, when

A. $R > > r$

B. $R < < r$

C. $R = r$

D. None of these

Answer: B

Watch Video Solution

302. Two identical calls send the same current in 2Ω resistance, whether connected in series or in parallel. The internal resistance of the cell should be

A. 1Ω

B. 2Ω

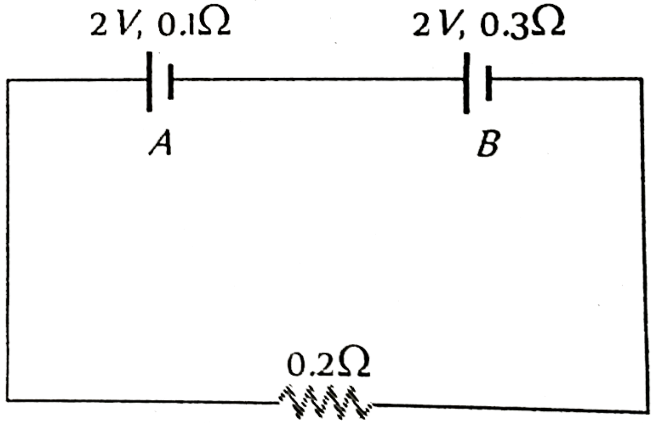
C. $\frac{1}{2}\Omega$

D. 2.5Ω

Answer: B

Watch Video Solution

303. The internal resistances of two cells shown are 0.1Ω and 0.3Ω. If $R = 0.2\Omega$, its potential difference across the cell



A. B will be zero

B. A will be zero

C. A and B will be 2V

D. A will be $> 2V$ and B $< 2V$

Answer: A

Watch Video Solution

304. The electromotive force of a primary cell is 2 volts. When it is short- circuited is gives a current of 4 amperes. It internal resistance in ohms is

A. 0.5

B. 5.0

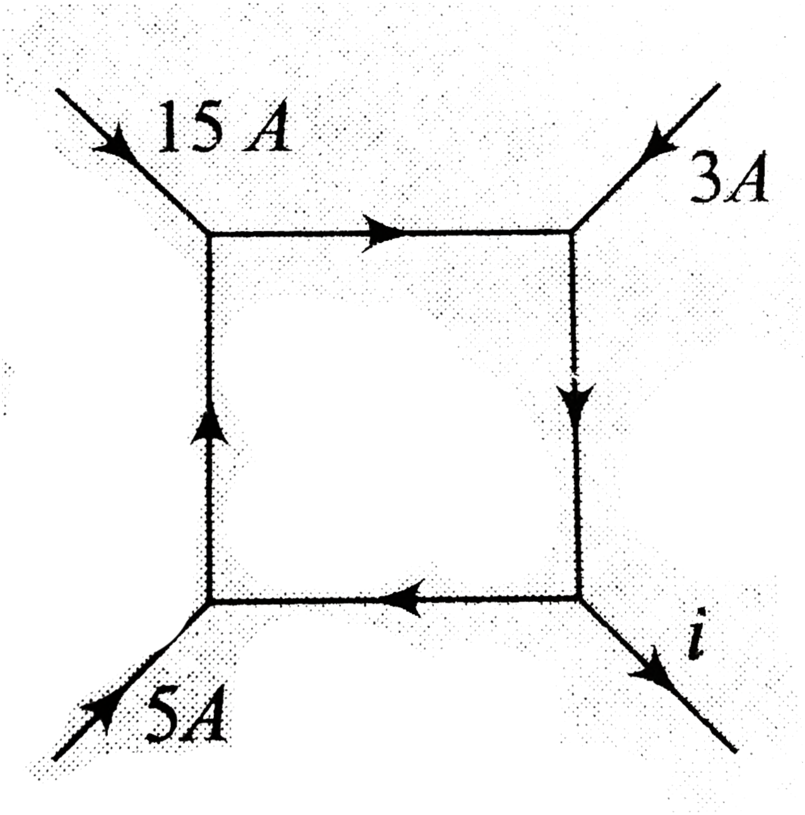
C. 2.0

D. 8.0

Answer: A

Watch Video Solution

305. Shown is a network of currents. The magnitude of the current is also shown there. Find the current i.



A. 3.4

B. $13A$

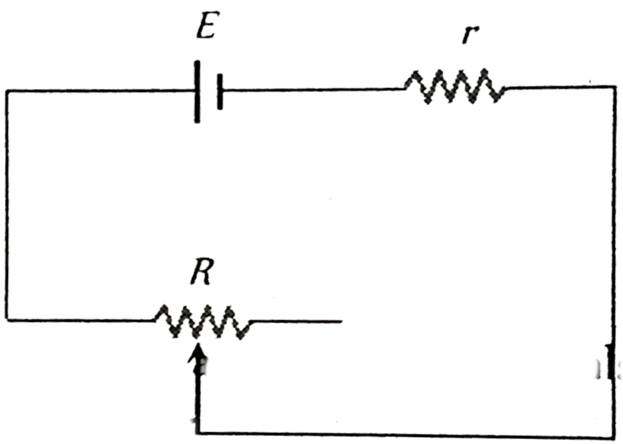
C. $23A$

D. $-3A$

Answer: C

Watch Video Solution

306. A battery of e.m.f. E and internal resistance r is connected to a variable resistor R as shown here. Which one of the following is true



A. Potential difference across the terminal of the battery is maximum when $R = r$

B. Power delivered to the resistor is maximum when $R = r$

C. Current in the circuit is maximum when $R = r$

D. Current in the circuit is maximum when $R > > t$

Answer: B

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307. A dry cell has an e.m.f. of $1.5V$ and an internal resistance of 0.05Ω. The maximum current obtainable from this cell for a very short time interval is

A. 30A

B. 300A

C. 3A

D. $0.3A$

Answer: A

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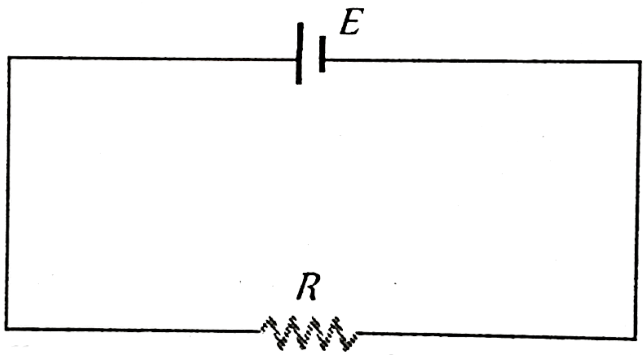
308. Consider the circuit given here with the following parameters E.M.F of the cell $= 12V$. Internal resistance of the cell $= 2\Omega$. Resistance $R = 4\Omega$.



Which one of the following statements in true

A. Rate of energy loss in the source is = 8 W

B. Rate of energy conversion in the source is 16 W

C. Power output in is = 8 W

D. Potential drop across R is $= 16V$

Answer: A

Watch Video Solution

309. A current of two amperes is flowing through a cell of e.m.f. 5 volts and internal resistance 0.5 ohm from negative to positive electrode. If the potential of negative electrode is 10 V , the potential of positive electrode will be

A. 5V

B. 14V

C. 15V

D. 16V

Answer: B

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310. 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. 4

C. 5

D. 10

Answer: A

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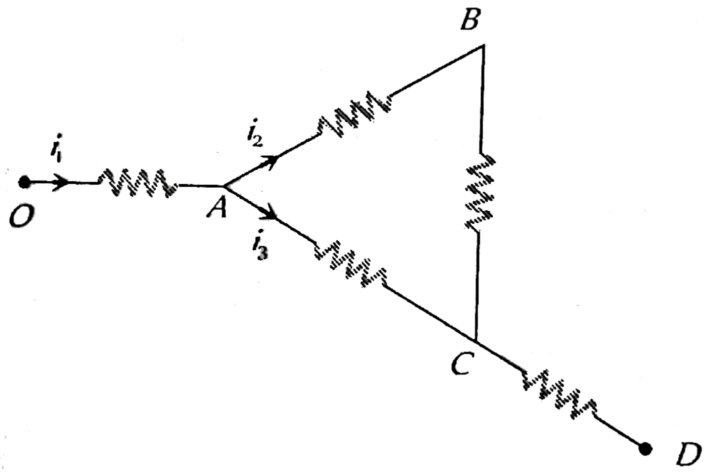
311. The current in the arm CD of the circuit will be



A. $i_1 + i_2$

B. $i_2 + i_3$

C. $i_1 + i_3$

D. $i_1 - i_2 + i_3$

Answer: B

Watch Video Solution

312. When a resistance of 2 ohm is connected across terminals of a cell, the current is $0.5A$. When the resistance is increased to 5 ohm, the current is $0.25A$ The e.m.f. of the cell is

A. $1.0V$

B. $1.5V$

C. $2.0V$

D. $2.5V$

Answer: B

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313. If six identical cells each having an e.m.f. of 6 V are connected in parallel, the e.m.f. of the combination is

A. $1V$

B. $36V$

C. $\frac{1}{6}V$

D. $6V$

Answer: D

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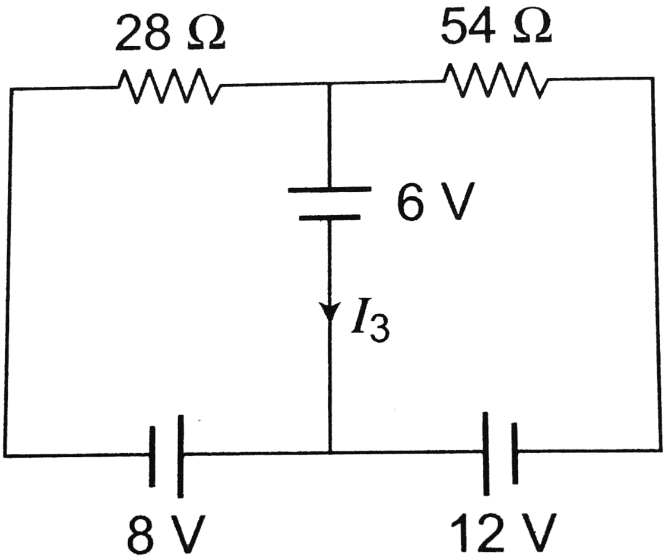
314. Consider the circuit shown in the figure. The current I_3 is equal to



A. 5 amp

B. 3 amp

C. -3 amp

D. $-5/6$ amp

Answer: D

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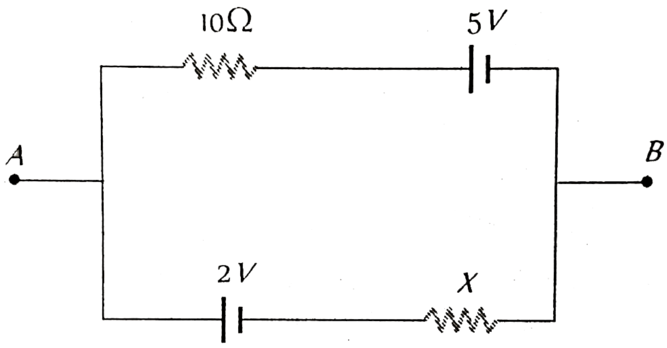
315. If $V_{AB} = 4V$ in the given fig are, then resistance χ will be



A. 5Ω

B. 10Ω

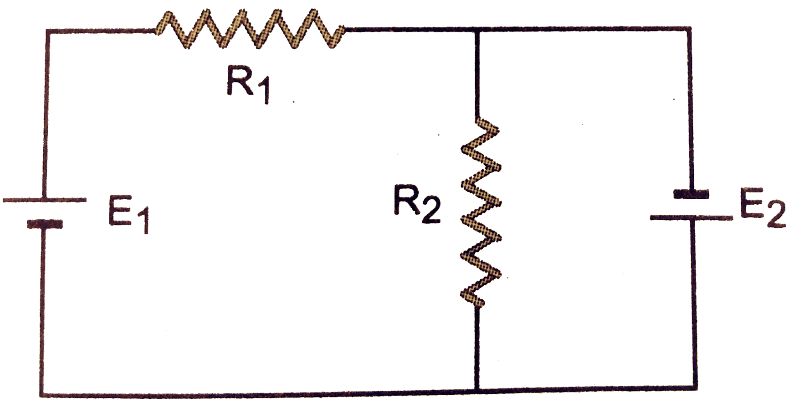
C. 15Ω

D. 20Ω

Answer: D

Watch Video Solution

316. Two resistance R_1 and R_2 are joined as shown in figure to two batteries of emf E_1 and E_2. If E_2 is short circuited, what is the current through R_1 ?



A. E_1 / R_1

B. E_2 / R_1

C. E_2 / R_2

D. $E_1 / (R_2 + R_1)$

Answer: A

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317. A storage battery has e.m.f. 15 volts and internal resistance 0.05 ohm . Its terminal voltage when it is delivering 10 ampere is

A. 30 volts

B. 1.00 volts

C. 14.5 volts

D. 15.5 volts

Answer: C

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318. The number of dry cells, each of e.m.f. 1.5 volt and internal resistance 0.5ω that must be joined in series with a resistance of 20 ohm so as to send a current of 0.6 ampere through the circuit is -

A. 2

B. 8

C. 10

D. 12

Answer: C

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319. Emf if most closely related to

A. Mechanical force

B. Potenital difference

C. Electric field

D. Magnetic field

Answer: B

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320. For driving a current of 2 A for 6 minutes in a circuit, 1000 J of work is to be done. The e.m.f. of the source in the circuit is

A. $1.38V$

B. $1.68V$

C. $2.04V$

D. $3.10V$

Answer: A

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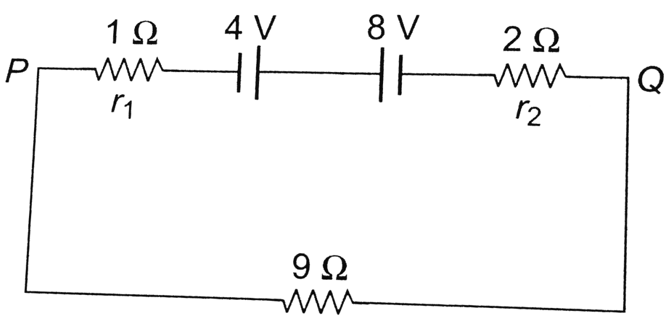
321. Two batteries of e.m.f. $4V$ and $8V$ with internal resistances 1Ω and 2Ω are connected in a circuit with a resistance of 9Ω as shown in figure. The current and potential difference between the points P and Q



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

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

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

D. $\frac{1}{2}A$ and $12V$

Answer: A

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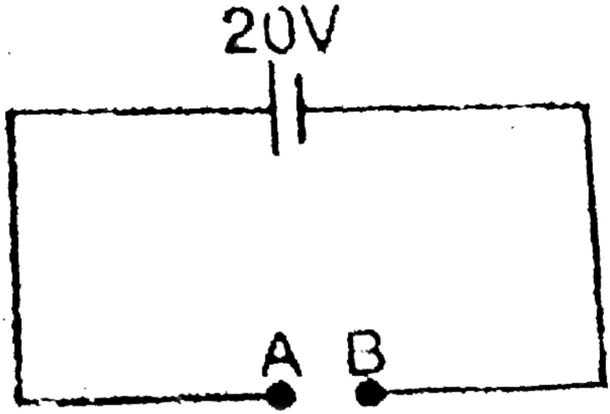
322. In the shown circuit, what is the potential difference across A and B



A. $50V$

B. $45V$

C. $30V$

D. $20V$

Answer: D

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323. Four identical cells each having an electromotive force (e.m.f.) of 12 V , are connected in parallel. The resultant electromotive force (e.m.f.) of the combination is

A. $48V$

B. $12V$

C. $4V$

D. $3V$

Answer: B

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

A. Current

B. Resistance

C. Power

D. Potential difference

Answer: D

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325. A cell of emf 6 V and resistance 0.5 ohm is short circuited. The current in the cell is

A. 3 amp

B. 12 amp

C. 24 amp

D. 6 amp

Answer: B

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326. A storage cell is charged by 5 amp D . C . for 18 hours . Its strength after charging will be

A. 18 AH

B. 5 AH

C. 90 AH

D. 15AH

Answer: C

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327. A battery having e.m.f. 5 V and internal resistance 0.5Ω is connected with a resistance of 4.5Ω then the voltage at the terminals of battery is

A. $4.5V$

B. $4V$

C. $0V$

D. $2V$

Answer: A

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328. The internal resistance of a cell of e.m.f. 12 V is $5 \times 10^{-2} \Omega$. It is connected across an unknown resistance. Voltage across the cell, when a current of 60 A is drawn from it, is

A. 15V

B. 12V

C. 9V

D. 6V

Answer: C

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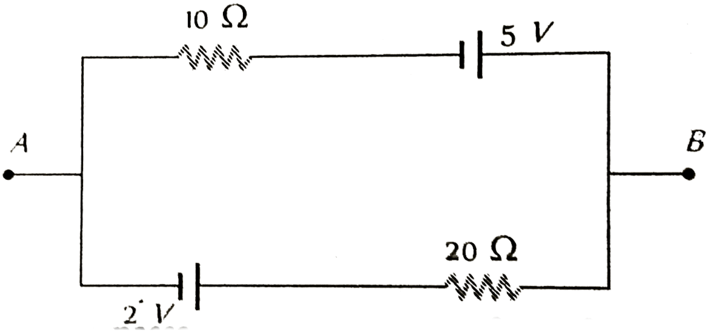
329. The current in the given circuit is



A. $0.1A$

B. $0.2A$

C. $0.3A$

D. $0.4A$

Answer: A

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330. A current of 2.0 ampere passes through a cell of e.m.f. 1.5 volts having internal resistance of 0.15 ohm. The potential difference measured, in volts, across both the ends of the cell will be

A. 1.35

B. 1.50

C. 1.00

D. 1.20

Answer: D

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331. A battery has e.m.f. 4 V and internal resistance r . When this battery is connected to an external resistance of 2 ohms , a current of 1 amp . flows in the circuit. How much current will flow if the terminals of the battery are connected directly

A. 1 amp

B. 2 amp

C. 4 amp

D. Infinite

Answer: B

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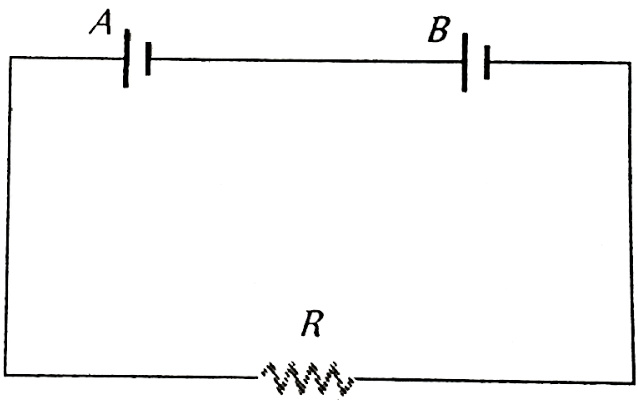
332. Two batteries A and B each of e.m.f. 2 V are connected in series to an external resistance R = 1 ohm . If the internal resistance of battery A is 1.9 ohms and that of B is 0.9 ohm , what is the potential difference between the terminals of battery A



A. 2V

B. 3.8V

C. Zero

D. None of the above

Answer: C

Watch Video Solution

333. When a resistor of 11Ω is connected in series with an electric cell, the current following in it is $0.5A$. Instead, when a resistor of 5Ω is connected to the same electric cell in series, the current increases by $0.4A$ The internal resistance of the cell is

A. 1.5Ω

B. 2Ω

C. 2.5Ω

D. 3.5Ω

Answer: C

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334. The internal resistance of a cell is the resistance of

A. Electrodes of the cell

B. Vessel of the cell

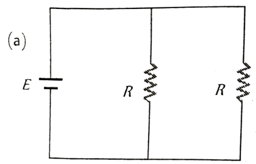
C. Electrolyte used in the cell

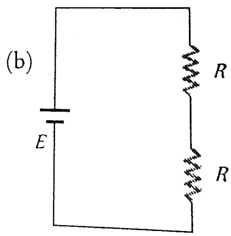
D. Material used in the cell

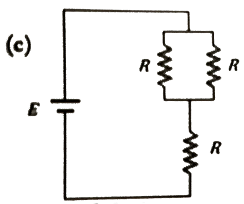
Answer: C

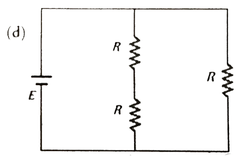
Watch Video Solution

335. Consider four circuits shown in the figure below. In which circuit power dissipated is greatest (Neglect the internal resistance of the power supply)?

A. 

B. 

C. 

D. 

Answer: A

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336. Krichoff's I law and II law of current, proves the

A. Conservation of charge and energy

B. Conservation of current and energy

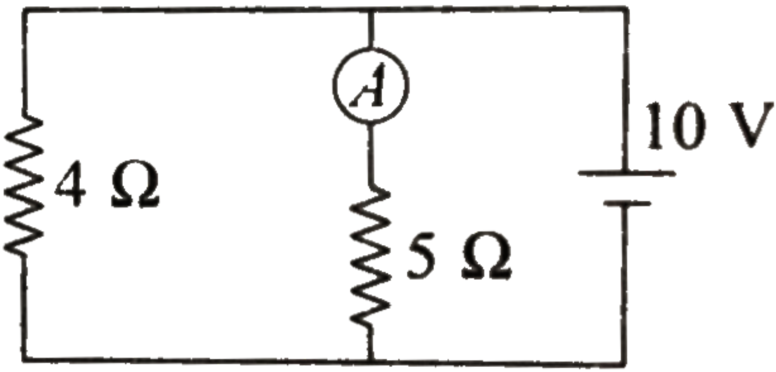
C. Conservation of mass and charge

D. None of these

Answer: A

Watch Video Solution

337. In the circuit shows in Fig. 6.41, the reading of the ammeter is (assume internal resistance of the battery be to zero)



A. $\frac{40}{29}A$

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

C. $\frac{5}{3}A$

D. 2A

Answer: D

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338. In the above question, if the internal resistance of the battery is 1 ohm , then what is the reading of ammeter

A. $5/3A$

B. $40/29A$

C. $10/9A$

D. $1A$

Answer: B

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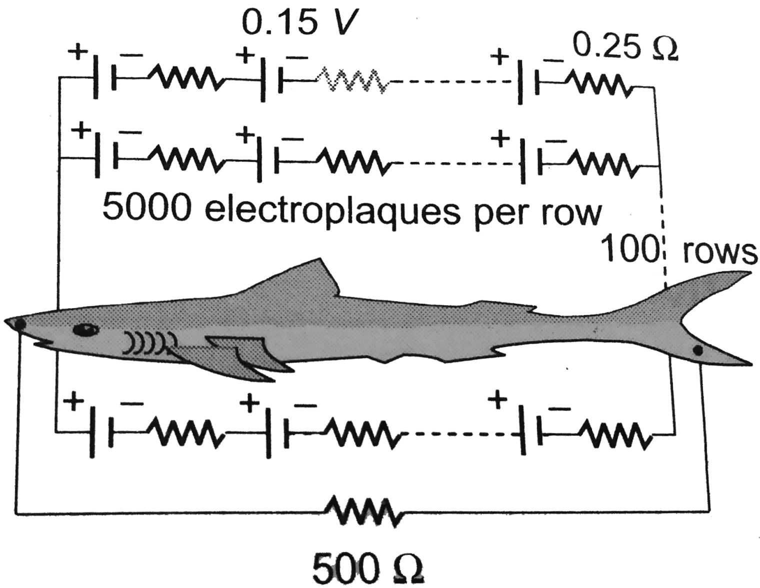
339. Eels are able to generate current with biological cells called electroplaques. The electroplaques in an eel are arranged in 100 rows, each row stretching horizontally along the body of the fish containing 5000 electroplaques. The arrangment is suggestively shown below. Each electroplaques has an emf of $0.15V$ and internal resistance of 0.25Ω

The water surrounding theeel completes a cricuit be ween the head and its tail. If the water surrounding it has a resistance of 500Ω, the current an eel can produce in water is about



A. 1.5A

B. 3.0A

C. 15A

D. 30A

Answer: A

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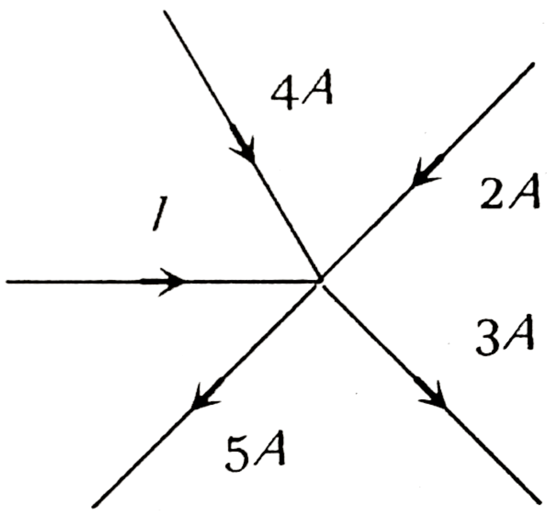
340. In the given current distribution what is the value of I



A. 3A

B. 8A

C. 2A

D. 5A

Answer: C

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341. A capacitor is conneted to a cell emf E having some internal resistance r. The potential difference across the

A. Cell is $< E$

B. Cell is E

C. Capacitor is $> E$

D. capacitor is $< E$

Answer: B

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342. When the resistance of 9Ω is connected at the ends of a battery, its potential difference decreases from 40 volt to 30 volt . The internal resistance of the battery is

A. 6Ω

B. 3Ω

C. 9Ω

D. 15Ω

Answer: B

Watch Video Solution

343. What is the maximum power output than can be obtained from a cell of emf E and internal resistance r?

A. $E^2 / 2r$

B. $E^2 / 4r$

C. E^2 / r

D. $E^2 / 3r$

Answer: B

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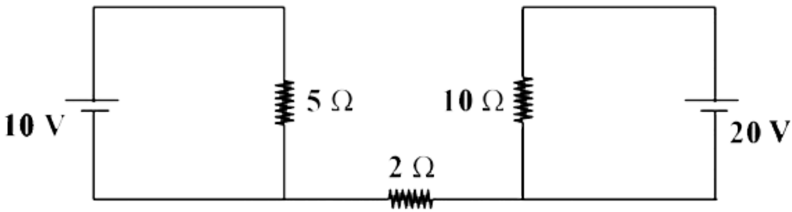
344. Find out the value of current through 2Ω resistance for the given circuit.



