19. Current Electricity – Multiple Choice Questions

1. Electric Conduction, Ohm's Law and Resistance

1. 62.5×10^{18} electrons per second are flowing through a wire of area of cross-section $0.1\, m^2$, the value of current flowing will be

(a) 1 A (b) 0.1 A

(c) 10 A (d) 0.11 A

2. 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}

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

(a) 10 *C* (b) 20 *C*

(c) 30 *C* (d) 40 *C*

4. In a neon discharge tube $2.9 \times 10^{18}\, Ne^{+}$ ions move to the right each *second* while 1.2×10^{18} electrons move to the left per *second*. Electron charge is $1.6 \times 10^{-19} C$. The current in the discharge tube

(a) 1 *A* towards right (b) 0.66 *A* towards right

(c) 0.66 *A* towards left (d) Zero

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

(a) $\upsilon / 4$ (b) $\upsilon / 2$

(c) υ (d) 4υ

6. Which of the following characteristics of electrons determines the current in a conductor

(a) Drift velocity along

(b) Thermal velocity alone

(c) Both drift velocity and thermal velocity

(d) Neither drift nor thermal velocity

7. A current *I* is passing through a wire having two sections *P* and *Q* of uniform diameters *d* and *d*/2 respectively. If the mean drift velocity of electrons in sections *P* and *Q* is denoted by υ_P and υ_Q respectively, then

(a) $\upsilon_P = \upsilon_Q$ (b) $\upsilon_P = \frac{1}{2} \upsilon_Q$

(c) $\upsilon_P = \frac{1}{4} \upsilon_Q$ (d) $\upsilon_P = 2\, \upsilon_Q$

8. 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

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^2 (b) 3.2 A/m^2

(c) 1.6 A/m^2 (d) None of these

10. A cylindrical metal wire of length *l* and cross sectional 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) $\frac{Rl}{S}$

11. An electric cell of e.m.f. *E* is connected across a copper wire of diameter *d* and length *l*. The drift velocity of electrons in the wire is υ_d. If the length of the wire is changed to 2*l*, the new drift velocity of electrons in the copper wire will be

(a) υ_d (b) $2\upsilon_d$

(c) $\upsilon_d / 2$ (d) $\upsilon_d / 4$

12. Consider a current carrying wire (current *I*) in the shape of a circle

(a) Source of emf

(b) Electric field produced by charges accumulated on the surface of wire

(c) The charges just behind a given segment of wire which push them just the right way by repulsion

(d) The charges ahead

13. The density of copper is $9 \times 10^3 kg/m^3$ and its atomic mass is 63.5*u*. Each copper atom provides one free electron. Estimate the number of free electrons per cubic meter in copper

(a) 10^{19} (b) 10^{23}

(c) 10^{25} (d) 10^{29}

14. 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}

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

(a) $1.25\,m$ (b) $2.5\,m$

(c) $10\,m$ (d) $20\,m$

16. 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) $R/4$

17. 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

18. The following four wires are made of the same material and are at the same temperature. Which one of them has highest electrical resistance

(a) Length = 50 *cm*, diameter = 0.5 *mm*

(b) Length = 100 *cm*, diameter = 1 *mm*

(c) Length = 200 *cm*, diameter = 2 *mm*

(d) Length = 300 *cm*, diameter = 3 *mm*

19. 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

20. 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}

21. 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

22. Two wires of same material having length and radii in the ratio 3 : 4 and 3 : 2 respectively are connected in parallel with a potential source of 6*V*. The ratio of currents flowing through them, $I_1 : I_2 =$

(a) 1 : 3 (b) 3 : 1

(c) 1 : 2 (d) 2 : 1

23. A metal rod of length $10\,cm$ and a rectangular cross –section of $1\,cm \times \frac{1}{2}\,cm$ is connected to a battery across opposite faces. The resistance will be

(a) Maximum when the battery is connected across $1\,cm \times \frac{1}{2}\,cm$ faces

(b) Maximum when the battery is connected across $10\,cm \times 1\,cm$ faces

(c) Maximum when the battery is connected across $10\,cm \times \frac{1}{2}\,cm$ faces

(d) Same irrespective of the three faces

24. Length of a hollow tube is 5*m*, it's outer diameter is 10 *cm* and thickness of it's 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

25. Two rods of same material and length have their electric resistances 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 $1:2$