A. 5A

B. 2A

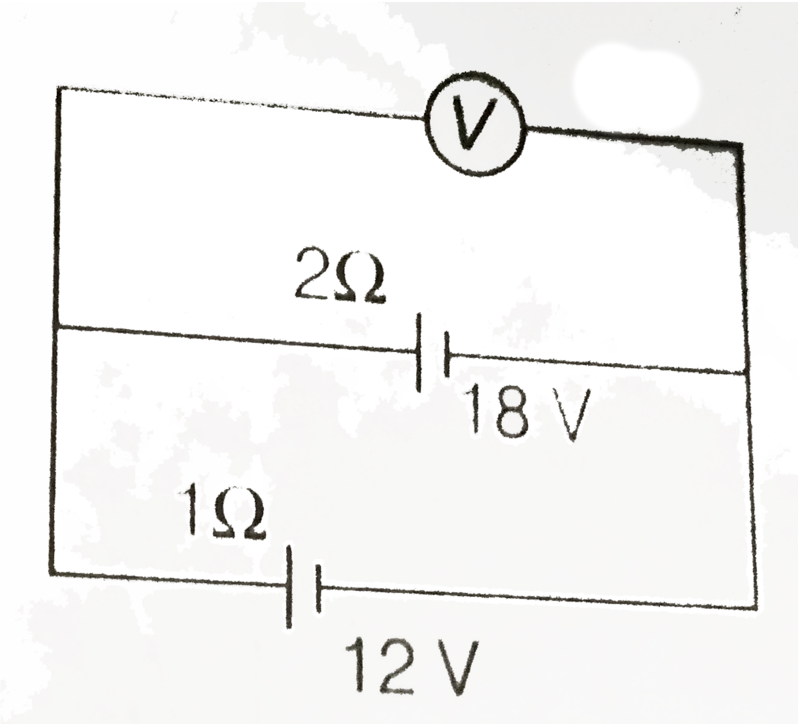
C. Zero

D. 4A

Answer: C

Watch Video Solution

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



A. 15 volt

B. 30 volt

C. 14 volt

D. 18 volt

Answer: C

Watch Video Solution

346. 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

A. $R = R_1 R_2 / (R_1 + R_2)$

B. $R = R_1 R_2 / (R_2 - R_1)$

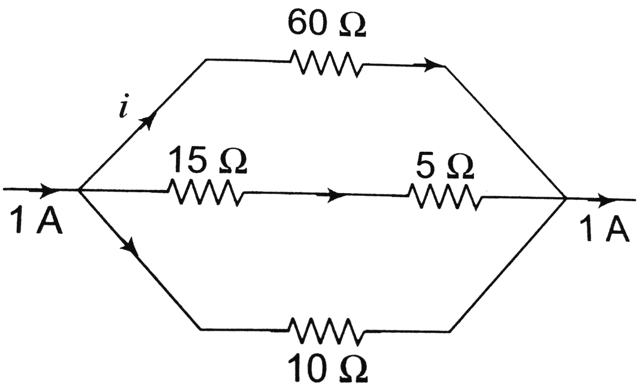
C. $R = R_2 \times (R_1 + R_2) / (R_2 - R_1)$

D. $R = R_2 - R_1$

Answer: D

Watch Video Solution

347. The magnitude in i in ampere unit is



A. 0.1

B. 0.3

C. 0.6

D. None of these

Answer: A

Watch Video Solution

348. To get the maximum current from a parallel combination of n identical cells each of internal resistance r in an external resistance R, when

A. Series

B. Parallel

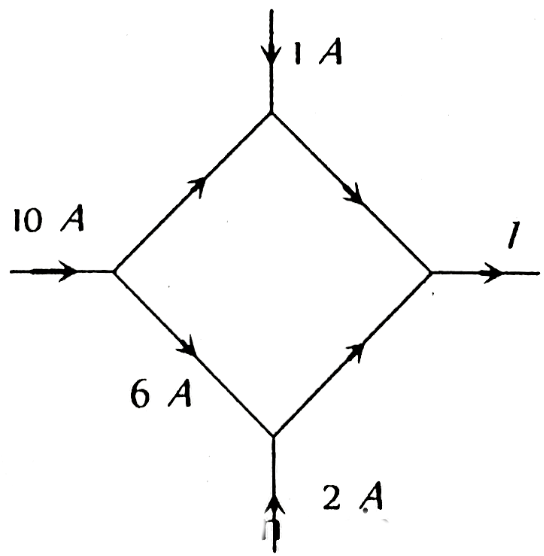
C. Mixed

D. Depends upon the relative values of exterbal and internal resistane

Answer: D

Watch Video Solution

349. The figure shows a network of currents. The magnitude of currents is shown here. The current I will be



A. 3A

B. 9A

C. 13A

D. 19A

Answer: C

Watch Video Solution

350. The n rows each containing m cells in series are joined in parallel. Maximum current is taken from this combination across an external resistance of 3Ω resistance. If the total number of cells used are 24 and internal resistance of each cell is 0.5Ω then

A. $m = 8, n = 3$

B. $m = 6, n = 4$

C. $m = 12, n = 2$

D. $m = 2, n = 12$

Answer: C

Watch Video Solution

351. A cell of constant e.m.f. first connected to a resistance R_1 and then connected to a resistance R_2. If power delivered in both cases is then the internal resistance o f the cell is

A. $\sqrt{R_1 R_2}$

B. $\sqrt{\frac{R_1}{R_2}}$

C. $\frac{R_1 - R_2}{2}$

D. $\frac{R_1 + R_2}{2}$

Answer: A

Watch Video Solution

352. In meter brigde of Wheatstone bridge for measurment of resistance, the known and the unknown resistance are interchanged. The error so removed is

A. End correction

B. Index error

C. Due to temperature effect

D. Randon error

Answer: A

Watch Video Solution

353. A galvanometer can be converted into an ammeter by connecting

A. Low resistance in series

B. High resistance in parallel

C. Low resistance in parallel

D. High resistance in series

Answer: C

Watch Video Solution

354. 10^{-3} amp is flowing through a resistance of 1000Ω. To measure the correct potential difference, the voltmeter is to be used to which the resistance should be

A. 0Ω

B. 500Ω

C. 1000Ω

D. $> > 1000\Omega$

Answer: D

Watch Video Solution

355. A galvanometer of 100Ω resistance gives full scale deflection when 10 mA of current is passed. To convert it into 10 A range ammeter, the resistance of the shunt required will be

A. -10Ω

B. 1Ω

C. 0.1Ω

D. 0.01Ω

Answer: C

Watch Video Solution

356. 50Ω and 100Ω resistors are connected in series. This connection is connected with a battery of 24 volts. When a voltmeter of 100Ω resistance is connected across 100Ω resistor, then the reading of the voltmeter will be

A. $1.6V$

B. $1.0V$

C. $1.2V$

D. $2.0V$

Answer: C

Watch Video Solution

357. A 2 volt battery, a 15Ω resistor and a potentiometer of $100cm$ length, all are connected in series. If the resistance resistance of potentiometer wire is 5Ω, then the potential gradient of the potentiometer wire is

A. $0.005V / cm$

B. $0.05V / cm$

C. $0.02V / cm$

D. $0.2V / cm$

Answer: A

Watch Video Solution

358. An ammeter gives full scale deflection when current of 1.0 A is passed in it. To convert it into 10 A range ammeter, the ratio of its resistance and the shunt resistance will be

A. $1:9$

B. $1:10$

C. $1:11$

D. $9:1$

Answer: D

Watch Video Solution

359. By ammeter, which of the following can be measured

A. Electric potential

B. Potential difference

C. Current

D. Resistance

Answer: C

Watch Video Solution

360. The resistance of 1 A ammeter is 0.018Ω . To convert it into 10 A ammeter, the shunt resistance required will be

A. 0.18Ω

B. 0.0018Ω

C. 0.002Ω

D. 0.12Ω

Answer: C

Watch Video Solution

361. 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 voltmeter

D. Potentiometer does not take current from the circuit

Answer: D

Watch Video Solution

362. To send 10% of the main current through a moving coil galvanometer of resistance 99ω, the shunt required is –

A. 9.9Ω

B. 10Ω

C. 11Ω

D. 9Ω

Answer: C

Watch Video Solution

363. An ammeter of 5 ohm resistance can read 5 mA . If it is to be used to read 100 volts, how much resistance is to be connected in series

A. 19.9995Ω

B. 199.995Ω

C. 1999.95Ω

D. 19995Ω

Answer: D

Watch Video Solution

364. The potential gradient long the length of a unifrom wire is $10\text{volt}/meter$. B and C are the two points at $30cm$ and $60cm$ point on a meter scale fitted along the wire. The potential diffenence between B and C will be

A. 3 volt

B. 0.4 volt

C. 7 volt

D. 4 volt

Answer: A

Watch Video Solution

365. 100 current gives a full scale deflection in a galvanometer of 2Ω resistance. The resistance connected with the galvanometer to convert it into a voltmeter to measure V 5 is

A. 98Ω

B. 52Ω

C. 50Ω

D. 48Ω

Answer: D

Watch Video Solution

366. When a 12Ω resistor is connected with a moving coil galvanometer, then its deflection reduces form 50 divions to 10 divisions. The ressitance of the galvanometer is

A. 24Ω

B. 36Ω

C. 48Ω

D. 60Ω

Answer: C

Watch Video Solution

367. A galvanometer can be used as a voltmeter by connecting

A. High resistance in series

B. Low resistance in series

C. High resistance in parallel

D. Low resistance in parallel

Answer: A

Watch Video Solution

368. The tangent galvanometer, when connected in series with a standard resistance can be used as

A. An ammeter

B. An voltmeter

C. A wattmeter

D. Both an ammeter and a voltmeter

Answer: B

Watch Video Solution

369. In Wheatstone's bridge $P = 9 ohm$, $Q = 11 ohm$, $R = 4 ohm$ and $S = 6 ohm$. How much resistance must be put in parallel to the resistance S to balance the bridge

A. 24 ohm

B. $\frac{44}{9}$ ohm

C. 26.4 ohm

D. 18.7 ohm

Answer: C

Watch Video Solution

370. A Daniel cell is balanced on $125cm$ length of a potentiometer wire. Now the cells is short-circuited by a resistance $2ohm$ and the balance is obtained at $100cm$. The internal resistance of the Dainel cell is

A. 0.5 ohm

B. 1.5 ohm

C. 1.25 ohm

D. $4/5$ ohm

Answer: A

Watch Video Solution

371. Sensitivity of potentiometer can be increased by

A. Increasing the e.m.f. of the cell

B. Increasing the length of the potentiometer wire

C. Decreasing the length of the potentiometer wire

D. None of the above

Answer: B

Watch Video Solution

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

A. It uses a sensitive galvanometer

B. It does not disturb the potential difference it measures

C. It is an elaborate arrangement

D. It has a long wire hence heat developed is quickly radiated

Answer: B

Watch Video Solution

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

A. 1V

B. $1.5V$

C. 2V

D. 3V

Answer: A

Watch Video Solution

374. A galvanometer of 10 ohm resistance gives full scale deflection with 0.01 ampere of current. It is to be converted into an ammeter for measuring 10 ampere current. The value of shunt resistance required will be

A. $\frac{10}{999}$ ohm

B. 0.1 ohm

C. 0.5 ohm

D. 1.0 ohm

Answer: A

Watch Video Solution

375. A potentiometer is used for the compaisem of e.m.f. of two cells E_1 and E_2. For cell E_1 the no deflection point os obtained at $20 cm$ and for E_2 the no deflection point is obtained at $30 cm$. The ratio of their e.m.f.'s will be

A. $2/3$

B. $1/2$

C. 1

D. 2

Answer: A

Watch Video Solution

376. What is potential gradient ? How is it measured ? Explain.

A. Falll of potential per unit length of the wire

B. Fall of potential per unit area of the wire

C. Fall of potential between two ends of the wire

D. Potential at any one end of the wire

Answer: A

Watch Video Solution

377. In an experiment of meter bridge, a null point is obtaining at the center of the bridge wire. When a resistance of $10ohm$ is connected in one gap, the value of resistance other gap is

A. 10Ω

B. 5Ω

C. $\frac{1}{5}\Omega$

D. 500Ω

Answer: A

Watch Video Solution

378. If the length of potentiometer wire is increased, then the length of the previously obtained balance will

A. Increase

B. Decrease

C. Remain unchanged

D. Become two times

Answer: A

Watch Video Solution

379. In a potentiometer, balance point is obtained, when

A. The e.m.f. of the battery becomes equal to the e.m.f. of the experimental cell

B. The p.d. of the wire between the + ve end to jockey becomes equal to the e.m.f. of the experimental cell

C. The p.d. of the wire between + ve point and jockey becomes equal to the e.m.f. of the battery

D. The p.d. across the potentiometer wire becomes equal to the e.m.f. of the battery

Answer: B

Watch Video Solution

380. In the experiment of potentiometer, at balance, there is no current in the

A. Main circuit

B. Galvanometer circuit

C. Potentiometer circuit

D. Both main and galvanometer circuits

Answer: B

Watch Video Solution

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

A. Change

B. Remain unchanged

C. Depend on the internal resistance of cell and resistance of galvanometer

D. None of these

Answer: B

Watch Video Solution

382. The resistance of a galvanometer is 90 ohm s. If only 10 percent of the main current may flow through the galvanometer, in which way and of what value, a resistor is to be used

A. 10 ohms in series

B. 10 ohms in parallel

C. 810 ohms in series

D. 810 ohms in parallel

Answer: B

Watch Video Solution

383. Two cells when connected in series are balanced on $8m$ on a potentiometer. If cells are connected with polarities of one the cellis reversed, they balance on $2m$. The ratio of e.m.f.'s of the two cellsis

A. $3:5$

B. $5:3$

C. $3:4$

D. $4:3$

Answer: B

Watch Video Solution

384. A voltmeter has a resistance G and range V. Calculate the resistance to be used in series with it to extend its range to nV.

A. nG

B. $(n-1)G$

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

D. $\frac{G}{(n-1)}$

Answer: B

Watch Video Solution

385. Which of the following statement is wrong

A. Voltmeter should have high resistance

B. Ammeter should have low resistance

C. Ammeter is placed in parallel across the conductor in a circuit

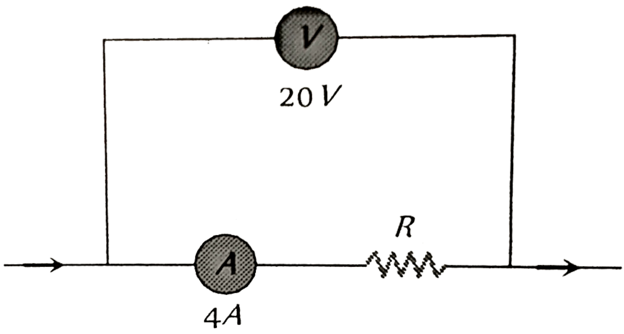
D. Voltmeter is placed in parallel across the conductor in a circuit

Answer: C

Watch Video Solution

386. In the diagram shown, the reading of voltmeter is 20 V and that of ammeter is 4 A . The value of R should be

(Consider given ammeter and voltmeter are not ideal)



A. Equal to 5Ω

B. Greater from 5Ω

C. Less than 5Ω

D. Greater or less than 5Ω depends on the material of R

Answer: C

Watch Video Solution

387. A moving coil galvanometer has a resistance of 50Ω and gives full scale deflection for 10 mA . How could it be converted into an ammeter with a full scale deflection for 1 A

A. $50/99\Omega$ in series

B. $50/99\Omega$ in parallel

C. 0.01Ω in series

D. 0.01Ω in parallel

Answer: B

Watch Video Solution

388. The current flowing in a coil of resistance 90Ω is to be reduced by 90%. What value of resistance should be connected in parallel with it

A. 10Ω

B. 100Ω

C. 9Ω

D. 10Ω

Answer: B

Watch Video Solution

389. A galvanometer of resistance 25Ω gives full scale deflection for a current of 10 milliampere , is to be changed into a voltmeter of range 100 V by connecting a resistance of ' R ' in series with galvanometer. The value of resistance R in Ω is

A. 10000

B. 10025

C. 975

D. 9975

Answer: D

Watch Video Solution

390. In a potentiometer circuit there is a cell of e.m.f. 2 volt , a resistance of 5 ohm and a wire of uniform thickness of length 1000 cm and resistance 15 ohm . The potential gradient in the wire is

A. $\frac{1}{500}V/cm$

B. $\frac{3}{5000}V/cm$

C. $\frac{1}{1000}V/cm$

D. $\frac{1}{10000}V/cm$

Answer: B

Watch Video Solution

391. The resistance of a galvanometer is 25 ohm and it requires $50\mu A$ for full deflection. The value of the shunt resistance required to convert it into an ammeter of 5 amp is

A. 2.5×10^{-4} ohm

B. 1.25×10^{-3} ohm

C. 0.05 ohm

D. 2.5 ohm

Answer: A

Watch Video Solution

392. Which is a wrong statement

A. The Wheatstone bridge is most sensitive when all the four resistances are of the same order

B. In a balanced Wheatstone bridge, interchanging the positions of galvanometer and cell affects the balance of the bridge

C. Kirchhoff's first law (for currents meeting at a junction in an electric circuit) expresses the conservation of charge

D. The rheostat can be used as a potential divider

Answer: B

Watch Video Solution

393. A voltmeter having a resistance of 998 ohms is connected to a cell of e.m.f. 2 volt and internal resistance 2 ohm. The error in the measurment of e.m.f. will be

A. 4×10^{-1} volt

B. 2×10^{-3} volt

C. 4×10^{-3} volt

D. 2×10^{-1} volt

Answer: C

Watch Video Solution

394. For comparing the e.m.f.'s of two cells with a potentiometer, a standard cell is used to develop a potential gradient along the wires. Which of the following possibilities would make the experiment unsuccessful gt

A. The e.m.f. of the standard cell is larger than the E e.m.f.'s of the two cells

B. The diameter of the wires is the same and uniform throughout

C. The number of wires is ten

D. The e.m.f. of the standard cell is smaller than the e.m.f.'s of the two cells

Answer: D

Watch Video Solution

395. Which of the following is correct

A. Ammeter has low resistance and is connected in series

B. Ammeter has low resistance and is connected in parallel

C. Voltmeter has low resistance and is connected in parallel

D. None of the above

Answer: A

Watch Video Solution

396. An ammeter with internal resistance 90Ω reads 1.85 A when connected in a circuit containing a battery and two resistors 700Ω and 410Ω in series. Actual current will be

A. $1.85A$

B. Greater than $1.85A$

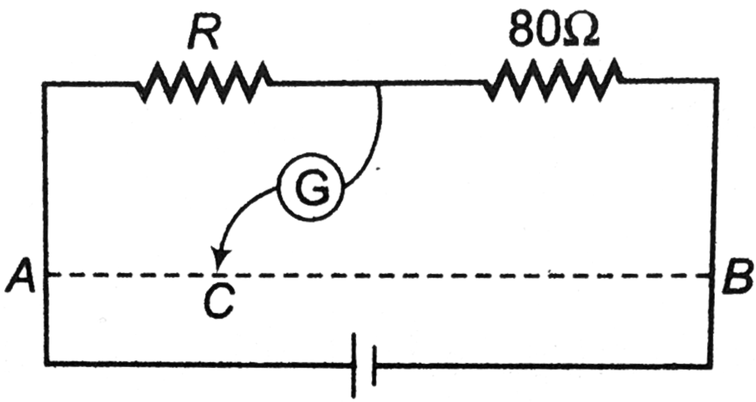
C. Less than $1.85A$

D. None of these

Answer: B

Watch Video Solution

397. AB is a wire of uniform resistance. The galvanometer G shows no deflection when the length $AC = 20cm$ and $CB = 80cm$. The resistance R is equal to.



A. 2Ω

B. 8Ω

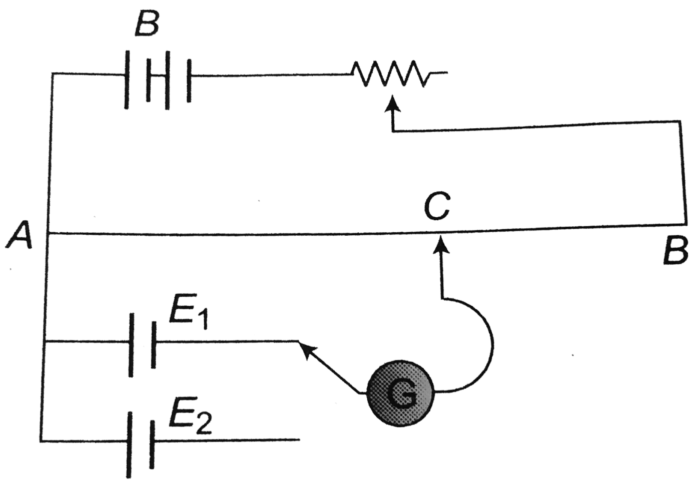
C. 20Ω

D. 40Ω

Answer: C

Watch Video Solution

398. The circuit shown here is used to compare the e.m.f. of the two cells $E_2(E)_1 > E_2$. The null point is at C when the galvanometer is connected to E_1. When the galvanometer is connected to E_2, the null point will be



A. To the left of C

B. To the right of C

C. At C itself

D. Nowhere on AB

Answer: A

Watch Video Solution

399. In an experiment to measure the internal resistance of a cell by a potentiometer, it is found that the balance point is at a length of $2m$ when the cell is shunted by a 5Ω resistance and is at a length of $3m$ when the cell is shunted by a 10Ω resistance, the internal resistance of the cell is then

A. 1.5Ω

B. 10Ω

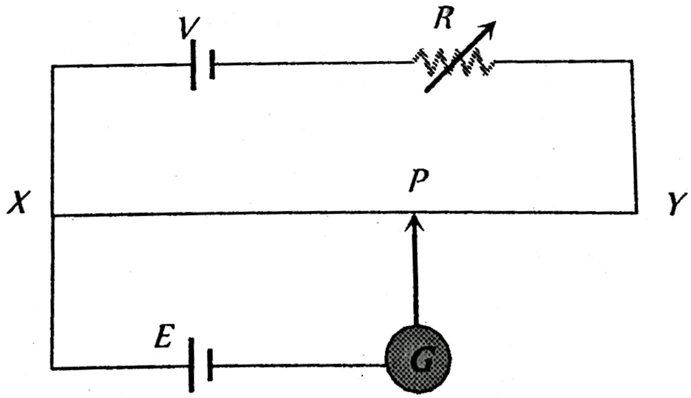
C. 15Ω

D. 1Ω

Answer: B

Watch Video Solution

400. A potentiometer circuit shown in the figure is set up to measure e.m.f. of a cell E . As the point P moves from X to Y the galvanometer G shows deflection always in one direction, but the deflection decreases continuously until Y is reached. In order to obtain balance point between X and Y it is necessary to



A. Decreases the resistance R

B. Increase the resistance R

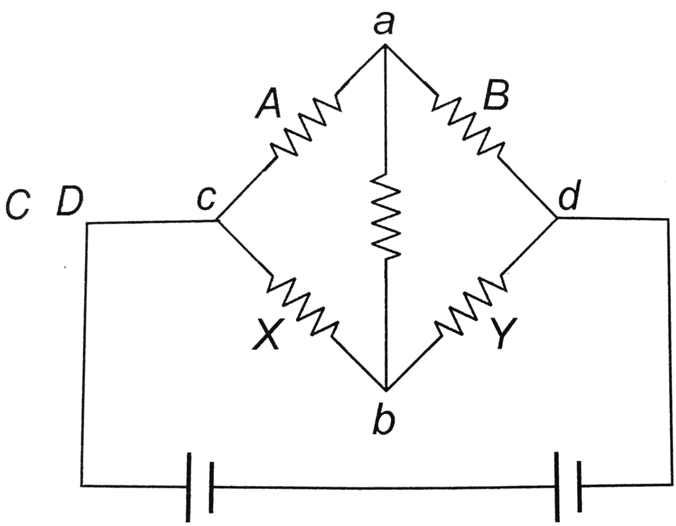
C. Reverse the terminals of battery V

D. Reverse the terminals of cell E

Answer: A

Watch Video Solution

401. In the Wheatstone's bridge (shown in figure) $X = Y$ and $A > B$. The direction of the current between ab will be



A. From a to b

B. From b to a

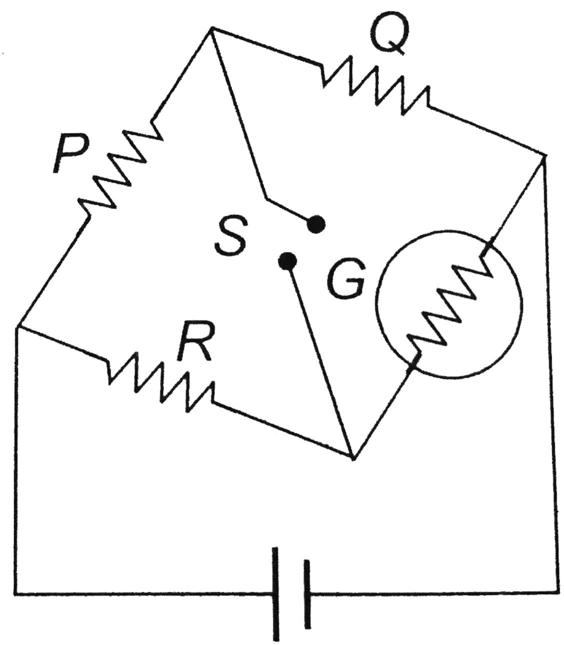
C. From b to a through c

D. From a to b through c

Answer: B

Watch Video Solution

402. The firgure shows a circuit diagram of a 'Wheatstone Bridge' to measure the resistance G of the galvanometer The relation $\frac{P}{Q} = \frac{R}{G}$ will be satisfied only when



A. The galvanometer shows a deflection when switch S is closed

B. The galvanometer shows a deflection when switch S is open

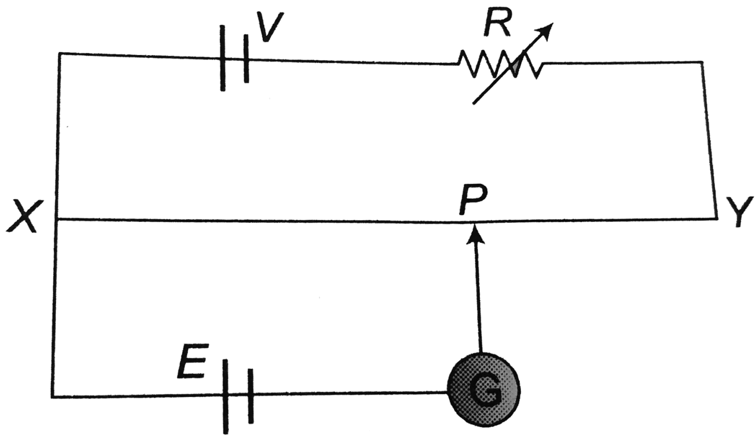
C. The galvanometer shows no change in deflection whether S is open or closed

D. The galvanometer shows no deflection

Answer: C

Watch Video Solution

403. The resistance of a galvanometer is $50 ohm$ and the current required to give full scale deflection is $100 \mu A$. In order to convert it into an ammeter, reading upto $10 A$, it is necessary to put a resistance of



A. $5 \times 10^{-3}\Omega$ in parallel

B. $5 \times 10^{-4}\Omega$ in parallel

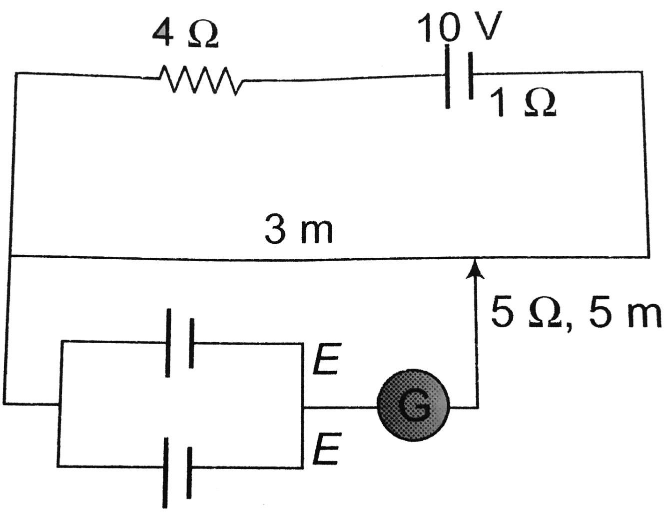
C. $10^{5}\Omega$ in series

D. $99, 950\Omega$ in series

Answer: B

Watch Video Solution

404. A resistance of 4Ω and a wire of length 5 meters and resistance 5Ω are joined in series and connected to a cell of e.m.f. $10V$ and internal resistance 1Ω. A parallel combination of two identical cells is balanced across $300cm$ of wire. The e.m.f. E of each cell is



A. $1.5V$

B. $3.0V$

C. $0.67V$

D. $1.33V$

Answer: B

Watch Video Solution

405. The resistivity of a potentiometer wire is $40 \times 10^{-8} \Omega - m$ and its area of cross section is $8 \times 10^{-6} m^2$. If 0.2 A current is flowing through the wire the potential gradient will be

A. 10^{-2} volt/m

B. 10^{-1} volt/m

C. 3.2×10^{-2} vol/m

D. 1 vol/m

Answer: A

Watch Video Solution

406. If only 2% of the main current is to be passed through a galvanometer of resistance G , then the resistance of shunt will be

A. $\frac{G}{50}$

B. $\frac{G}{49}$

C. $50G$

D. $49G$

Answer: B

Watch Video Solution

407. The resistance of an ideal voltmeter is

A. Zero

B. Very low

C. Very large

D. Infinite

Answer: D

Watch Video Solution

408. A $100V$ voltmeter of internal resistance $20k\Omega$ in series with a high resistance R is connected to a $110V$ line. The voltmeter reads $5V$, the value of R is

A. $210k\Omega$

B. $315k\Omega$

C. $420k\Omega$

D. $440k\Omega$

Answer: C

Watch Video Solution

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

A. Specific resistance is low

B. Density is high

C. Temperature coefficient of resistance is negligible

D. Melting point is high

Answer: C

Watch Video Solution

410. The net resistance of a volmeter should be large to ensure that

A. It does not get overheated

B. It does not draw excessive current

C. It can measure large potential difference

D. It does not appreciably change the potential difference to be measured

Answer: D

Watch Video Solution

411. A galvanometer has resistance of 7Ω and given a full scale deflection for a current of $1.0A$. How will you convert it into a voltmeter of range 10V

A. 3Ω in series

B. 3Ω in aprallel

C. 17Ω in series

D. 30Ω in series

Answer: A

Watch Video Solution

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

A. $0.5V/m$

B. $2V/m$

C. $5V/m$

D. $10V/m$

Answer: A

Watch Video Solution

413. In meter bridge , the balancing length from left is found to be 20 cm when standard connected of 1Ω is in right gap .

The value of unknown resistance is

A. 0.8Ω

B. 0.5Ω

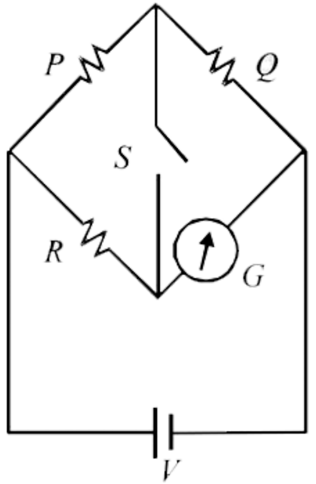
C. 0.4Ω

D. 0.25Ω

Answer: D

Watch Video Solution

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



A. $I_R = I_G$

B. $I_P = I_G$

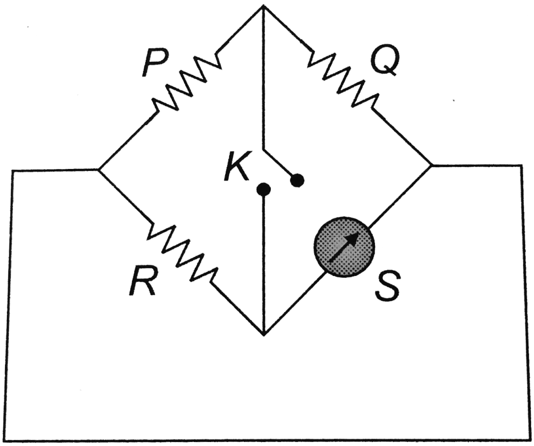
C. $I_Q = I_G$

D. $I_Q = I_R$

Answer: A

Watch Video Solution

415. In the following Wheatstone bridge $P/Q = R/S$. If key K is closed, then the galvanometer will show deflection



A. In left side

B. In right side

C. No deflection

D. In either side

Answer: D

Watch Video Solution

Watch Video Solution

416. A galvanometer having a resistance of 8 ohm is shunted by a wire of resistance 2 ohm . If the total current is 1 amp , the part of it passing through the shunt will be

A. 0.2amp

B. 0.8 amp

C. 0.2 amp

D. 0.5 amp

Answer: B

Watch Video Solution

417. A potentiometer wire has length 10 m and resistance 20Ω. A 2. 5 V battery of negligible internal resistance is connected across the wire with an 80Ω series resistance. The potential gradient on the wire will be

A. $5 \times 10^{-5} V/mm$

B. $2.5 \times 10^{-4} V/cm$

C. $0.62 \times 10^{-4} V/mm$

D. $1 \times 10^{-5} V/mm$

Answer: A

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418. An ammeter whose resistance is 180Ω gives full scale deflection when current is 2mA. The shunt required to convert it into an ammeter reading 20 mA (in ohms) is

A. 18

B. 20

C. 0.1

D. 10

Answer: B

Watch Video Solution

419. A galvanometer whose resistance is 120Ω gives full scale deflection with a curretn of $0.5A$ so that it can read a maximum current of $10A$. A shunt resistance is added in parallel with it. The resistance of the ammeter so formed is

A. 0.06Ω

B. 0.006Ω

C. 0.6Ω

D. $6\Omega s$

Answer: C

Watch Video Solution

420. In a potentiometer experiment, the galvanometer shows no deflection when a cell is connected across $60cm$ of the potentiometer wire. If the cell is shunted by a resistance of

6Ω, the balance is obtained across $50cm$ of the wire. The internal resistance of the cell is

A. 0.5Ω

B. 0.6Ω

C. 1.2Ω

D. 1.5Ω

Answer: C

Watch Video Solution

421. A voltmeter of resistance 1000Ω gives full scale deflection when a current of $100mA$ flow through it. The shunt resistance required across it to enable it to be used as an ammter reading $1A$ at full scale deflection is

A. 10000Ω

B. 9000Ω

C. 222Ω

D. 111Ω

Answer: D

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422. The resistance of 10 metre long potentiometer wire is 1 ohm/meter . A cell of e.m.f. 2.2 volts and a high resistance box are connected in series to this wire. The value of resistance taken from resistance box for getting potential gradient of 2.2 millivolt/metre will be

A. 790Ω

B. 810Ω

C. 990Ω

D. 1000Ω

Answer: C

Watch Video Solution

423. We have a galvanometer of resistance 25Ω. It is shunted by a 2.5Ω wire. The part of total current that flows through the galvanometer is given as

A. $\frac{I}{I_0} = \frac{1}{11}$

B. $\frac{I}{I_0} = \frac{1}{10}$

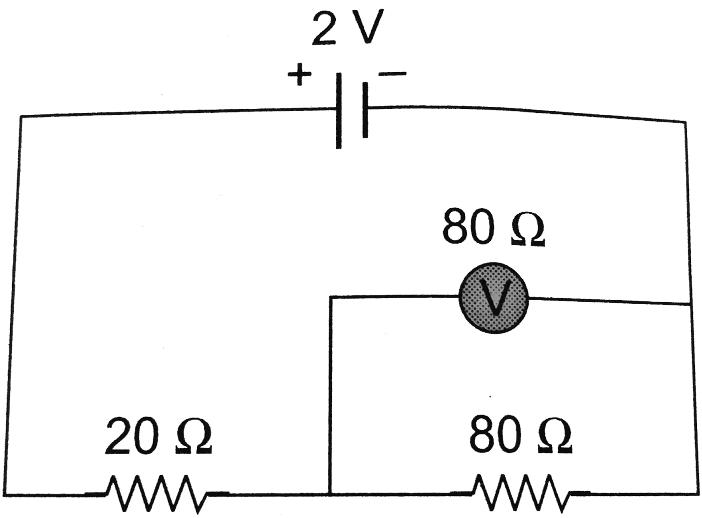
C. $\frac{I}{I_0} = \frac{3}{11}$

D. $\frac{I}{I_0} = \frac{4}{11}$

Answer: A

Watch Video Solution

424. In the adjoining circuit, the e.m.f. of the cell is 2 volt and the internal resistance is negligible. The resistance of the voltmeter is $80 ohm$. The reading of the voltmeter will be



A. 0.80 volt

B. 1.60 volt

C. 1.33 volt

D. 2.00 volt

Answer: C

Watch Video Solution

425. If the resistivity of a potentiometer wire be ρ and area of cross-section be A , then what will be potential gradient along the wire

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

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

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

D. $IA\rho$

Answer: A

Watch Video Solution

426. A voltmeter has resistance of 2000 ohms and it can measure upto $2V$. If we want ot increase its range to $10V$ then the, required resistance in series will be

A. 2000Ω

B. 4000Ω

C. 6000Ω

D. 8000Ω

Answer: D

Watch Video Solution

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

A. 0.25Ω

B. 0.50Ω

C. 0.80Ω

D. 1.00Ω

Answer: B

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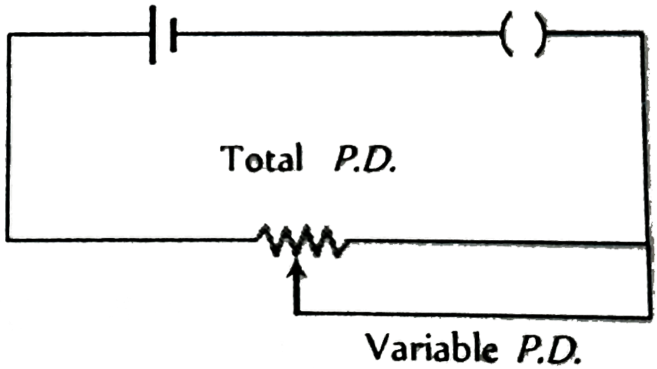
428. The arrangement as shown in figure is called as



A. Potential divider

B. Potential adder

C. Potential substracter

D. Potential multiplier

Answer: A

Watch Video Solution

429. A potentiometer wire of length 1m and resistance 10Ω is connected in series with a cell of emf 2V with internal resistance 1Ω and a resistance box including a resistance R. If potential difference between the ends of the wire is 1 mV, the value of R is

A. 20000Ω

B. 19989Ω

C. 10000Ω

D. 9989Ω

Answer: B

Watch Video Solution

430. In a balanced wheatstone's network, the resistances in the arms Q and S are interchanged. As result of this:

A. Network is not balanced

B. Network is still balanced

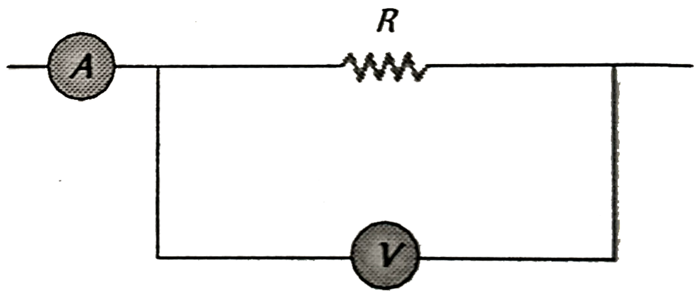
C. Galvanometer shows zero deflection

D. Galvanometer and the cell must be interchanged to balance

Answer: A

Watch Video Solution

431. The ammeter A reads 2A and the voltmeter V reads 20V, the value of resistance R is (Assuming finite resistance's of ammeter and voltmeter)



A. Exactly 10 ohm

B. Less than 10 ohm

C. More than 10 ohm

D. We cannot definitely say

Answer: C

Watch Video Solution

432. The resistance of a galvanometer coil is R . What is the shunt resistance required to convert it into an ammeter of range 4 times

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

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

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

D. $4R$

Answer: C

Watch Video Solution

433. If an ammeter is connected in parallel to a circuit, it is likely to be damaged due to excess

A. Current

B. Voltage

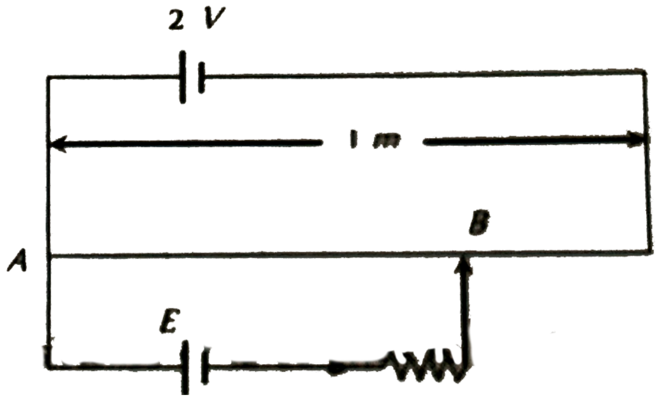
C. Resistance

D. All of these

Answer: A

Watch Video Solution

434. In the given figure, battery E is balanced on 55 cm length of potentiometer wire but when a resistance of 10Ω is connected in parallel with the battery then it balances on 50 cm length of the potentiometer wire then internal resistance r of the battery is



A. 1Ω

B. 3Ω

C. 10Ω

D. 5Ω

Answer: A

Watch Video Solution

435. A galvanometer with a resistance of 12Ω gives full scale deflection when a current of 3 mA is passed. It is required to convert it into a voltmeter which can read up to 18 V . the resistance to be connected is

A. 6000Ω

B. 5988Ω

C. 5000Ω

D. 4988Ω

Answer: B

Watch Video Solution

436. The resistance of an ideal ammeter is

A. Infinite

B. Very high

C. Small

D. Zero

Answer: D

Watch Video Solution

437. A galvanometer of 25Ω resistance can read a maximum current of 6 mA . It can be used as a voltmeter to measure a maximum of 6 V by connecting a resistance to the galvanometer. Identify the correct choice in the given answers

A. 1025Ω in series

B. 1025Ω in parallel

C. 975Ω in series

D. 975Ω in parallel

Answer: C

Watch Video Solution

438. A galvanometer has a resistance of $25 ohm$ and a maximum of $0.01A$ current can be passed throught it. In order to change it into an ammeter of range $10A$, the shunt resistance required is

A. $5/999$ ohm

B. $10/999$ ohm

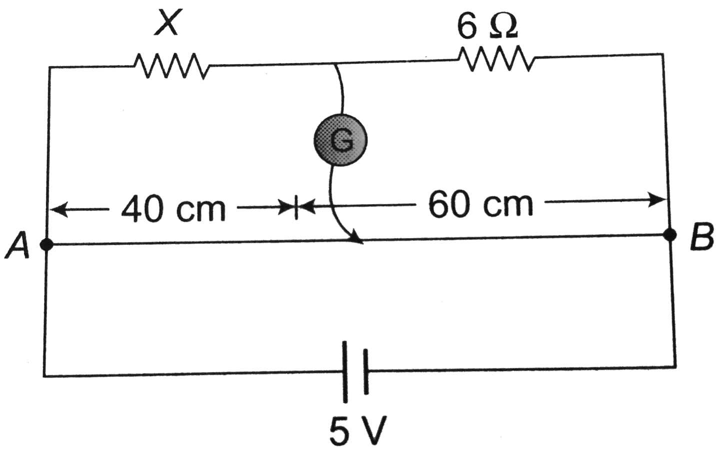
C. $20/999$ ohm

D. $25/999$ ohm

Answer: D

Watch Video Solution

439. In the circuit shown, a meter bridge is in its balanced state. The meter bridge wire has a resistance $.1 ohm/cm$. The value of unknown resistance X and the current drawn from the battery of negligible resistance is



A. 6Ω, 5 amp

B. 10Ω, 0.1 amp

C. 4Ω, 1.0 amp

D. 12Ω, 0.5 amp

Answer: C

Watch Video Solution

440. A galvanometer has 30 divisions and a sensitivity $16\mu A / \text{div}$. It can be converted into a voltmeter to read $3V$ by connecting

A. Resistance nearly $6k\Omega$ in series

B. $6k\Omega$ in parallel

C. 500Ω in series

D. It cannot be converted

Answer: A

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441. Voltmeters V_1 and V_2 are connected in series across a $D.C.$ line V_1 reads 80 volts and has a per volt resistance of

$200ohms, V_2$ has a total resistance of 32 kilo ohms.

The line voltage is

A. 120 volts

B. 160 volts

C. 220 volts

D. 240 volts

Answer: D

Watch Video Solution

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

A. 1

B. 2

C. 5

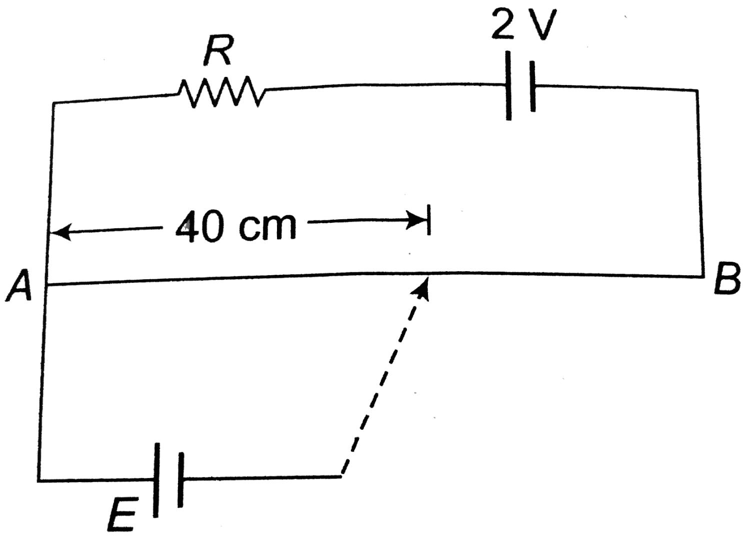
D. 10

Answer: D

Watch Video Solution

443. AB is a potentiometer wire of length $100 cm$ and its resistance is $10 ohms$. It is connected in series with a resistance $R = 10 ohms$ and a battery of e.m.f. $2V$ and negligible internal resistance. If a source of unknown e.m.f. E

is balanced by $40cm$ length of the potentiometer wire, the value of E is



A. $0.8V$

B. $1.6V$

C. $0.08V$

D. $0.16V$

Answer: D

Watch Video Solution

444. An ammeter gives full deflection when a current of $2amp$. Flows through it. The resistance of ammeter is $12ohms$. If the same ammeter is to be used for measuring a maximum current of $5amp$, then the ammeter must be connected with a resistance of

A. 8 ohms in series

B. 18 ohms in series

C. 8 ohms in parallel

D. 18 ohms in parallel

Answer: C

Watch Video Solution

445. In a circuit 5 percent of total current passes through a galvanometer. If resistance of the galvanometer is G then value of the shunt is

A. $19G$

B. $20G$

C. $\frac{G}{20}$

D. $\frac{G}{19}$

Answer: D

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446. A voltmeter having resistance of 50×10^3 ohm is used to measure the voltage in a circuit. To increase the range of measurement 3 times the additional series resistance required is

A. 10^5 ohm

B. 105 k ohm

C. 900 k ohm

D. 9×10^6 ohm

Answer: A

Watch Video Solution

447. In a potentiometer experiment two cells of e.m.f. E and E are used in series and in conjunction and the balancing length is found to be 58 cm of the wire. If the olarity of E is reversed, then the balancing length becomes 29 cm . The ratio $\frac{E_1}{E_2}$ of the e.m.f. of the two cells is

A. $1:1$

B. $2:1$

C. $3:1$

D. $4:1$

Answer: C

Watch Video Solution

448. A milliammeter of range 10 mA has a coil of resistance 1Ω. To use it as voltmeter of range 10 volt , the resistance that must be connected in series with it, will be

A. 999Ω

B. 99Ω

C. 1000Ω

D. None of these

Answer: A

Watch Video Solution

449. A voltmeter has a range $O - V$ with a series resistance R. With a series resistance $2R$, the range is $O - V$. The correct relation between V and V 'is

A. $V = 2V$

B. $V' > 2V$

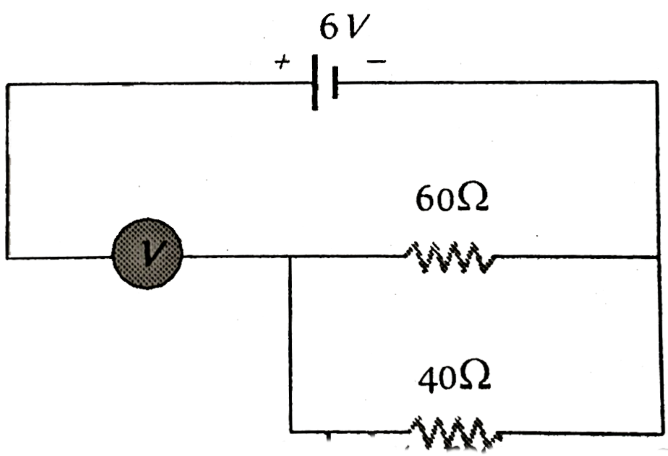
C. $V' > > 2V$

D. $V' < 2V$

Answer: D

Watch Video Solution

450. The measurement of voltmeter in the following circuit is



A. $2.4V$

B. $3.4V$

C. $4.0V$

D. $6.0V$

Answer: D

Watch Video Solution

451. A 36Ω galvanometer is shunted by resistance of 4Ω. The percentage of the total current, which passes through the galvanometer is

A. 8%

B. 9%

C. 10%

D. 91%

Answer: C

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452. An ammeter and a voltmeter of resistance R connected in seires to an electric cell of negligible internal resistance. Their readings are A and V respecitvely. If another resistance R is connected in parallel with the voltmeter

A. Both A and V will increase

B. Both A and V will decrease

C. A will decrease and V will increase

D. A will increase V will decrease

Answer: D

Watch Video Solution

453. A wire of length 100 cm is connected to a cell of emf 2 V and negligible internal resistance. The resistance of the wire is 3Ω. The additional resistance required to produce a potential drop of 1 milli volt per cm is

A. 60Ω

B. 47Ω

C. 57Ω

D. 35Ω

Answer: C

454. A galvanometer of resistance 20Ω is to be converted into an ammeter of range 1 A . If a current of 1 mA produces full scale deflection, the shunt required for the purpose is

A. 0.01Ω

B. 0.05Ω

C. 0.02Ω

D. 0.04Ω

Answer: C

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455. There are three voltmeters of the same range but of resistance 10000Ω, 8000Ω and 4000Ω respectively. The best voltmeter among these is the one whose resistance is

A. 10000Ω

B. 8000Ω

C. 4000Ω

D. All are equally good

Answer: A

Watch Video Solution

456. If an ammeter is to be used in place of a voltmeter, then we must connect with the ammeter a

A. Low resistance in parallel

B. High resistance in parallel

C. High resistance in series

D. Low resistance in series

Answer: C

Watch Video Solution

457. The potentiometer wire 10m long and 20 ohm resistance is connected to a 3 volt emf battery and a 10ohm resistance. The value of potential gradient in volt/m of the wire will be

A. 0.02

B. 0.3

C. 0.2

D. 1.3

Answer: C

Watch Video Solution

458. A potentiometer has uniform potential gradient across it. Two cells connected in series (i) to support each other and (ii) to oppose each other are balanced over 6 m and 2 m respectively on the potentiometer wire. The e.m.f.'s of the cells are in the ratio of

A. $1:2$

B. $1:1$

C. $3:1$

D. $2:1$

Answer: D

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459. The material of wire of potentiometer is

A. Copper

B. Steel

C. Manganin

D. Aluminium

Answer: C

Watch Video Solution

460. To convert a galvanometer into a voltmeter, one should connect a

A. High resistance in series with galvanometer

B. Low resistance in series with galvanometer

C. High resistance in parallel with galvanometer

D. Low resistance in parallel with galvanometer

Answer: A

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461. To convert a $800mV$ range milli voltmeter of resistance 40Ω into a galvanometer of 100 mA` range, the resistance to be connected as shunt is

A. 10Ω

B. 20Ω

C. 30Ω

D. 40Ω

Answer: A

Watch Video Solution

462. A 100 ohm galvanometer gives full scale deflection at 10mA. How much shunt is required to read 100 mA

A. 11.11 ohm

B. 9.9 ohm

C. 1.1 ohm

D. 4.4ohm

Answer: A

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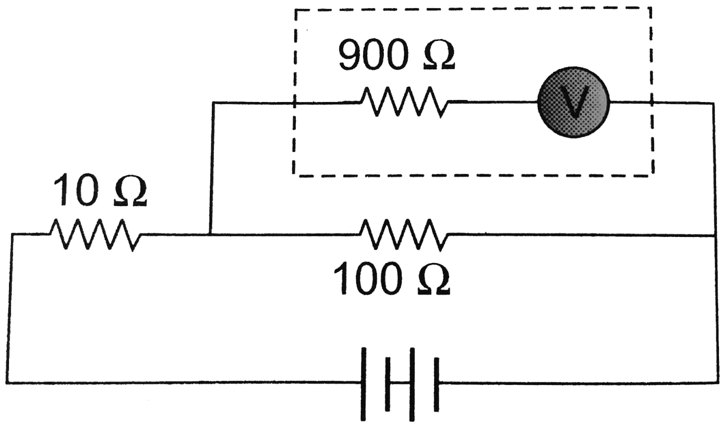
463. The potential difference across the 100Ω resistance in the following circuit is measured by a voltmeter of 900Ω resistance. The percentage error made in reading the potential difference is



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

B. 0.1

C. 1.0

D. 10.0

Answer: C

Watch Video Solution

464. A cell of internal resistance 3 ohm and emf 10 volt is connected to a uniform wire of length 500 cm and resistance 3 ohm . The potential gradient in the wire is

A. $30mV / cm$

B. $10mV / cm$

C. $20mV / cm$

D. $4mV / cm$

Answer: B

Watch Video Solution

465. An ammeter of 100Ω resistance gives full deflection for the current of 10^{-5} amp . Now the shunt resistance required to convert it into ammeter of 1 amp . range, will be

A. $10^{-4}\Omega$

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

C. $10^{-3}\Omega$

D. $10^{-1}\Omega$

Answer: C

Watch Video Solution

466. A galvanometer of resistance 36Ω is changed into an ammeter by using a shunt of 4Ω. The fraction f of total current passing through the galvanometer is

A. $\frac{1}{40}$

B. $\frac{1}{4}$

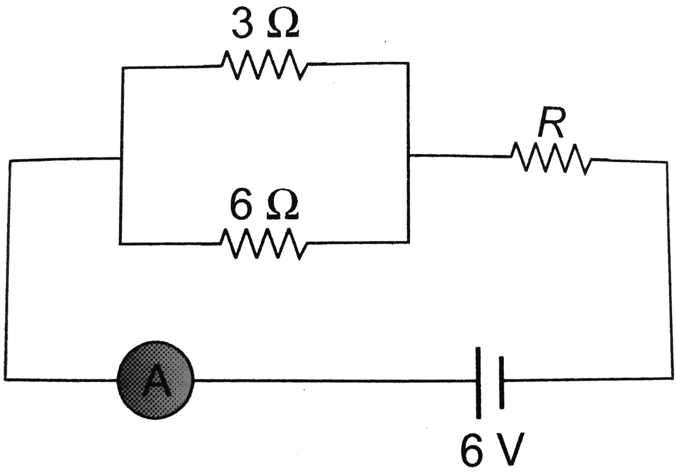
C. $\frac{1}{140}$

D. $\frac{1}{10}$

Answer: D

Watch Video Solution

467. If tha ammter in the given circuit reads $2A$, the resistance R is



A. 1 ohm

B. 2 ohm

C. 3 ohm

D. 4 ohm

Answer: A

Watch Video Solution

468. A 50 ohm galvanometer gets full scale deflection when a current of 0.01 A passes through the coil. When it is converted to a 10 A ammeter, the shunt resistance is

A. 0.01Ω

B. 0.05Ω

C. 2000Ω

D. 5000Ω

Answer: B

Watch Video Solution

469. Resistance in the two gaps of a meter bridge are $10 ohm$ and $30 ohm$ respectively. If the resistances are interchanged he balance point shifts by

A. $33.3cm$

B. $66.67cm$

C. $25cm$

D. $50cm$

Answer: D

Watch Video Solution

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

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

B. $10^{-6} V / m$

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

D. $10^{-8} V / m$

Answer: C

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471. Two resistance of 400Ω and 800Ω are connected in series with 6 volt battery of negligible internal resistance. A voltmeter of resistance $10,000\Omega$ is used to measure the potential difference across 400Ω. The error in measurement of potential difference in volts approximatley is

A. 0.01

B. 0.02

C. 0.03

D. 0.05

Answer: D

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472. A galvanometer having a coil resistance of 100ω gives a full scale deflection , when a current of $1mA$ is passed through it. The value of the resistance, which can convert this galvanometer into ammeter giving a full scale deflection for a current of $10A$, is :

A. 9

B. 6

C. 3

D. 1.5

Answer: C

Watch Video Solution

473. An ammeter reads upto 1 ampere. Its internal resistance is 0.81 ohm. To increase the range to 10 A the value of the required shunt is

A. 0.09Ω

B. 0.03Ω

C. 0.3Ω

D. 0.9Ω

Answer: A

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474. The length of a wire of a potentiometer is 100 cm, and the e.m.f. of its standard cell is E volt. It is employed to measure the e.m.f. of a battery whose internal resistance is 0.5Ω. If the balance point is obtained at l = 30 cm from the positive end, the e.m.f. of the battery is .

where i is the current in the potentiometer wire.

A. $\frac{30E}{100}$

B. $\frac{30E}{100.5}$

C. $\frac{30E}{(100-0.5)}$

D. $\frac{30(E-0.5i)}{100}$, where i is the current in the potentiometer

Answer: A

Watch Video Solution

475. Resistance of 100 cm long potentiometer wire is 10Ω, it is connected to a battery (2 volt) and a resistance R in series. A source of 10 mV gives null point at 40 cm length, then external resistance R is

A. 490Ω

B. 790Ω

C. 590Ω

D. 990Ω

Answer: B

Watch Video Solution

476. The e.m.f. of a standard cell balances across 150 cm length of a wire of potentiometer. When a resistance of 2Ω is connected as a shunt with the cell, the balance point is obtained at 100cm . The internal resistance of the cell is

A. 0.1Ω

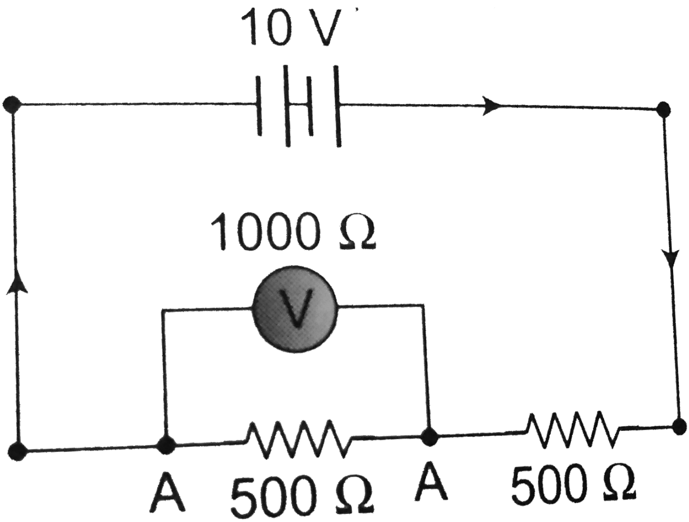
B. 1Ω

C. 2Ω

D. 0.5Ω

Answer: B

477. What is the reading of voltmeter in the following figure ?



A. 3V

B. 2V

C. 5V

D. 4V

Answer: D

Watch Video Solution

478. The current flowing in a coil of resistance 90Ω is to be reduced by 90%. What value of resistance should be connected in parallel with it

A. 9Ω

B. 90Ω

C. 1000Ω

D. 10Ω

Answer: D

Watch Video Solution

479. The maximum current that can be measured by a galvanometer of resistance 40Ω is 10 mA . It is converted into a voltmeter that can read upto 50 V . The resistance to be connected in series with the galvanometer is ... (in ohm)

A. 5040

B. 4960

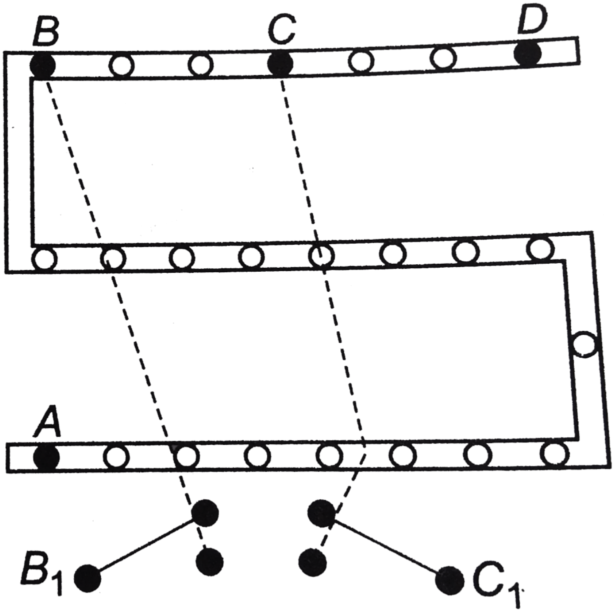
C. 2010

D. 4050

Answer: B

Watch Video Solution

480. For the post office arrangement to determine the value of unknown resistance, the unknown resistance should be connected between.



A. B and C

B. C and D

C. A and D

D. B and C

Answer: C

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481. A glavanometer of 50Ω resistance has 25 divisions. A current of 4×10^{-4} A gives a deflection of one division. To convert this galvanometer into a voltmeter having a range of $25V$, it should be connected with a resistance of

A. 2500Ω as a shunt

B. 2450Ω as a shunt

C. 2550Ω in series

D. 2450Ω in series

Answer: D

Watch Video Solution

482. In a meter bridge experiment, null point is obtained at $20cm$ from one end of the wire when resistance X is balanced against another resistance Y. If $X < Y$, then the new position of the null point from the same end, if one decides to balance a resistance of $4X$ against Y will be at.

A. 50 cm

B. 80 cm

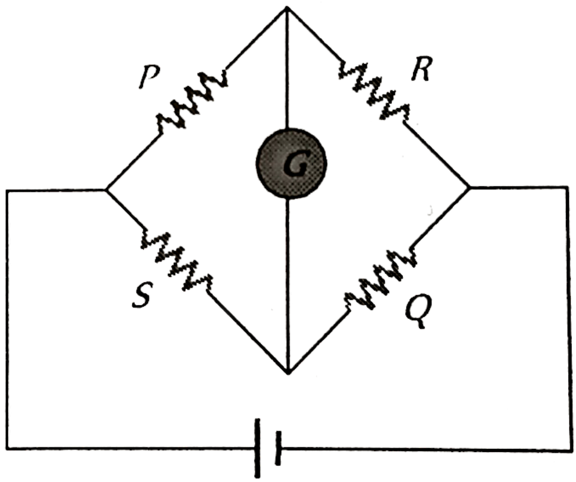
C. 40 cm

D. 70 cm

Answer: A

Watch Video Solution

483. In the circuit given, the correct relation to a balanced Wheatstone bridge is



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

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

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

D. None of these

Answer: C

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484. A galvanometer coil of resistance 50Ω, show full deflection of $100\mu A$. The shunt resistance to be added to the galvanometer, to work as an ammeter of range 10 mA is

A. 5Ω in parallel

B. 0.5Ω in series

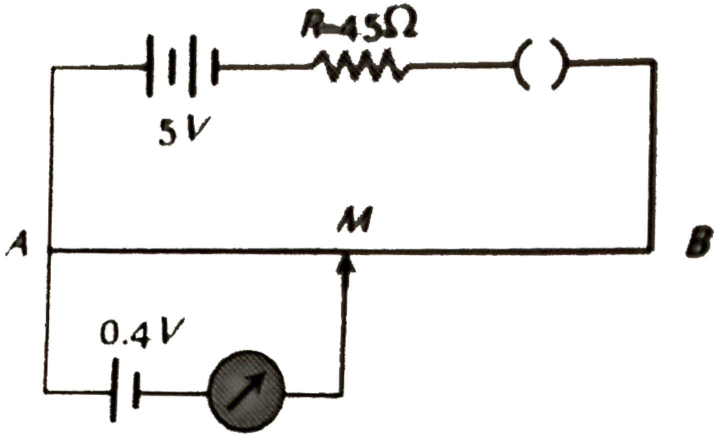
C. 5Ω in series

D. 0.5Ω in parallel

Answer: D

Watch Video Solution

485. 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. $0.4m$

B. $4m$

C. $0.8m$

D. $8m$

Answer: D

Watch Video Solution

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

A. $0.5V/m$

B. $10V/m$

C. $2V/m$

D. $5V/m$

Answer: A

Watch Video Solution

487. A voltmeter essentially consists of

A. A high resistance, in series with a galvanometer

B. A low resistance, in series with a galvanometer

C. A high resistance in parallel with a galvanometer

D. A low resistance in parallel with a galvanometer

Answer: A

Watch Video Solution

488. In a potentiometer experiment the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2Ω, the balancing length becomes 120 cm.The internal resistance of the cell is

A. 4Ω

B. 2Ω

C. 1Ω

D. 0.5Ω

Answer: B

Watch Video Solution

489. 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. $1.1V$

B. $1.8V$

C. $2.4V$

D. $1.41V$

Answer: D

Watch Video Solution

490. A moving coil galvanometer of resistance 100Ω is used as an ammeter using a resistance 0.1Ω. The maximum diflection current in the galvanometer is $100\mu A$. Find the minimum current in the circuit so that the ammeter shows maximum deflection

A. $100.1mA$

B. $1000.1mA$

C. $10.01mA$

D. $1.01 mA$

Answer: A

Watch Video Solution

491. Two resistances are connected in the two gaps of a meter bridge. The balance point is $20 cm$ from the zero end. When a resistance 15Ω is connected in series with the smaller of two resistance, the null point+ shifts to $40 cm$. The smaller of the two resistance has the value.

A. 3

B. 6

C. 9

D. 12

Answer: C

Watch Video Solution

492. If resistance of voltmeter is 10000Ω and resistance of ammeter is 2Ω then find R when voltmeter reads 12 V and ammeter reads 0.1 A

A. 118Ω

B. 120Ω

C. 124Ω

D. 114Ω

Answer: A

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493. Potentiometer wire of length $1m$ is connected in series with 490Ω resistance and $2V$ battery. If $0.2m\frac{V}{c}m$ is the potential gradient, then resistance of the potentiameter wire is approximately

A. 4.9Ω

B. 7.9Ω

C. 5.9Ω

D. 6.9Ω

Answer: A

Watch Video Solution

494. 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. 45Ω

C. 90Ω

D. 270Ω

Answer: A

Watch Video Solution

495. Two uniform wires A and B are of the same total metal and have equal masses. The radius of wire A is twice that of wire B. The total resistance of A and B when connected in parallel is

A. 4Ω when the resistance of wire A is 4.25Ω

B. 5Ω the resistance of wire A is 4.25Ω

C. 4Ω when the resistance of wire B is 4.25Ω

D. 4Ω when the resistance of wire B is 4.25Ω

Answer: A

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

A. 4

B. 10

C. 8

D. 20

Answer: C

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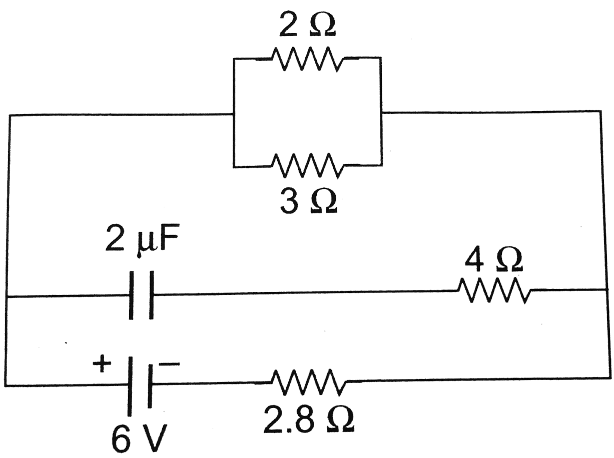
497. In the figure shown, the capacity of the consider C is $2\nu F$. The current in 2Ω resistor is



A. 9A

B. 0.9A

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

D. $\frac{1}{0.9}A$

Answer: B

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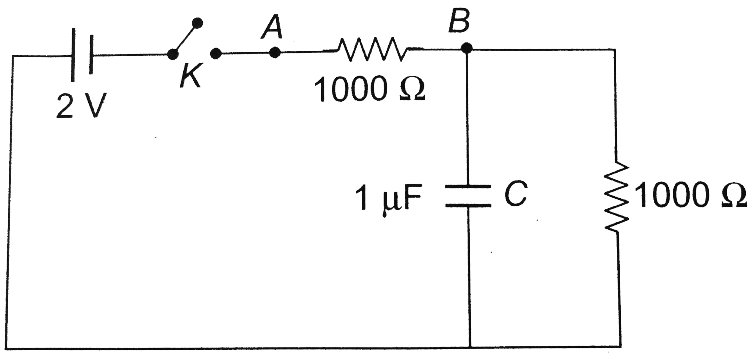
498. When the key E is pressed at time $t=0$, which of the following statements about the current I in the resistor AB of the given circuit is true.



A. $l=2mA$ at all t

B. I oscillates between 1 mA and 2mA

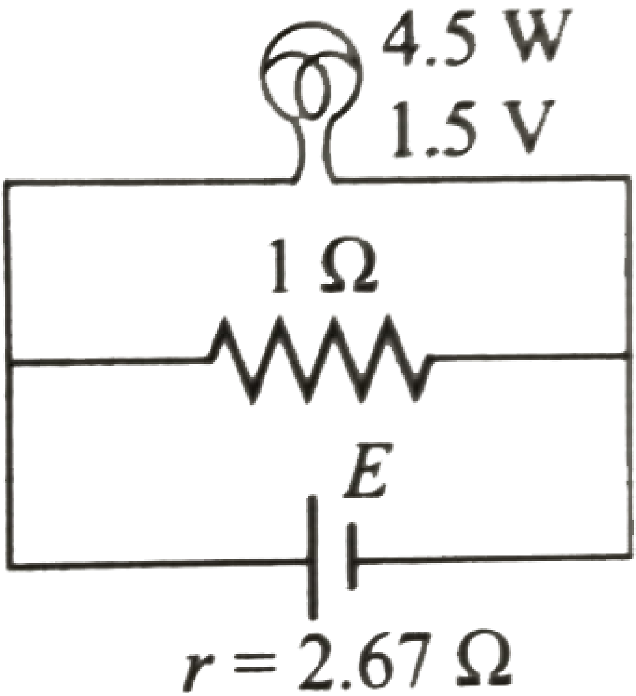
C. $l=1mA$ at all t

D. At $t=0, 1=2mA$ and with time it goes to 1mA

Answer: D

Watch Video Solution

499. A torch bulb rated $4.5W, 1.5V$ is connected as shown in Fig. 7.35. The emf of the cell needed to make the bulb glow at full intensity is



A. $4.5V$

B. $1.5V$

C. $2.67V$

D. $13.5V$

Answer: D

Watch Video Solution

500. There are three coils of equal resistance. The maximum number of resistances you can obtain by connecting them in any manner ypu choose, being free to use any number of the coils in any way is.

A. 3

B. 4

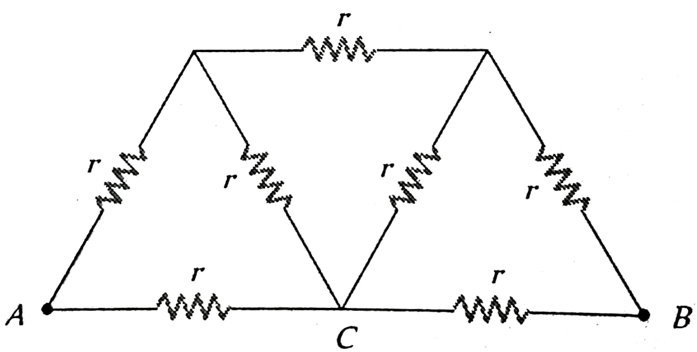
C. 6

D. 5

Answer: B

Watch Video Solution

501. In the circuit shown, the value of each resistance is r , then equivalent resistance of circuit between points A and B will be



A. $(4/3)r$

B. $3r/2$

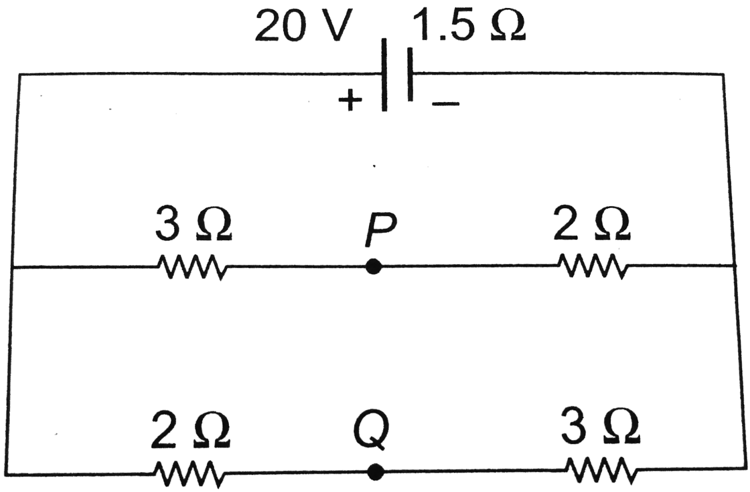
C. $r/3$

D. $8r/7$

Answer: D

Watch Video Solution

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



A. Zero

B. 4 volts $(V > V)$

C. 4 volts $(V > V)$

D. 2.5 volts $(V > V)$

Answer: D

Watch Video Solution

503. Two wires of resistance R_1 and R_2 have temperature coefficient of resistance α_1 and α_2 respectively. These are joined in series. The effective temperature coefficient of resistance is

A. $\dfrac{\alpha_1 + \alpha_2}{2}$

B. $\sqrt{\alpha_1 \alpha_2}$

C. $\dfrac{\alpha_1 R_1 + \alpha_2 R_2}{R_1 + R_2}$

D. $\dfrac{\sqrt{R_1 R_2 \alpha_1 \alpha_2}}{\sqrt{R_1^2 + R_2^2}}$

Answer: C

Watch Video Solution

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

A. $r_1 + r_2$

B. $r_1 - r_2$

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

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

Answer: B

Watch Video Solution

505. When connected across the terminals of a cell, a voltmeter measures 5 V and a connected ammeter measures 10 A of current. A resistance of 2 ohm s is connected across the terminals of the cell. The current flowing through this resistance will be

A. $2.5A$

B. $2.0A$

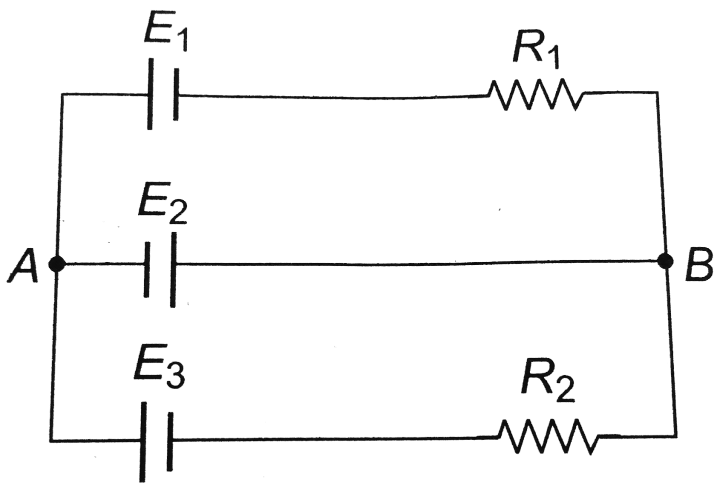
C. $5.0A$

D. $7.5A$

Answer: B

Watch Video Solution

506. In the circuit shown here, $E_1 = E_2 = E_3 = 2V$ and $R_1 = R_2 = 4ohms.$ The current flowing between point A and B through battery E_2 is



A. Zero

B. 2 amp from A to B

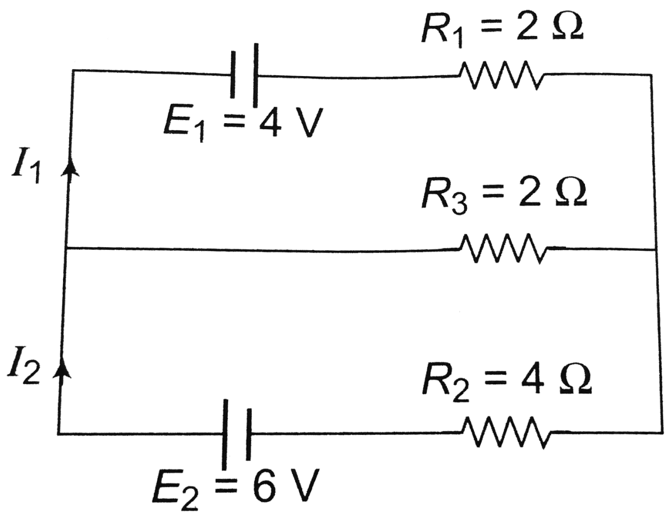
C. 2 amp from B to A

D. None of the above

Answer: B

Watch Video Solution

507. In the circuit shown below $E_1 = 4.0V, R_1 = 2\Omega, E_2 = 6.0V, R_2 = 4\Omega$ and $R_3 = 2\Omega$. The current I_1 is



A. $1.6A$

B. $1.8A$

C. $1.25A$

D. $1.0A$

Answer: B

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508. A microammeter has as resistance of 100Ω and full scale range of $50\mu A$. It can be used a voltmeter or as ahigher range ammeter provided a resistance is added to it. Pick the correct range and resistance combinations

50 V range with $10k\Omega$ resistance in series

b.$10V$ range with $200k\Omega$ resistance in series

c. 5mA rangw with 1Ω resistance in parallel

$10mA$ range with 1Ω resistance in parallel

A. 50 V range with $10k\Omega$ resistance in series

B. 10 V range with $200k\Omega$ resistance in series

C. 10 mA range with 1Ω resistance in parallel

D. 10 mA range with 0.1Ω resistance in parallel

Answer: B

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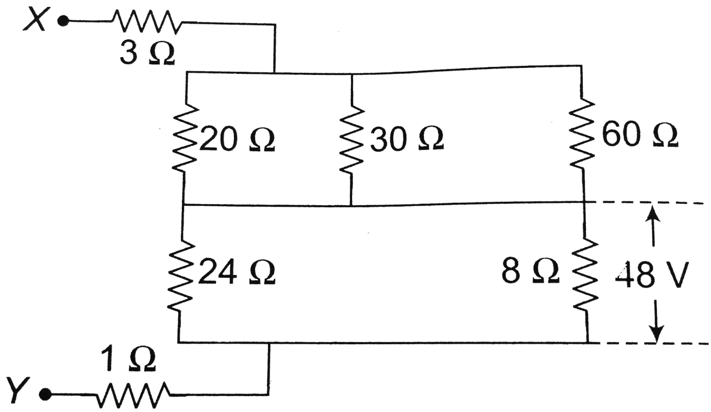
509. The potential difference across 8 ohm resistance is 48 volt as shownin the figure. The value of potential difference across X and Y point will be



A. 160 volt

B. 128 volt

C. 80 volt

D. 62 volt

Answer: A

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510. Two resistance R_1 and R_2 are made of different material. The temperature coefficient of the material of R_1 is α and of the material of R_2 is $-\beta$. Then resistance of the series combination of R_1 and R_2 will not change with temperature, if R_1 / R_2 will not change with temperature if R_1 / R_2 equals

A. $\frac{\alpha}{\beta}$

B. $\frac{\alpha+\beta}{\alpha-\beta}$

C. $\frac{\alpha^2+\beta^2}{\alpha\beta}$

D. $\frac{\beta}{\alpha}$

Answer: D

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511. An ionization chamber with parallel conducting plates as anode and cathode has 5×10^7 electrons and the same number of singly-charged positive ions per cm^2. The electrons are moving at $0.4m/s$. The current density from anode to cathodes $4\mu A/m^2$. The velocity of positive ions moving towards cathode is

A. $0.4m/s$

B. $16m/s$

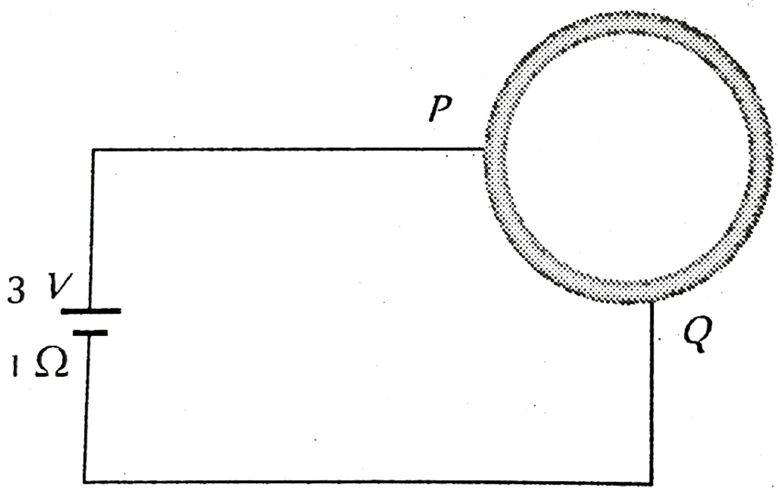
C. Zero

D. $0.1m/s$

Answer: D

Watch Video Solution

512. A wire of resistance 10Ω is bent to form a circle. P and Q are points on the circumference of the circle dividing it into a quadrant and are connected to a Battery of 3 V and internal resistance 1Ω as shown in the figure. The currents in the two parts of the circle are



A. $\frac{6}{23} A$ and $\frac{18}{23} A$

B. $\frac{5}{26} A$ and $\frac{15}{26} A$

C. $\frac{4}{25} A$ and $\frac{12}{25} A$

D. $\frac{3}{25} A$ and $\frac{9}{25} A$

Answer: A

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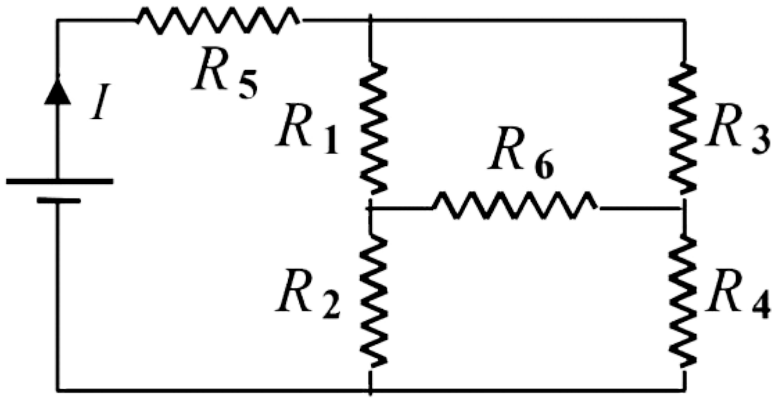
513. In the given circuit, it is observed that the current I is independent of the value of the resistance R_6. Then the resistance values must satisfy



.

A. $R_1R_2R_5 = R_3R_4R_6$

B. $\dfrac{1}{R_5} + \dfrac{1}{R_6} = \dfrac{1}{R_1 + R_2} + \dfrac{1}{R_3 + R_4}$

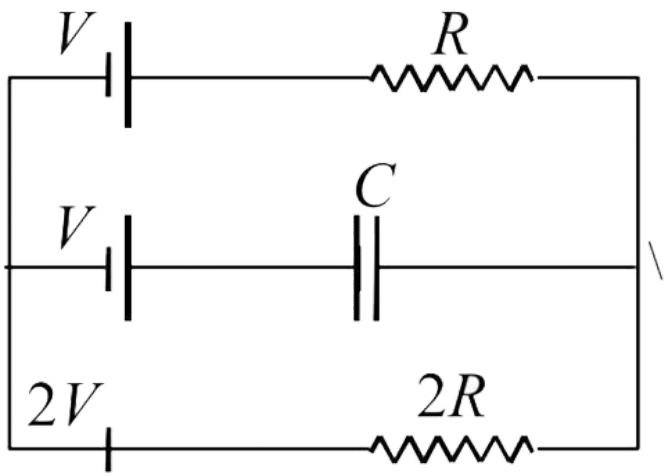
C. $R_1R_4 = R_2R_3$

D. $R_1R_3 = R_2R_4 = R_5R_5$

Answer: C

Watch Video Solution

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



A. V

B. $V/2$

C. $V/3$

D. $2V/3$

Answer: C

Watch Video Solution

515. A wire of length L and 3 identical cells of negligible internal resistance are connected in series. Due to the current, the temperature of the wire is raised by ΔT in a time t. A number N of similar cells is now connected in series with a wire of the same material and cross-section but of length

2L. The temperature of the wire is raised by the same amount

ΔT in the same time t. the value of N is

A. 4

B. 6

C. 8

D. 9

Answer: B

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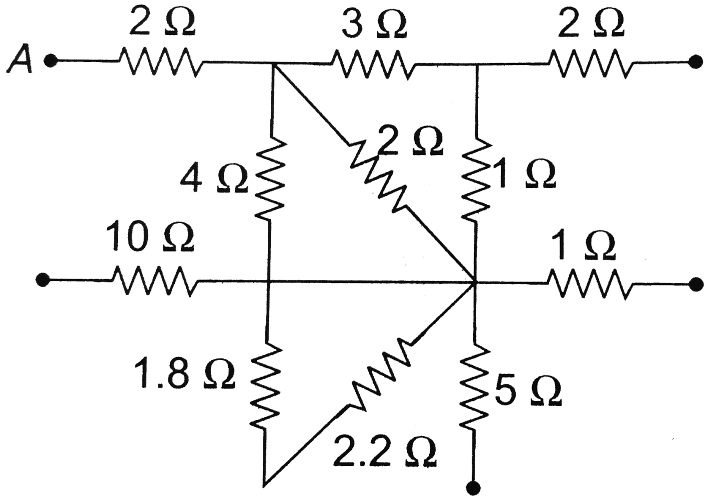
516. What is the equivalent resistance between the point A

and B of the network ?



A. $\frac{57}{7}\Omega$

B. 8Ω

C. 6Ω

D. $\frac{57}{5}\Omega$

Answer: B

Watch Video Solution

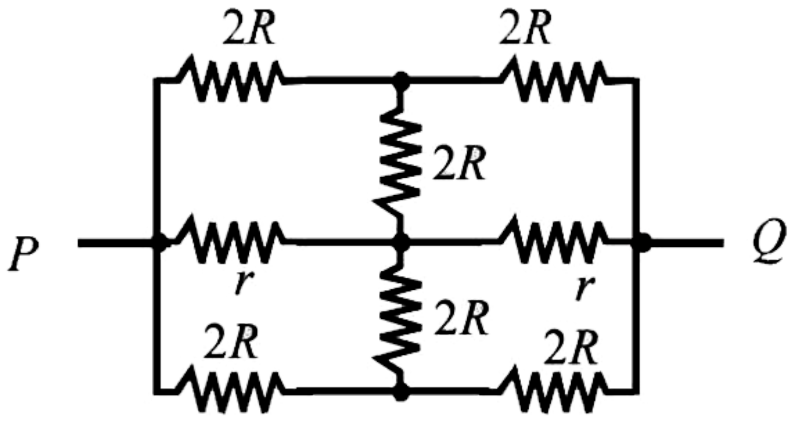
517. The effective resistance between points P and Q of the electrical circuit shown in the figure is

(a) $\frac{2Rr}{R+r}$

(b) $\frac{8R(R+r)}{3R+r}$

(c) $2r+4R$

(d) $\frac{5R}{2}+2r$.



A. $2R/(R+r)$

B. $8R(R+r)/(3R+r)$

C. $2r+4R$

D. $5R/2 + 2r$

Answer: A

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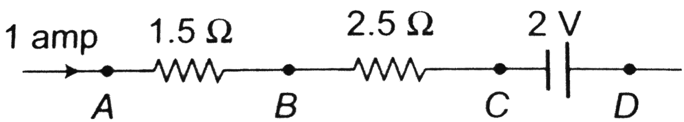
518. In the circuit element given here, if the potential at point $B = V_B = 0$, then the potentials of A and D are given as



A. $V_A = -1.5, V_D = +2V$

B. $V_A = +1.5V, V_D) = +2V$

C. $V_A = +1.5V, V_D = +0.5V$

D. $V_A = +1.5V, V_D = -0.5V$

Answer: D

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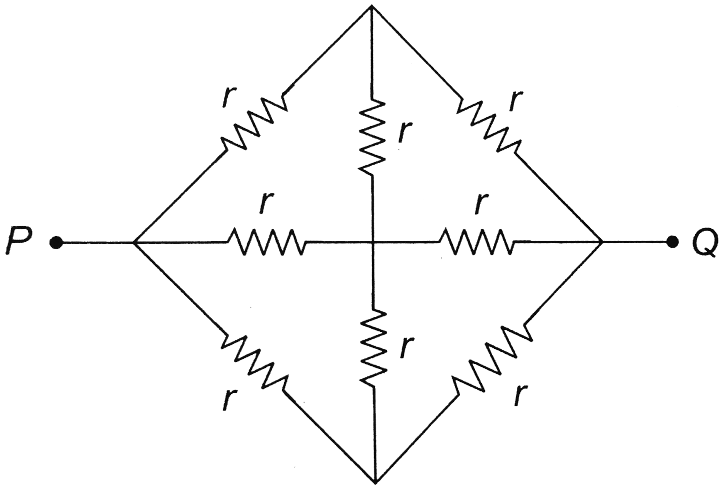
519. The equivalent resistance between the point P and Q in the network given here is equal to (given $r = \frac{3}{2}\Omega$)



A. $\frac{1}{2}\Omega$

B. 1Ω

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

D. 2Ω

Answer: B

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520. The current in conductor varies with time t as $I = 2t + 3t^2$ where I is in ampere and t in seconds. Electric charge flowing through a section of the conductor during $t = 2\sec$ to $t = 3\sec$ is

A. $10C$

B. $24C$

C. $33C$

D. $44C$

Answer: B

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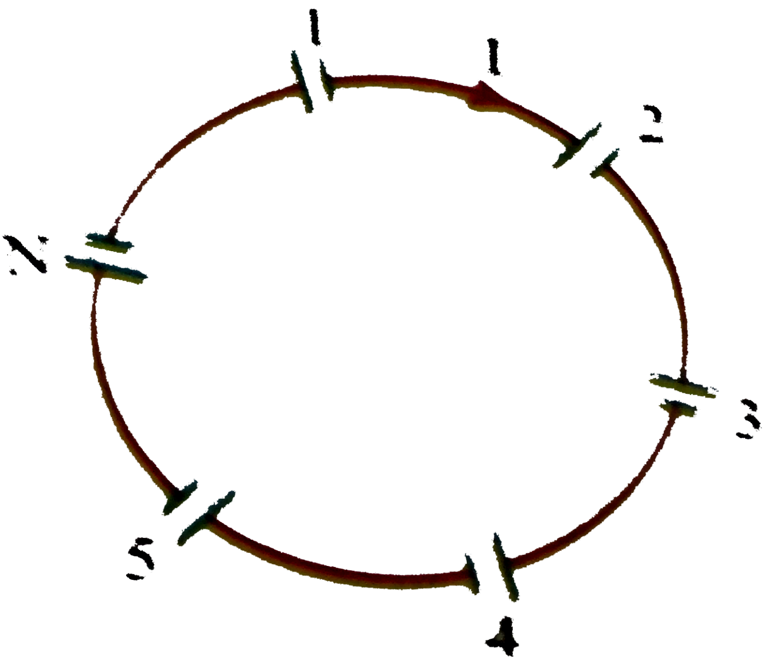

521.

A group of N cells where e.m.f. varies directly with the internal resistance as per the equation $E_N = 1.5 r_N$ are connected as shown in the figure. The current I in the circuit is:

A. 0.51 amp

B. 5.1 amp

C. 0.15amp

D. 1.5amp

Answer: D

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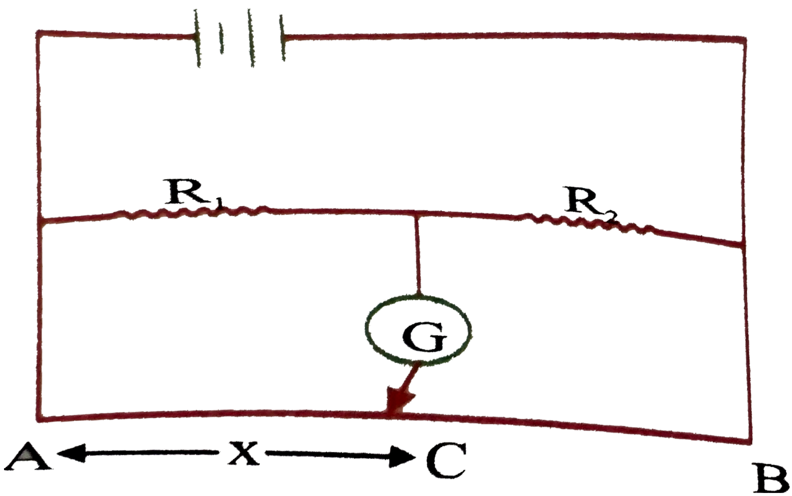
522. 

In the shown arrangement of the experiment of the meter bridge if AC corresponding to null deflection of galvanometer is x, what would be its value if the radius of the wire AB is doubled?

A. x

B. $x / 4$

C. $4x$

D. $2x$

Answer: A

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523. 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. 20

B. 15

C. 19

D. 40

Answer: A

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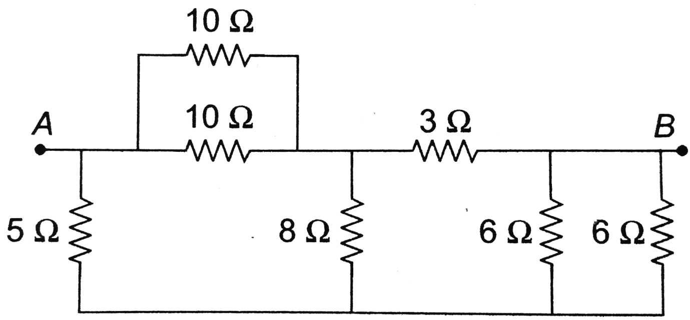
524. Seven resistance are connected as shown in the firgure. The equivalent resistance between A and B is



A. 3Ω

B. 4Ω

C. 4.5Ω

D. 5Ω

Answer: B

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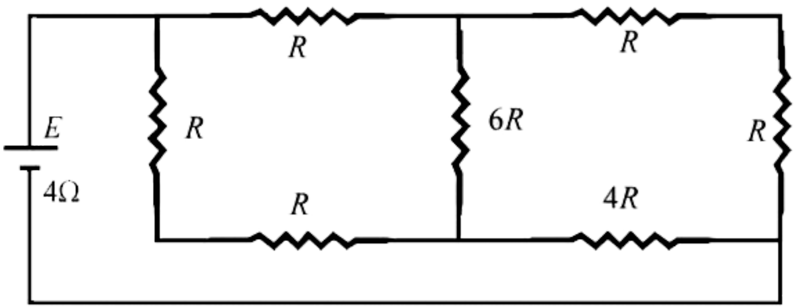
525. A battery of internal resistance 4Ω is connected to the network of resistance as shown . In order that the maximum power can be delivered to the network, the value of R in Ω

should be



4

8

.

A. $4/9$

B. $8/9$

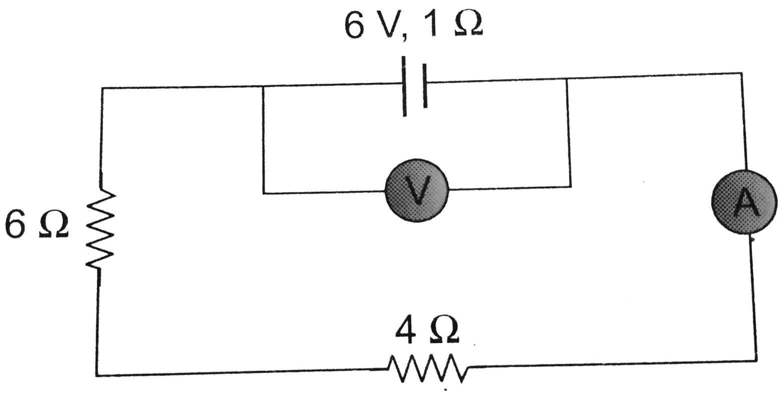
C. 2

D. 18

Answer: C

Watch Video Solution

526. In the circuit shown here, the readings of the ammeter and voltmeter are



A. $6A, 60V$

B. $0.6A, 6V$

C. $6/1A, 60/11A$

D. $11/6A, 11/60V$

Answer: C

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527. Length of a hollow tube is $5m$, its outer diameter is $10cm$ and thickness of its wall is 5 mm. If resistivity of the material of the tube is $1.7 \times 10^{-8}\Omega \times m$ then resistance of tube will be

A. $5.6 \times 10^{-5}\Omega$

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

C. $4 \times 10^{-5}\Omega$

D. None of these

Answer: A

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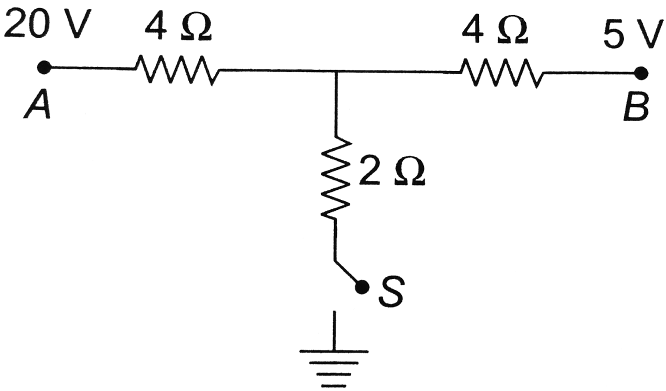
528. As the switch S is closed in the circuit shown in figure, current passed through it is.



A. $4.5A$

B. $6.0A$

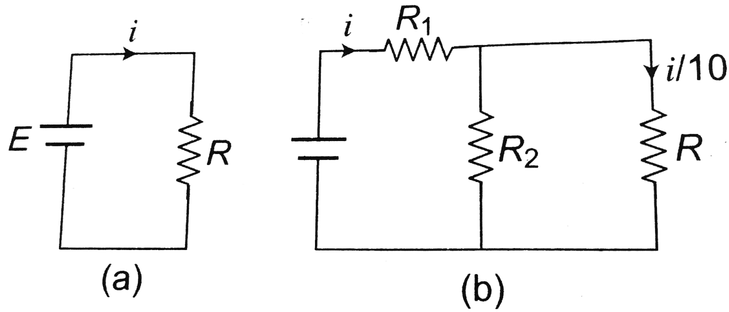
C. $3.0A$

D. Zero

Answer: A

Watch Video Solution

529. Consider the circuit shown in the figure. Both the circuits are taking same current from battery but current through R in the second circuit is $\frac{1}{10}th$ of current through R in the first circuit. If R is 11Ω, the value of R_1



A. 9.9Ω

B. 11Ω

C. 8.8Ω

D. 7.7Ω

Answer: A

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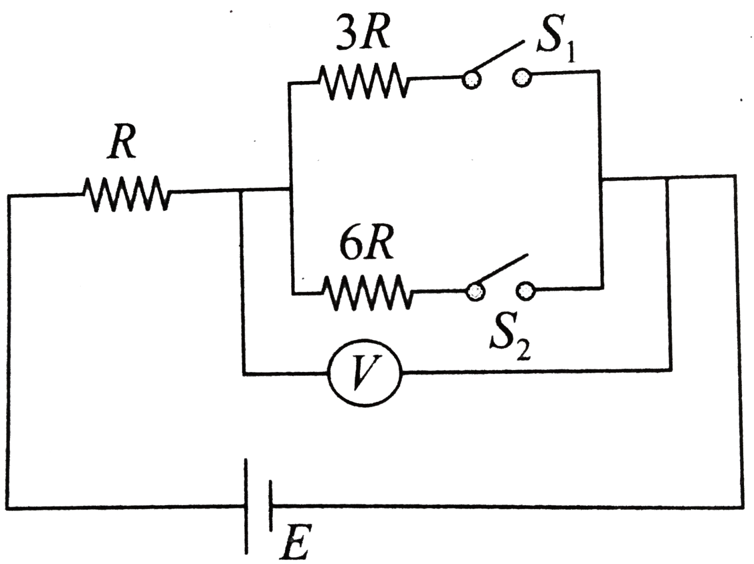
530. In the circuit shown in figure, reading of voltmeter is V_1 when only S_1 is closed, reading of voltmeter is V_2 when only S_2 is closed, and reading of voltmeter is V_3 when both S_1 and S_2 are closed. Then .



A. $V > V > V$

B. $V > V > V$

C. $V > V > V$

D. $V > V > V$

Answer: B

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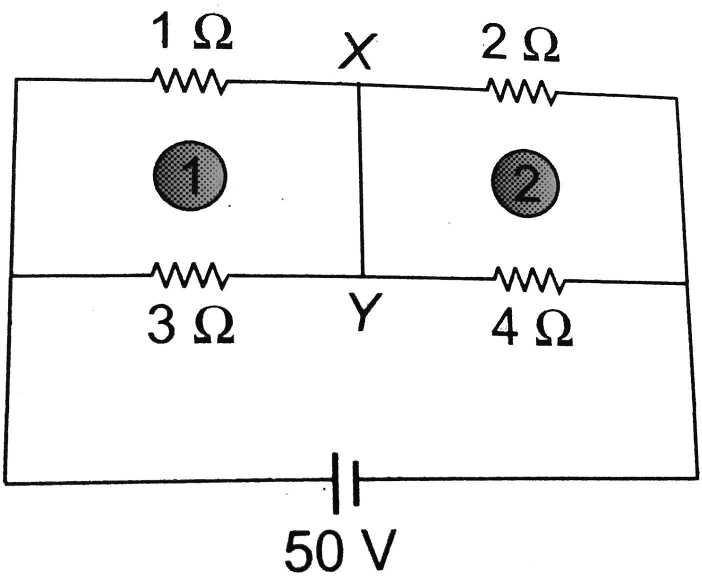
531. Current through XY of circuit shown is



A. 1A

B. 4A

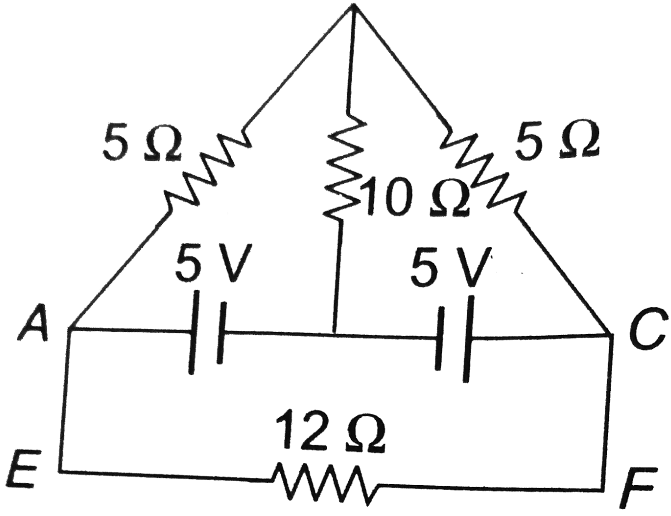
C. 2A

D. 3A

Answer: C

Watch Video Solution

532. In the circuit of adjoining figure the current through 12Ω resister will be



A. $1A$

B. $\frac{1}{5}A$

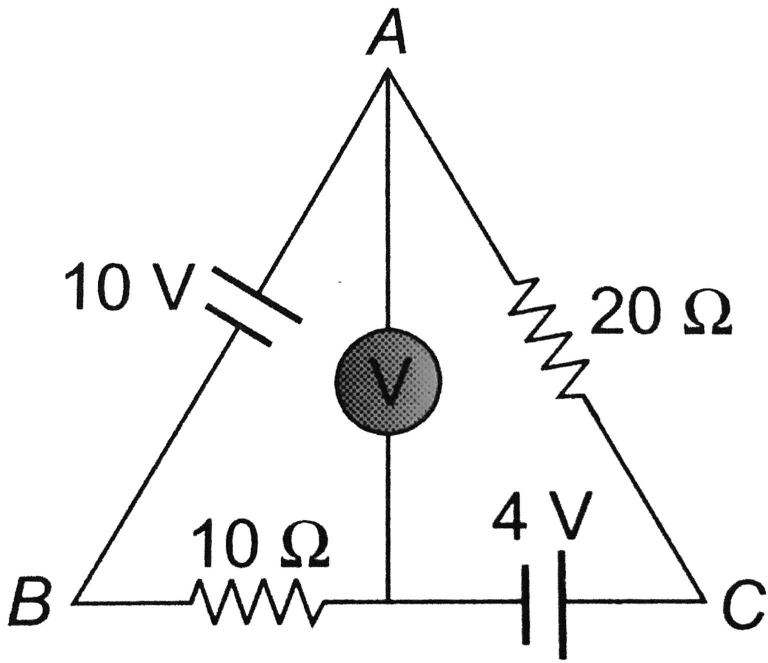
C. $\frac{2}{5}A$

D. 0A

Answer: D

Watch Video Solution

533. The reading of the ideal voltmeter in the adjoining diagram will be



A. 4V

B. 8V

C. 12V

D. 14V

Answer: B

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534. The resistance of the series combination of two resistances is S. When they are joined in parallel the total resistance is P. If S= nP then the minimum possible value of n is

A. 4

B. 3

C. 2

D. 1

Answer: A

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535. A moving coil galvanometer has 150 equal divisions. Its current sensitivity is 10-divisions per milliampere and voltage sensitivity is 2 divisions per millivolt. In order that each division reads 1 volt, the resistance in ohms needed to be connected in series with the coil will be -

A. 99995

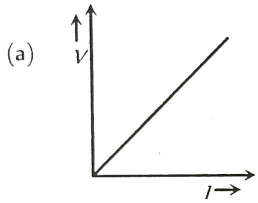
B. 9995

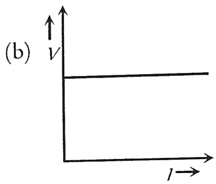
C. 10^3

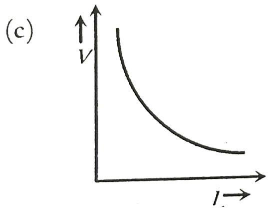
D. 10^5

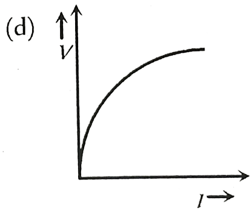
Answer: B

536. Which of the adjoining graphs represents ohmic resistance

A. 

B. 

C. 

D. 

Answer: A

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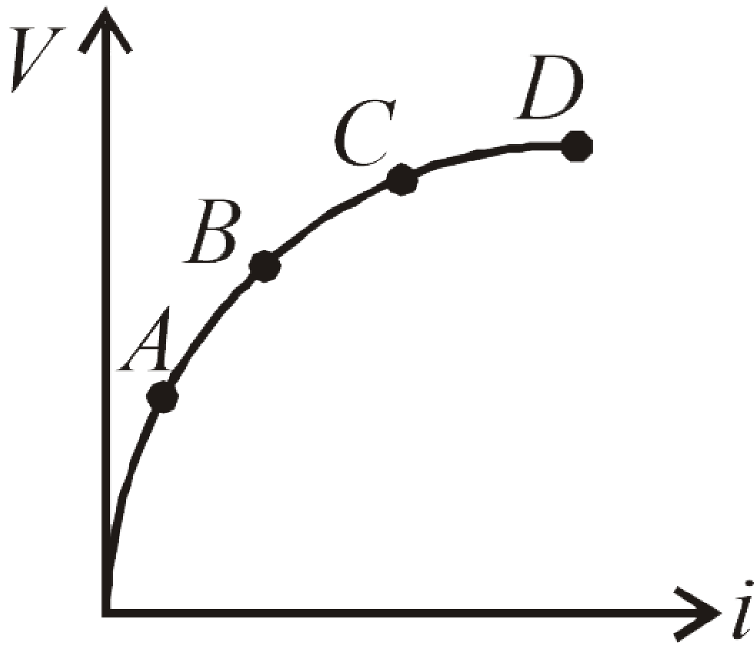
537. Variation of current passing through a conductor as the voltage applied across its ends is varied as shown in the adjoining diagram. If the resistance (R) is determined at the points A, B, C and D, we will find that



A. $R = R$

B. $R > R$

C. $R > R$

D. None of these

Answer: D

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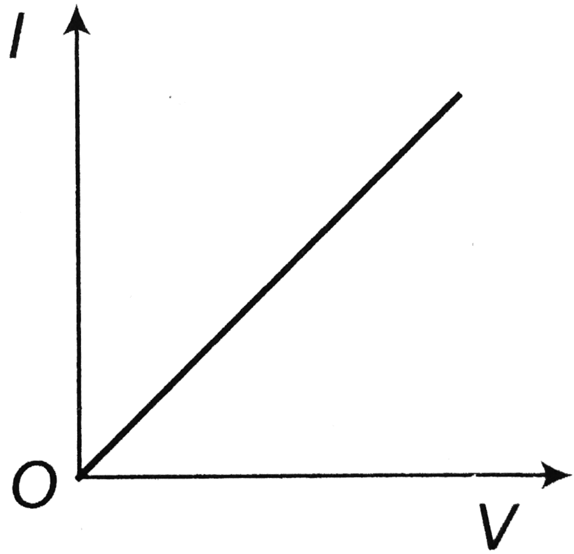
538. $I - V$ characterstic of a copper wire of length L and area fo cross-section A is shown in Fig. The slope of the curve

becomes



A. More if the experiment is performed at higher temperature

B. More if a wire of stell of same dimension is used

C. More if the length of the wire is increased

D. Less if the length of the wire is increased

Answer: D

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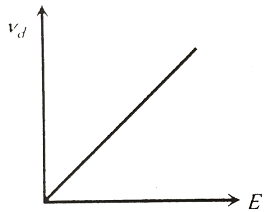
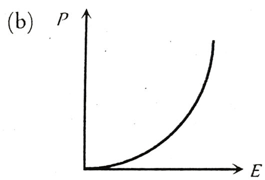
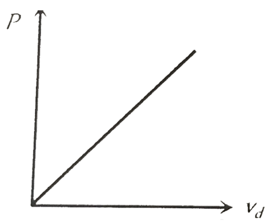
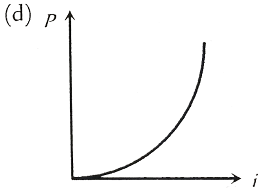
539. E denotes electric field in a uniform conductor, I corresponding current through it, v_d velocity of electrons and P denotes thermal power produced in the conductor, then which of the following graph is correct?

A. 

B. 

C. 

D. 

Answer: C

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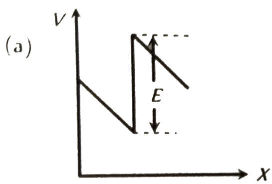
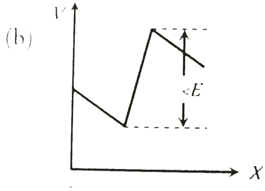
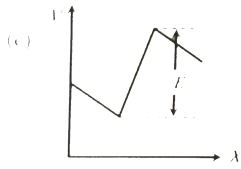
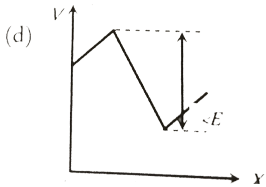
540. The two ends of a uniform conductor are joined to a cell of e.m.f. E and some internal resistance. Starting from the midpoint P of the conductor, we move in the direction of current and return to P. The potential V at every point on the path is plotted against the distance covered (x). which of the following graphs best represent the resulting curve ?

A. 

B. 

C. 

D. 

Answer: B

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541. The resistance t R of a conductor varies with temperature t as shown in the figure. If the variation is represented by

$R_t = R_0\left[1 + \alpha t + \beta t^2\right]$, then

A. α and β are both negative

B. α and β are both positive

C. α is positive and β is negative

D. α is negative and β are positive

Answer: B

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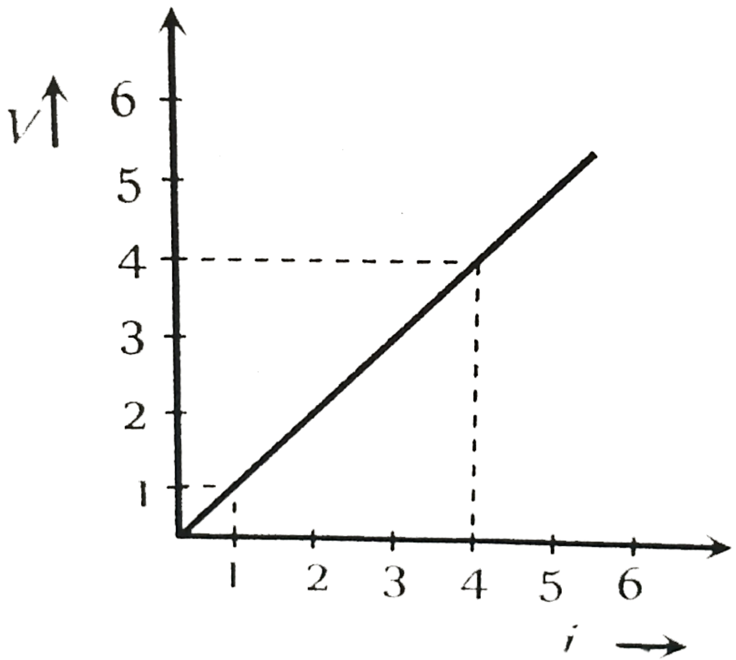
542. Variation of current and voltage in a conductor has been shown in the diagram below. The resistance of the conductor is.



A. 4 ohm

B. 2 ohm

C. 3 ohm

D. 1 ohm

Answer: D

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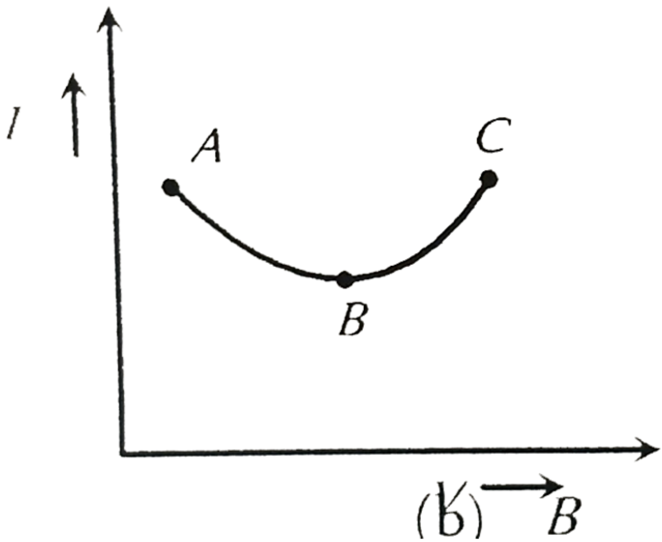
543. Resistance as shown in figure is negative at



A. A

B. B

C. C

D. None of these

Answer: A

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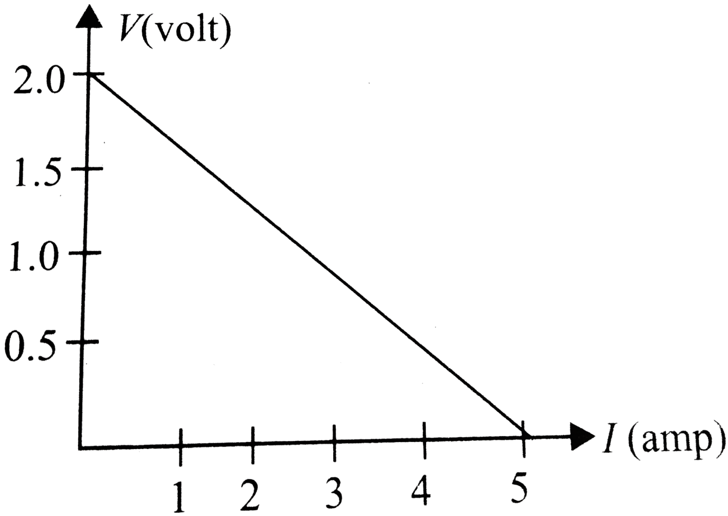
544. For a cell, a graph is plotted between the potential difference V across the terminals of the cell and the current I drawn the cell. The emf and the internal resistance of the cell are E and r, respectively. Then



A. $2V, 0.5\Omega$

B. $2V, 0.4\Omega$

C. $> 2V, 0.5\Omega$

D. $> 2V, 0.4\Omega$

Answer: B

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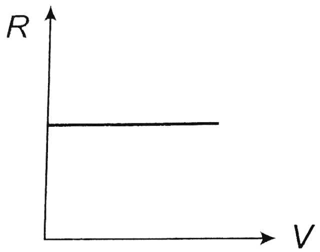
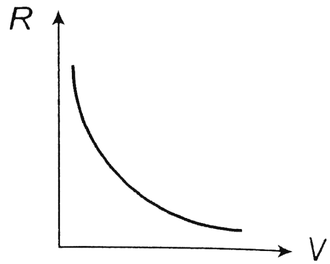
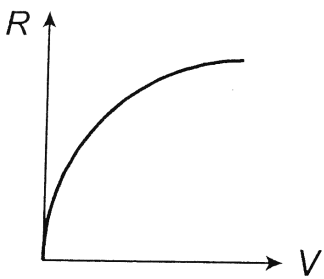
545. The graph which represents the relation between the total resistance R of a multi range moving coil voltmeter and its full scale deflection



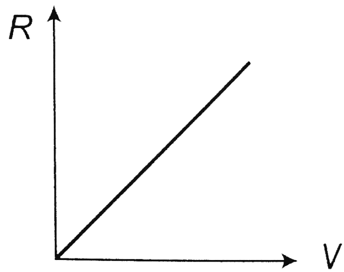
(i)



(ii)



(iii)



(iv)

A. (i) (iii)

B. (ii) (iv)

C. (iii)

D. (iv)

Answer: D

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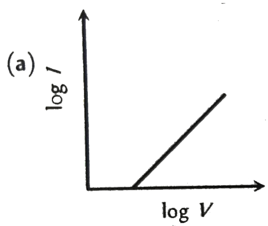
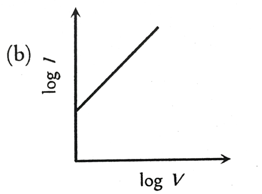
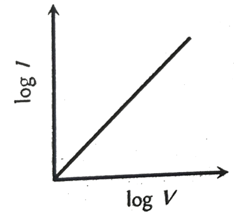
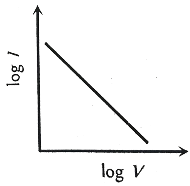
546. When a current I is passed through a wire of constant resistance, it produces a potential difference V across its ends. The graph drawn between log I and log V will be

A. 

B. 

C. 

D. 

Answer: A

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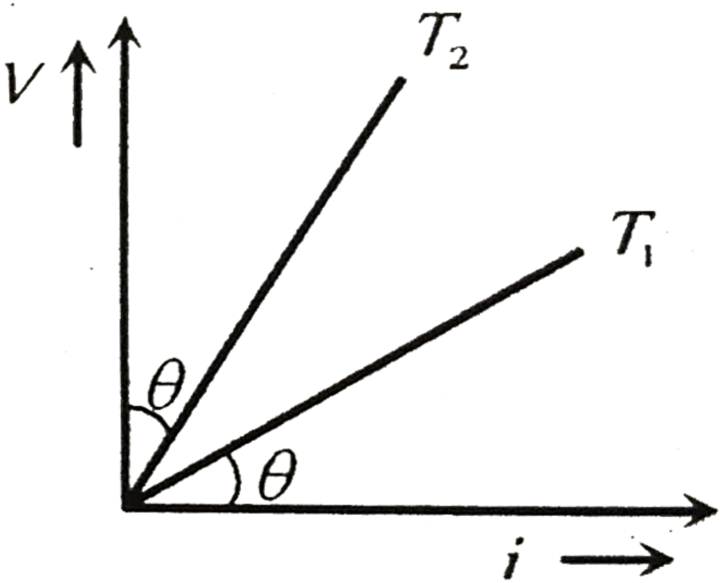
547. The V - i graph for a conductor at temperature T_1 and T_2 are as shown in the figure. $(T_2 - T_1)$ is proportional to



A. $\cot 2\theta$

B. $\sin \theta$

C. $\cot 2\theta$

D. $\tan \theta$

Answer: C

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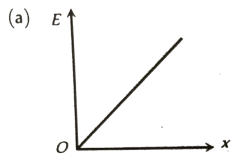
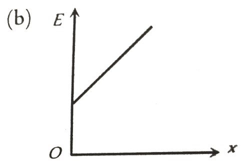
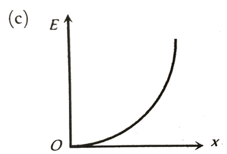
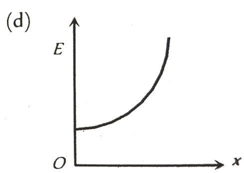
548. A cylindrical conductor has uniform cross-section. Resistivity of its material increase linearly from left end to right end. If a constant current is flowing through it and at a section distance x from left end, magnitude of electric field intensity is E , which of the following graphs is correct

A. 

B. 

C. 

D. 

Answer: B

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549. 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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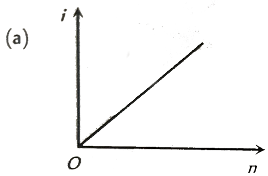
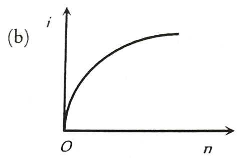
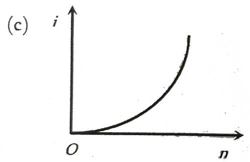
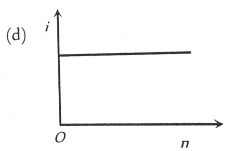
550. A battery consists of a variable number n of identical cells having internal resistance connected in series. The terminals of the battery are short circuited and the current I measured. Which one of the graph below shows the correct relationship between I and n?

A. 

B. 

C. 

D. 

Answer: D

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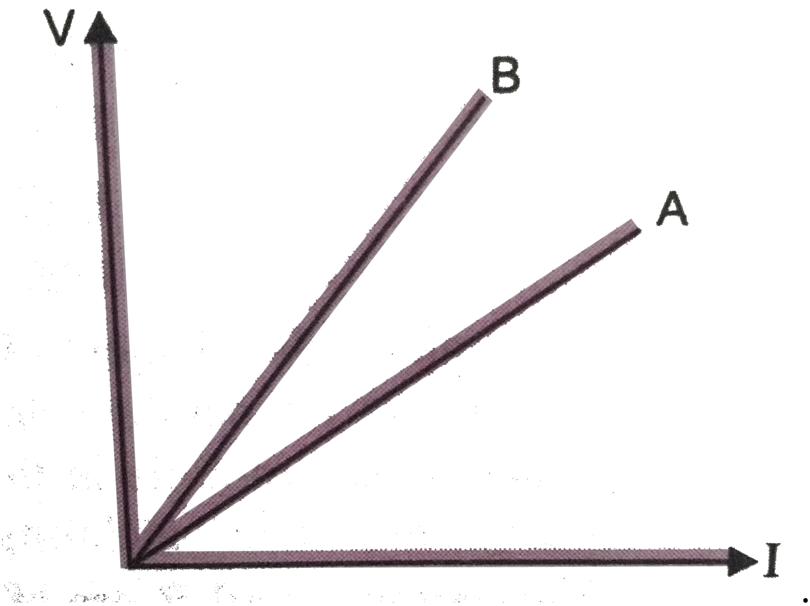
551. The $V - I$ graphs of parallel and series combinations of two metallic resistors are shown in (Fig. 3.53). Which graph represents the parallel combinations ?



A. A

B. B

C. A and B both

D. Neither A nor B

Answer: A

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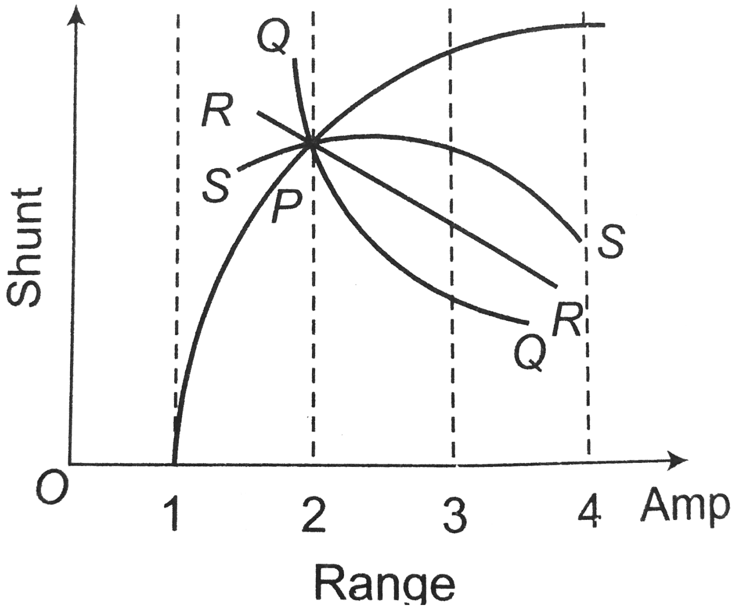
552. The ammeter has range 1 ampere without shunt. The range can be varied by using different shunt resistance. The graph between shunt resistance and range will have the nature



A. P

B. Q

C. R

D. S

Answer: B

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553. Assertion: The resistivity of a semiconductor increases with temperature.

Reason: The atoms of a semiconductor vibrate with larger amplitude at higher temperature therby increasing it resistivity.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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554. Assertion : In a simple battery circuit the point of lowest potential is positive terminal of the battery.

Reason : The current flows towards the point of the higher potential as it flows in such a circuit from the negative the positive terminal.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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555. 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. If both assertion and reason are true and the reason is the correct explanation of the assertion.

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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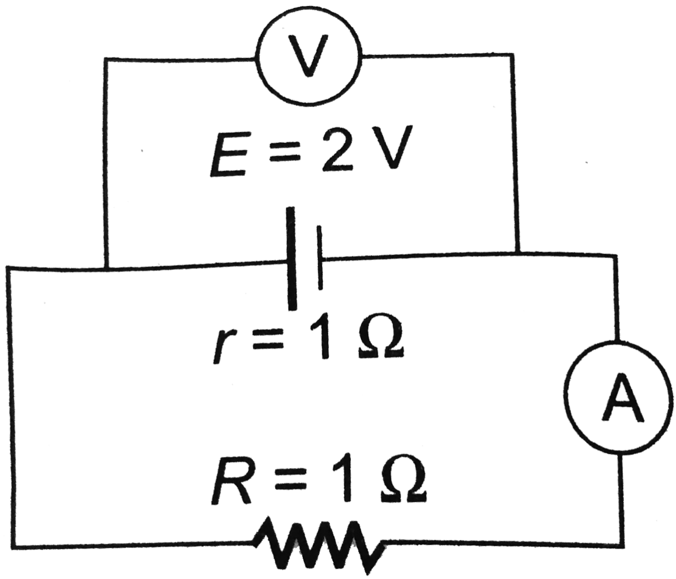
556. Assetion : In the following circuit emf is $2V$ and internal resistance of the cell is 1Ω and $R = 1\Omega$, then reading of the voltmeter is $1V$.

Reason : $V = E - ir$ where $E = 2v, i = \frac{2}{2} = 1A$ and

$R = 1\Omega$



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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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557. Assertion : There is no current in the metals in the absence of electric field.

Reason : Motion of free electron are randomly.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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558. Assertion : Electric appliances with metallic body, e.g. heaters, presses etc, have three pin connections, whereas an electric bulb has a two pin connection.

Reason : Three pin connection reduce heating of connecting cables.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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559. Assertion : The drift velocity of electrons in a metallic wire will decrease, if the temperature of the wire is increased.

Reason : On increasing temperature, conductivity of metallic wire decreases.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

Watch Video Solution

560. Assertion : The electric bulbs glows immediately when switch is on.

Reason : The drift velocity of electrons in a metallic wire is vary high.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

561. Assertion : Bending a wire does not effect electrical resistance.

Reason : The resistance of wire is proportional to the resistivity of material.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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

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

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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563. Assertion : Electric field outside the conducting wire which carreis a constant is zero.

Reason : Net charge on conducting wire is zero.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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564. Assertion : The resistance of super-conductor is zero.

Reason : The super-conductors are used for the transmission of electric power.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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565. Statement -1 : A potentiometer of longer length is used for accurate measurement

Statement -2 : The potential gradient for a potentiometer of longer length with a given source of e.m.f becomes small

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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566. Assertion : The e.m.f. of the drivercell in the potentiometer experiment should be greater than the e.m.f. of the cell to determined.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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567. Assertion : A person touching a high power line gas stuck with the line.

Reason : The current carrying wires attract the man toward it.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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568. Assertion : The connecting wires are made of copper.

Reason : The electrical conductivity of copper is high

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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Kirchhoff s Law, cells

1. A torch battery consisting of two cells of 1.45 volts and an internal resistance 0.15Ω, each cell sending currents through the filament of the lamps having resistance 1.5ohms. The value of current will be

A. $16.11 amp$

B. $1.611 amp$

C. $0.1611 amp$

D. $2.6 amp$

Answer: B

View Text Solution

2. Two non-ideal identical batteries are connected in parallel. Consider the following statements

(i) The equivalent e.m.f. is smaller than either of the two e.m.f.s

(ii) The equivalent internal resistance is smaller than either of the two internal resistances

A. Both (i) and (ii) are correct

B. (i) is correct but (ii) is wrong

C. (ii) is correct but (i) is wrong

D. Both (i) and (ii) are wrong

Answer: C

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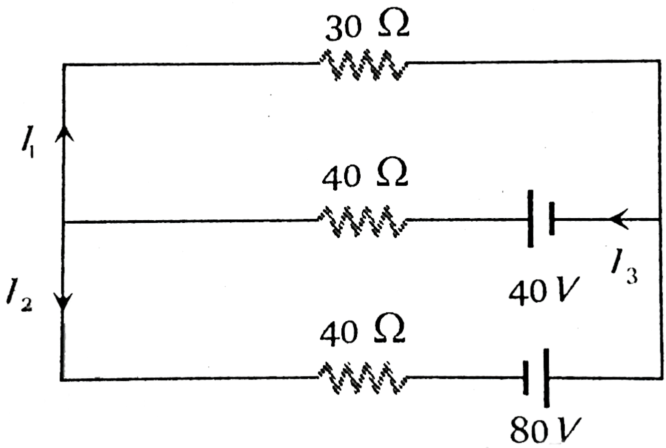
3. In the given circuit the current I is



A. $0.4A$

B. $-0.4A$

C. $0.8A$

D. $-0.8A$

Answer: B

View Text Solution

4. How much work in required to carry a $6\mu C$ charge from the negative terminal to the positive terminal of a 9V battery

A. $54 \times 10^{-3} J$

B. $54 \times 10^{-6} J$

C. $54 \times 10^{-9} J$

D. $54 \times 10^{-12} J$

Answer: B

View Text Solution

5. The emf of a battery is 2 V and its internal resistance is 0.5Ω. The maximum power which it can deliver to any external circuit will be

A. 8 watt

B. 4 watt

C. 2 watt

D. None of the above

Answer: C

View Text Solution

6. Current provided by a battery is maximum when

A. Internal resistance equal to external resistance

B. Internal resistance is greater than external resistance

C. Internal resistance is less than external resistance

D. None of these

Answer: A

View Text Solution

7. A battery is charged at a potential of 15 V for 8 hours when the current flowing is 10 A . The battery on discharge supplies a current of 5 A for 15 hours . The mean erminal voltage during discharge is 14 V. The "Watt-hour" efficiency of the battery is

A. 82.5%

B. 80%

C. 90%

D. 87.5%

Answer: D

View Text Solution

8. An energy source will supply a constant current into the load if its internal resistance is

A. Zero

B. Non-zero but less than the resistance of the load

C. Equal to the resistance of the load

D. Very large as compared to the load resistance

Answer: D

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Different Measuring Instruments

1. A cell of internal resistance 5.1Ω and of e.m.f. 1.5 volt balances 500 cm on a potentiometer wire. If a wire of 15Ω is connected between the balance point and the cell, then the balance point will shift

A. To zeri

B. By 500 cm

C. By 750 cm

D. None of the above

Answer: D

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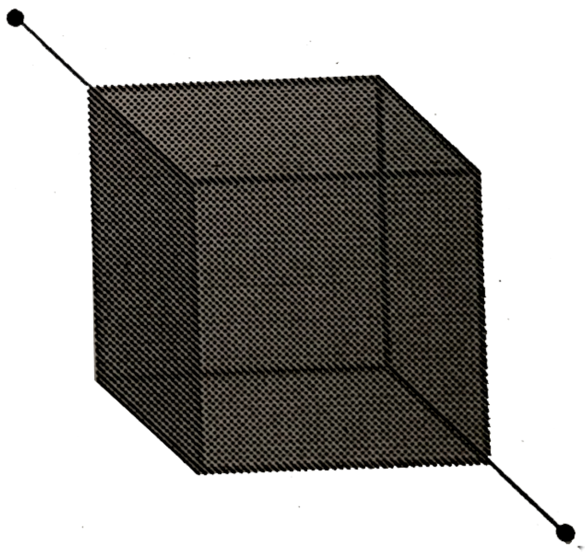
Critical Thinking

1. Twelve wires of equal length and same cross-section are connected in the form of a cube. If the resistance of each of the wires is R , then the effective resistance between the two diagonal ends would be



A. 2R

B. 12R

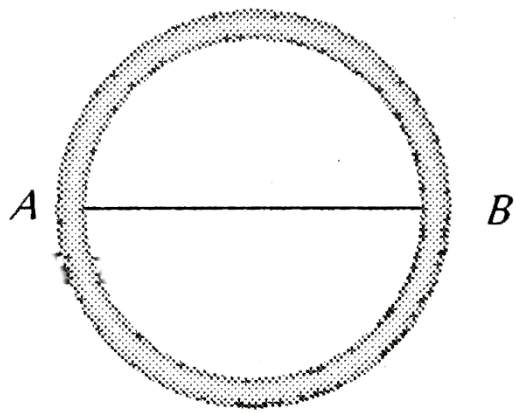
C. $\frac{5}{6}R$

D. 8R

Answer: C

View Text Solution

2. The resistance of a wire is $10^{-6}\Omega$ per metre. It is bend in the form of a circle of diameter m 2 . A wire of the same material is connected across its diameter. The total resistance across its diameter AB will be



A. $\frac{4}{3}\pi \times 10^{-6}\Omega$

B. $\frac{2}{3}\pi \times 10^{-6}\Omega$

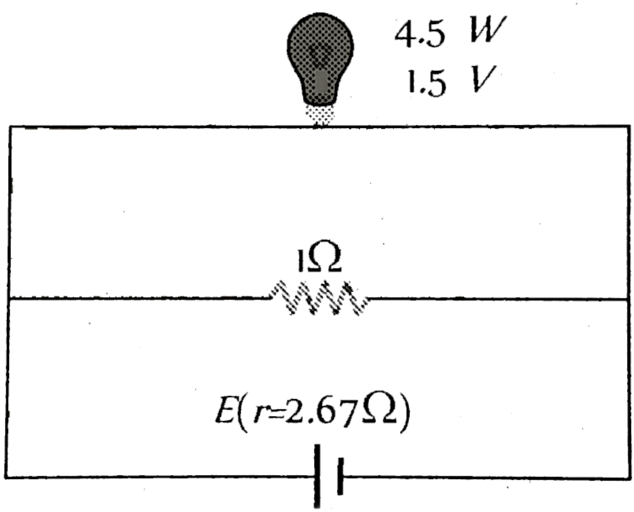
C. $0.88 \times 10^{-6}\Omega$

D. $14\pi \times 10^{-6}\Omega$

Answer: C

View Text Solution

3. In the circuit shown in the figure, the current through



A. The 3Ω resistor is $0.50A$

B. The 3Ω resistor is $0.25A$

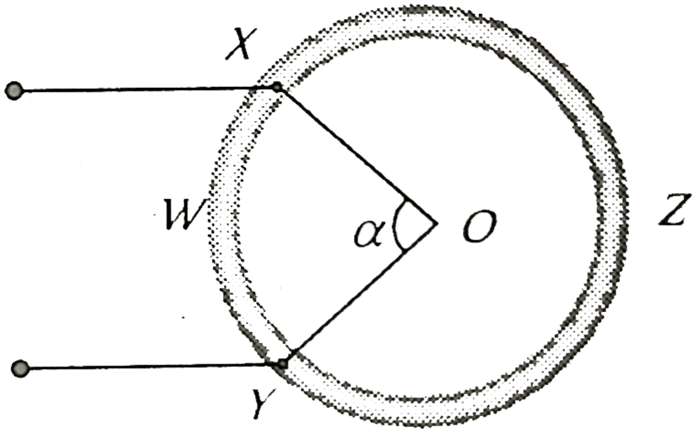
C. The 4Ω resistor is $0.50A$

D. The 4Ω resistor is $0.25A$

Answer: D

View Text Solution

4. A wire of resistor R is bent into a circular ring of radius r . Equivalent resistance between two points X and Y on its circumference, when angle XOY is α, can be given by



A. $\frac{R\alpha}{4\pi^2}(2\pi - \alpha)$

B. $\frac{R}{2\pi}(2\pi - \alpha$

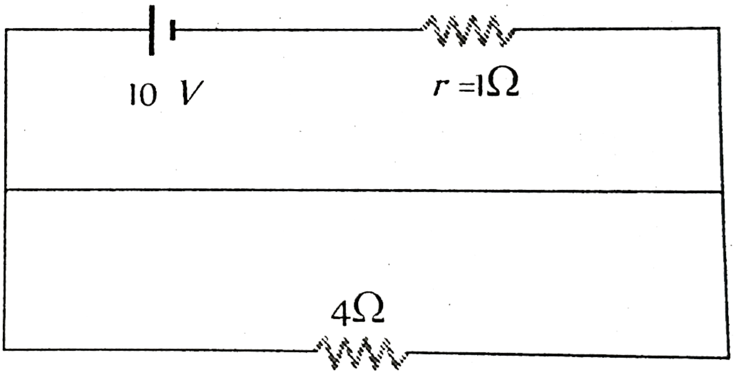
C. $R(2\pi - \alpha)$

D. $\frac{4\pi}{R\alpha}(2\pi - \alpha)$

Answer: A

View Text Solution

5. Potential diffference across the terminals of the batery shown in Figyre is $(r =$ internal resistance of battey)



A. $8V$

B. $10V$

C. $6V$

D. Zero

Answer: D

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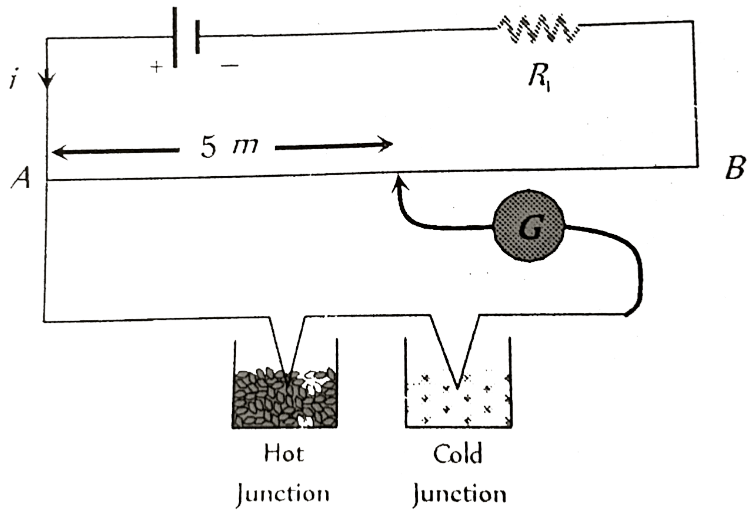
6. In the following circuit a 10 m long potentiometer wire with resistance 1.2 ohm/m , a resistance R 1 and an accumulator of emf 2 V are connected in series. When the emf of thermocouple is 2.4 mV then the deflection in galvanometer is zero. The current supplied by the accumulator will be



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

B. $8 \times 10^{-4} A$

C. $4 \times 10^{-3} A$

D. $8 \times 10^{-3} A$

Answer: A

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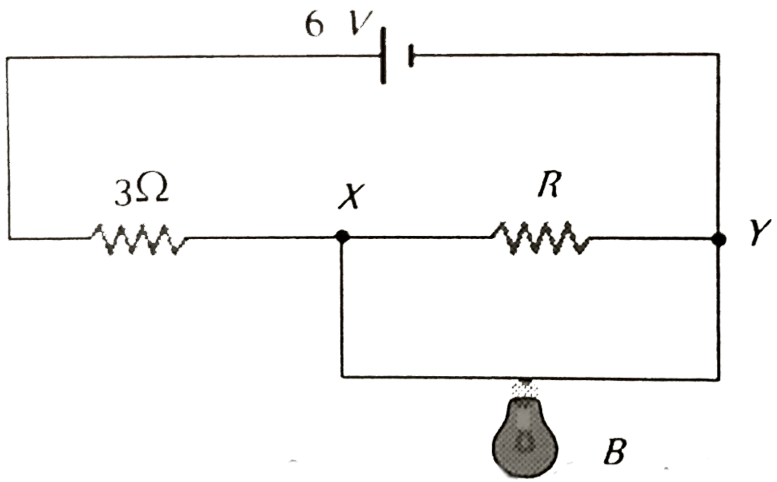
7. In the following circuit, bulb rated as 1.5 V , 0.45 W . If bulbs glows with full intensity then what will be the equivalent resistance between X and Y



A. 0.45Ω

B. 1Ω

C. 3Ω

D. 5Ω

Answer: B

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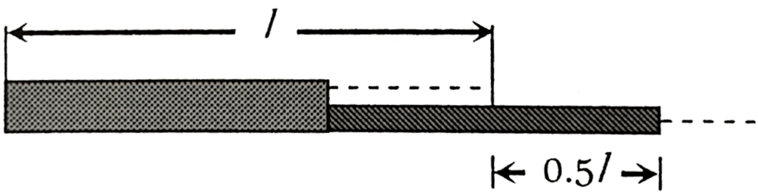
8. In order to quadruple the resistance of a uniform wire, a part of its length was uniformly stretched till the final length of the entire wire was 1.5 times the original length, the part of the wire was fraction equal to



A. $1/8$

B. $1/6$

C. $1/10$

D. $1/4$

Answer: A

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9. 12 cells each having same emf are connected in series with some cells wrongly connected. The arrangement is connected in series with an ammeter and two cells which are in series. Current is 3 A when cells and battery aid each other and is 2 A when cells and battery oppose each other. The number of cells wrongly connected is

A. 4

B. 1

C. 3

D. 2

Answer: B

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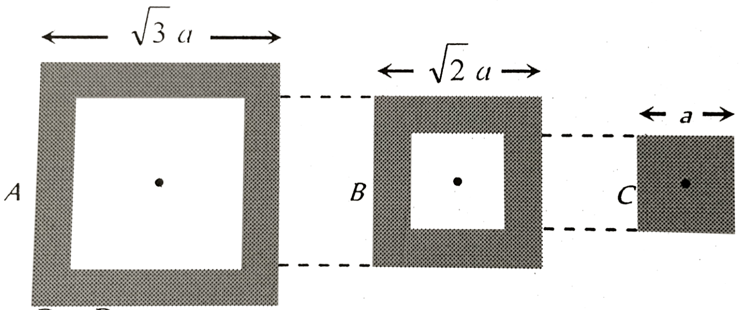
10. Following figure shows cross-sections through three long conductors of the same length and material, with square cross-section of edge lengths as shown. Conductor B will fit snugly within conductor A , and conductor C will fit snugly within conductor B . Relationship between their end to end resistance is



$R = R = R$

A. $R = R = R$

B. $R > R > R$

C. $R < R < R$

D. Information is not sufficient

Answer: A

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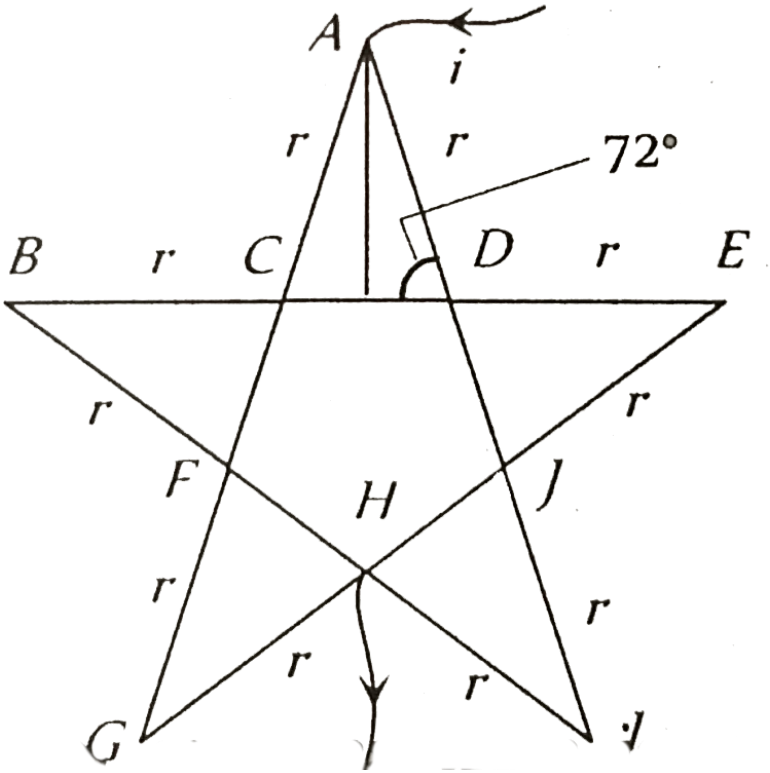
11. In the following star circuit diagram (figure), the equivalent resistance between the points A and H will be



A. $1.944r$

B. $0.973r$

C. $0.486r$

D. $0.243r$

Answer: B

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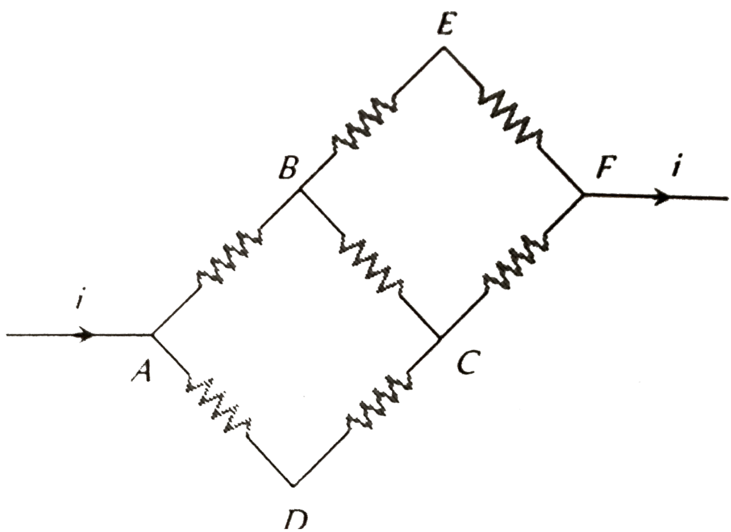
12. In the adjoining circuit diagram each resistance is of 10Ω.

The current in the arm AD will be



A. $\frac{2i}{5}$

B. $\frac{3i}{5}$

C. $\frac{4i}{5}$

D. $\frac{i}{5}$

Answer: A

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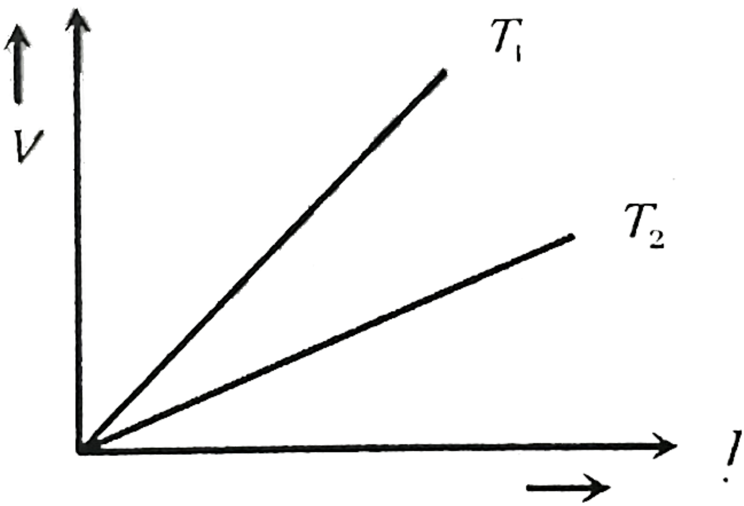
Graphical Questions

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



A. $T_1 > T_2$

B. $T_1 \approx T_2$

C. $T_1 = T_2$

D. $T_1 < T_2$

Answer: A

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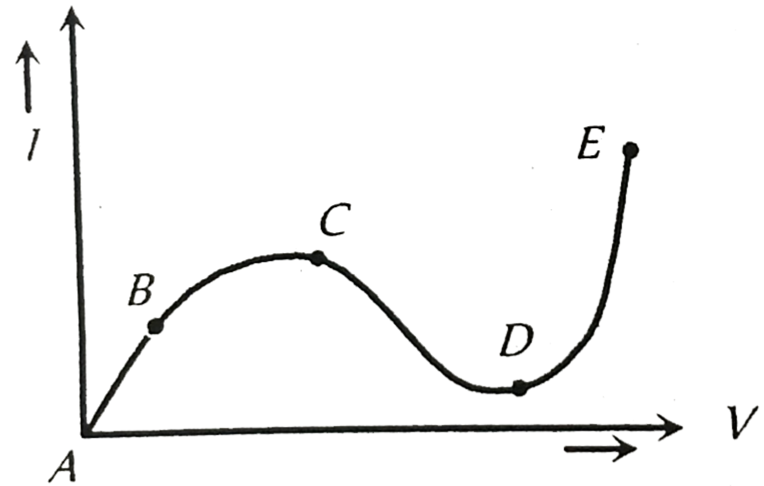
2. From the graph between current I and voltage V shown below, identify the portion corresponding to negative resistanc



A. AB

B. BC

C. CD

D. DE

Answer: C

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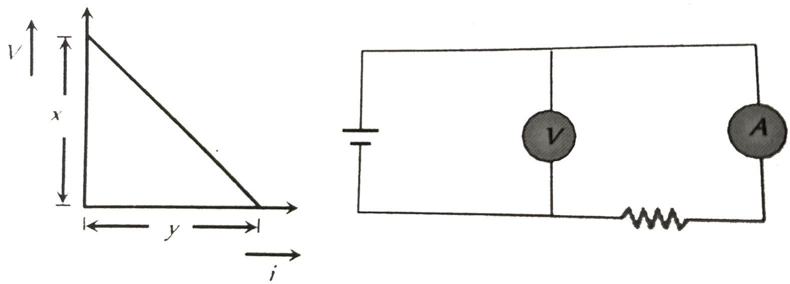
3. In an experiment, a graph was plotted of the potential difference V between the terminals of a cell against the circuit current i by varying load rheostat. Internal conductance of the cell is given by



A. xy

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

C. $\frac{x}{y}$

D. $(x - y)$

Answer: B

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Assertion & Reason

1. Assertion : Voltameter measures current more accurately than ammeter.

Reason : Relative error will be small if measured from voltameter.

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

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

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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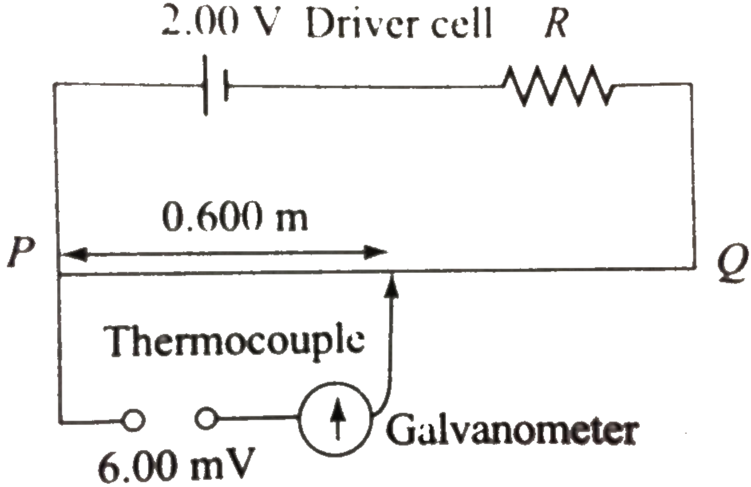
Self Evaluation Test -19

1. Figure 6.51 shows a simple a potentiometer circuit for measuring a small emf produced by a thermocouple.



The meter wire PQ has a resistance of 5Ω, and the driver cell has an emf of $2.00V$. If a balance point is obtained $0.600m$ along PQ when measuring an emf of $6.00mV$, what is the value of resistance R?

A. 995Ω

B. 1995Ω

C. 2995Ω

D. None of these

Answer: A

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2. A car has a fresh storage battery of emf 12 V and internal resistance $5.0 \times 10^{-2}\Omega$. If the starter motor draws a current of 90A, what is the terminal voltage of the battery when the starter is on?

A. 12V

B. $10.5V$

C. $8.5V$

D. $7.5V$

Answer: D

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3. 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. $7 : 13$

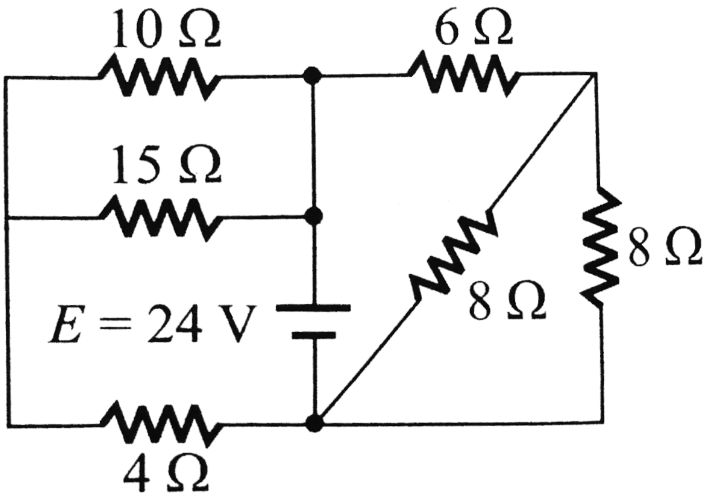
B. $13 : 7$

C. $9 : 11$

D. $11 : 9$

Answer: A

4. The equivalent resistance across the terminals of source of e.m.f. $24V$ for the circuit shown in the figure is



A. 15Ω

B. 10Ω

C. 5Ω

D. 4Ω

Answer: C

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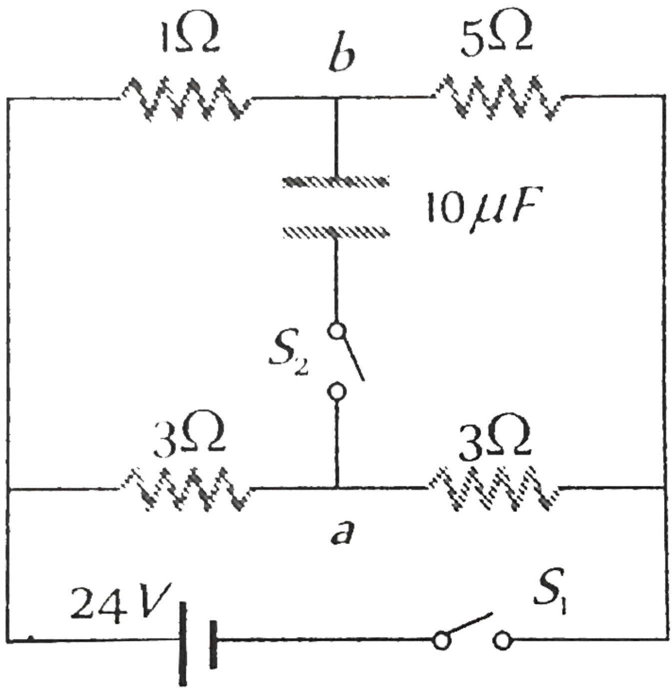
5. In the circuit shown in figure, switch S is initially closed and

S is open. Find V-V



A. $4V$

B. $8V$

C. $12V$

D. $16V$

Answer: B

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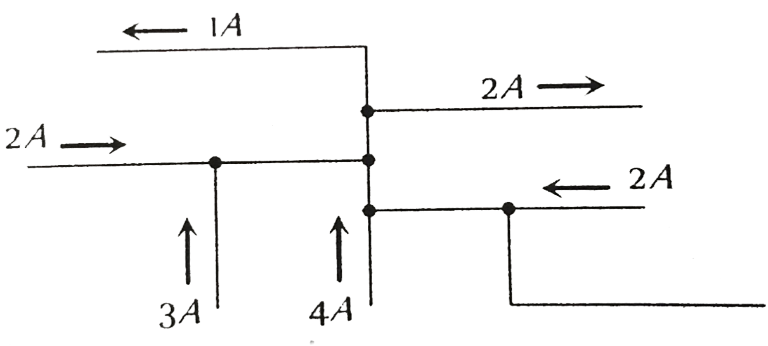
6. The figure here shows a portion of a circuit. What are the magnitude and direction of the current i in the lower right-hand wire



A. 7A

B. 8A

C. 6A

D. 2A

Answer: B

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7. A carbon resistor has colour strips as violet, yellow brown and golden. The resistance is

A. 641Ω

B. 741Ω

C. 704Ω

D. 407Ω

Answer: B

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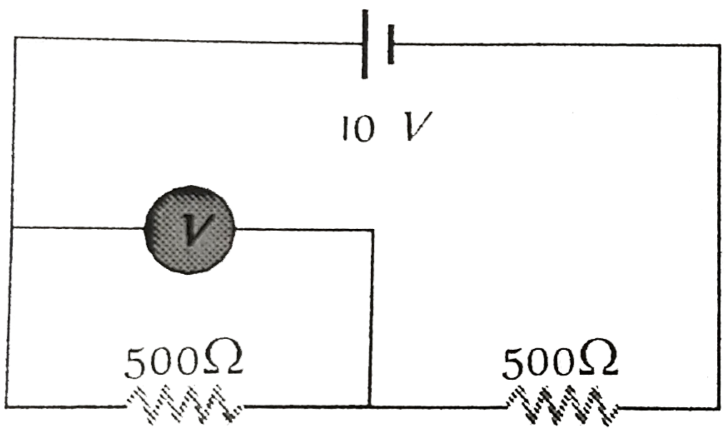
8. A voltmeter of resistance 1000Ω is connected across a resistance of 500Ω in the given circuit. What will be the reading of voltmeter



A. $1V$

B. $2V$

C. $6V$

D. $4V$

Answer: D

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9. A beam contains 2×10^{8} doubly charged positive ions per cubic centimeter, all of which are moving with a speed of $10^{5} m / s$. The current density is

A. $6.4 A / m$

B. $3.2 A / m$

C. $1.6 A / m$

D. None of these

Answer: A

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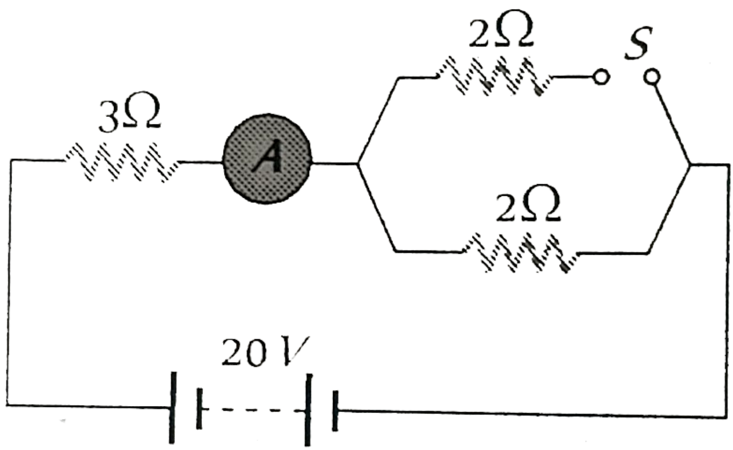
10. In the circuit shown, the reading of ammeter when switch S is open and when switch S is closed respectively are



A. 3A and 4A

B. 4A and 5A

C. 5A and 6A

D. 6A and 7A

Answer: B

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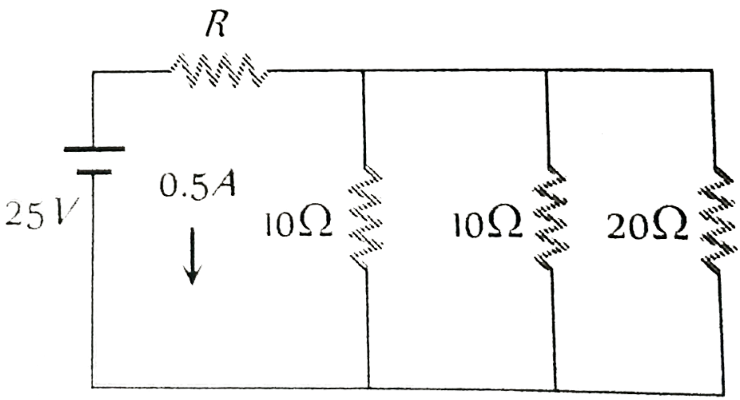
11. In the circuit as shown in figure the



A. Resistance $R = 46\Omega$

B. Current through 20Ω resistance is $0.1A$

C. Potential difference across the middle resistance is 2V

D. All option are correct

Answer: D

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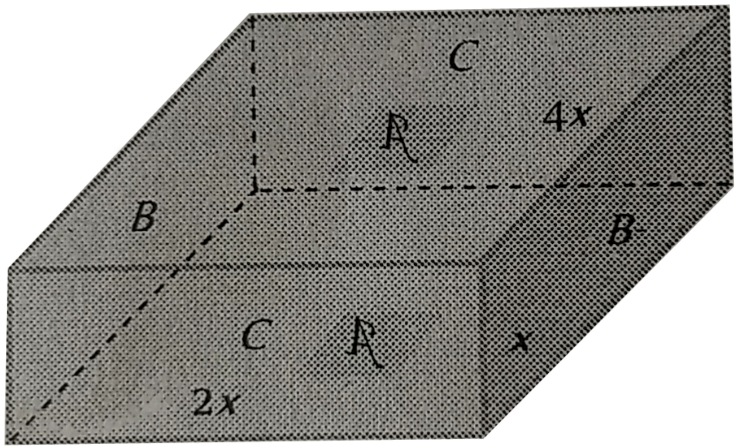
12. In figure shows a rectangular block with dimensions x , 2 x and 4 x . Electrical contacts can be made to the block between opposite pairs of faces (for example, between the faces labelled A - A , B - B and C - C). Between which two faces would the maximum electrical resistance be obtained (A - A : Top and bottom faces, B - B : Left and right faces, C - C : Front and rear faces)



A. A-A

B. B-B

C. C-C

D. Same for all three pairs

Answer: C

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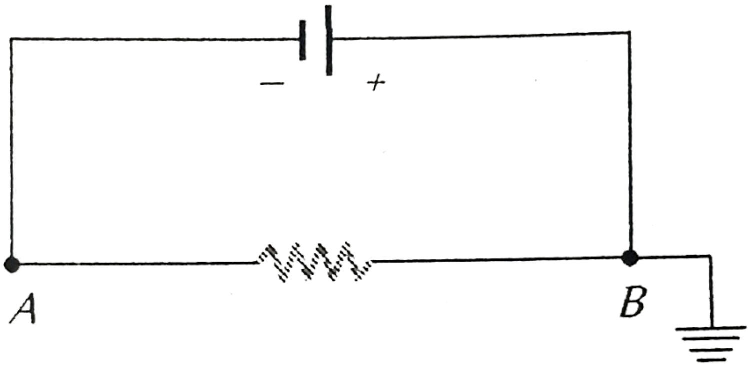
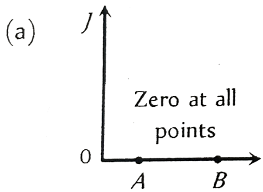
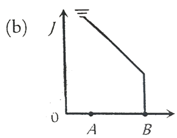
13. A battery is connected to a uniform resistance wire AB and B is earthed. Which one of the graphs below shows how the current density J varies along AB



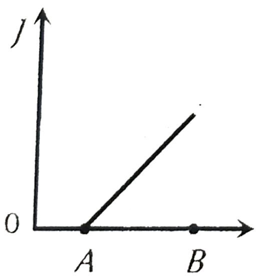
A.

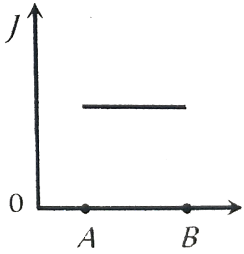


B.



C.



D. 

Answer: D

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14. A cylindrical metal wire of length l and cross sections area S , has resistance R , conductance G , conductivity σ and resistivity ρ . Which one of the following expressions for σ is valid

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

B. $\frac{\rho R}{G}$

C. $\frac{GS}{l}$

D. $\frac{Rl}{S}$

Answer: A

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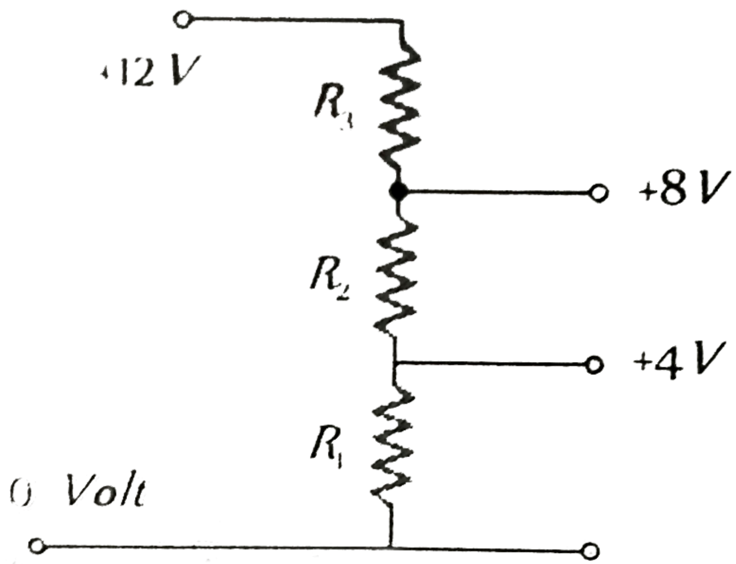
15. A potential divider is used to give outputs of 4 V and 8 V from a 12 V source. Which combination of resistances, (R , R, R) gives the correct voltages ? R : R : R



A. $2:1:2$

B. $1:1:1$

C. $2:2:1$

D. $1:1:2$

Answer: B

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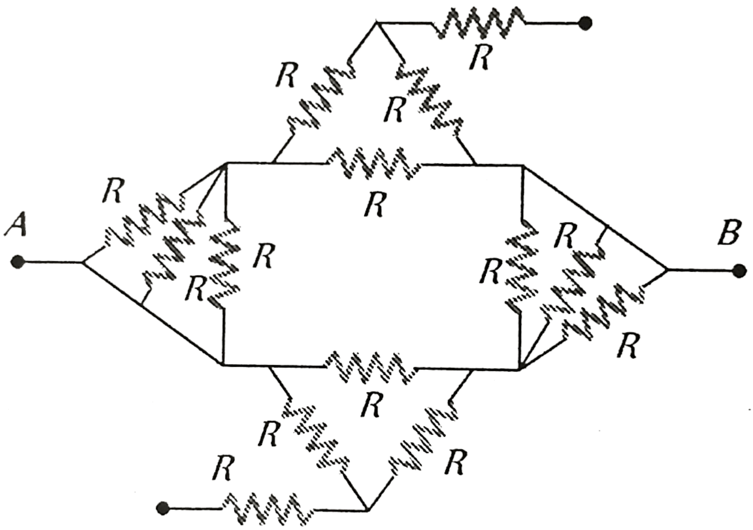
16. Find equivalent resistance between A and B



A. R

B. $\frac{3R}{94}$

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

D. $2R$

Answer: C

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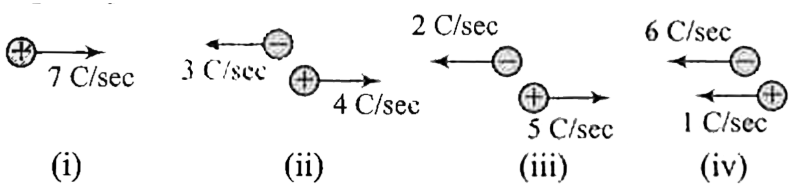
17. Following figures show four situations in which positive and negative charges move horizontaly through a region and give the rate at which each charge moves. Rank the situations according to the effective current through the region greatest first.



A. $i = ii = iii = iv$

B. $i > ii > iii > iv$

C. $i = ii = iii > iv$

D. $i = ii = iii < iv$

Answer: C

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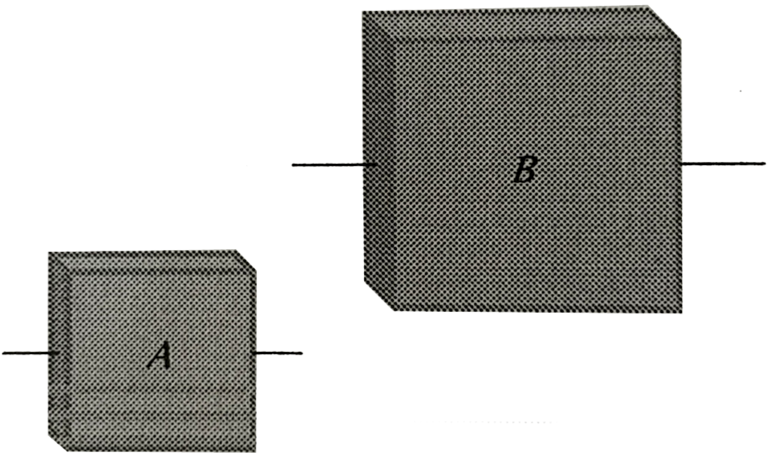
18. A and B are two square plates of same metal and same thickness but length of B is twice that of A . Ratio of resistances of A and B is



A. $4:1$

B. $1:4$

C. $1:1$

D. $1:2$

Answer: C

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19. A moving coil galvanometer is converted into an ammeter reads upto $0.03A$ by connecting a shunt of resistance $4r$ across it and ammeter reads up $0.06A$, when a shunt of resistance r is used. What is the maximum current which can be sent through this galvanometer if no shunt is used ?

A. $0.01A$

B. $0.02A$

C. $0.03A$

D. $0.04A$

Answer: B

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20. Two conductors are made of the same material and have the same length. Conductor A is a solid wire of diameter $1mm$. Conductor B is a hollow tube of outer diameter $2mm$ and inner diameter $1mm$. Find the ratio of resistance R_A to R_B.

A. 1

B. 2

C. 3

D. 4

Answer: C

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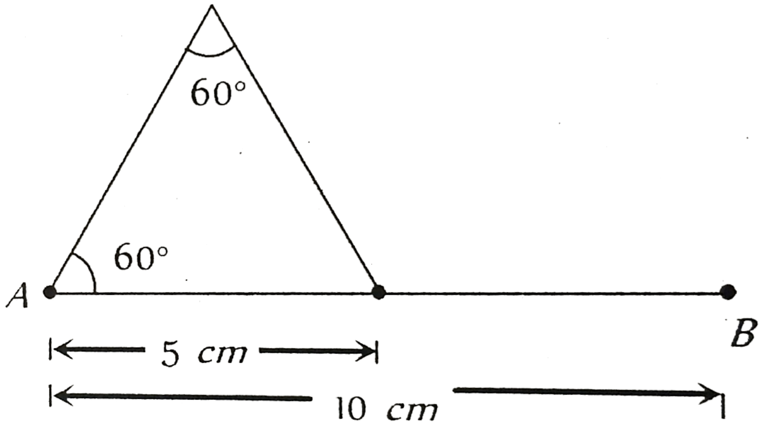
21. A wire has resistance of 24Ω is bent in the following shape.

The effective resistance between A and B is



A. 24Ω

B. 10Ω

C. $\frac{16}{3}\Omega$

D. None of these

Answer: B

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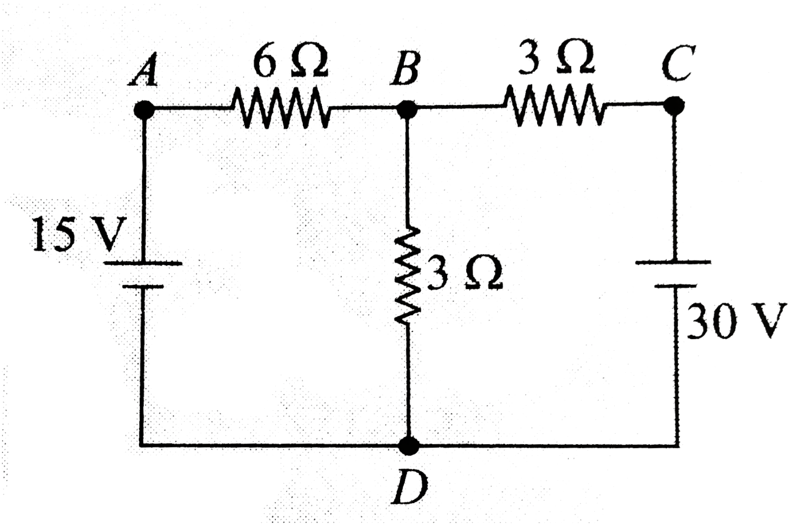
22. In the circuit shown in fig. 5.120 find the current through the branch BD.



A. 5A

B. 0A

C. 3A

D. 4A

Answer: A

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23. A battery of 24 cells each of emf 1.5 V and internal resistnace 2Ω is to be connected in order to send the maximum current through a 12Ω resistor. The correct arrangement of cells will be

A. 2 rows of 13 cells connected in parallel

B. 3 rows of 8 cells connected in parallel

C. 4 rows of 6 cells connected in parallel

D. All of these

Answer: A

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