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

(a) 1 : 3 : 5 (b) 5 : 3 : 1

(c) 1 : 15 : 125 (d) 125 : 15 : 1

27. 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 = 1.0×10^{-7} *ohm–m* and specific resistance of copper = 1.7×10^{-8} *ohm-m*)

(a) About 1.2 (b) About 2.4

(c) About 3.6 (d) About 4.8

28. A rod of a certain metal is 1.0 *m* long and 0.6 *cm* in diameter. Its resistance is 3.0×10^{-3} *ohm*. Another disc made of the same metal is 2.0 *cm* in diameter and 1.0 *mm* thick. What is the resistance between the round faces of the disc

(a) 1.35×10^{-8} *ohm* (b) 2.70×10^{-7} *ohm*

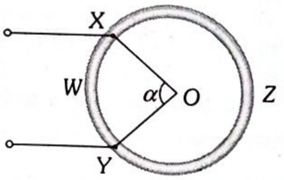
(c) 4.05×10^{-6} *ohm* (d) 8.10×10^{-5} *ohm*

29. We have two wires *A* and *B* of same mass and same material. The diameter of the wire *A* is half of that *B*. If the resistance of wire *A* is 24 *ohm* then the resistance of wire *B* will be

(a) 12 *Ohm* (b) 3.0 *Ohm*

(c) 1.5 *Ohm* (d) None of the above

30. 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



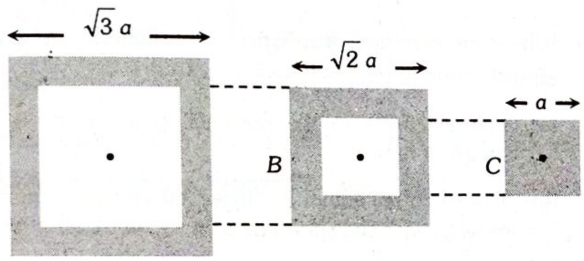
(a) $\frac{R\alpha}{4\pi^2}(2\pi-\alpha)$

(b) $\frac{R}{2\pi}(2\pi-\alpha)$

(c) $R\,(2\pi-\alpha)$

(d) $\frac{4\pi}{R\alpha}(2\pi-\alpha)$

31. 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



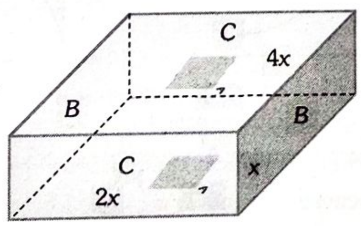
(a) $R_A = R_B = R_C$

(b) $R_A > R_B > R_C$

(c) $R_A < R_B < R_C$

(d) Information is not sufficient

32. Given figure shows a rectangular block with dimensions x, 2x and 4x. 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

33. 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

34. Resistance of tungsten wire at 150°C is $133\,\Omega$. Its resistance temperature coefficient is $0.0045/°C$. The resistance of this wire at 500°C will be

(a) $180\,\Omega$

(b) $225\,\Omega$

(c) $258\,\Omega$

(d) $317\,\Omega$

35. The alloys constantan and manganin are used to make standard resistance because they have

(a) Low resistivity

(b) High resistivity

(c) Low temperature coefficient of resistance

(d) Both (b) and (c)

36. Two different conductors have same resistance at 0°C. It is found that the resistance of the first conductor at t_1°C is equal to the resistance of the second conductor at t_2°C. The ratio of the temperature coefficients of resistance of the conductors, α_1/α_2 is

(a) $\frac{t_1}{t_2}$

(b) $\frac{t_2-t_1}{t_2}$

(c) $\frac{t_2-t_1}{t_1}$

(d) $\frac{t_2}{t_1}$

(e) $\frac{t_2}{t_2-t_1}$

37. Resistance of a wire at 20°C is $20\,\Omega$ and at 500°C is $60\,\Omega$. At what temperature its resistance is $25\,\Omega$

(a) 160°C

(b) 250°C

(c) 100°C

(d) 80°C

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

(a) $\frac{\alpha_1+\alpha_2}{2}$

(b) $\sqrt{\alpha_1\alpha_2}$

(c) $\frac{\alpha_1R_1+\alpha_2R_2}{R_1+R_2}$

(d) $\frac{\sqrt{R_1R_2\alpha_1\alpha_2}}{\sqrt{R_1^2+R_2^2}}$

39. Two resistances R_1 and R_2 are made of different materials. The temperature coefficient of the material of R_1 is α and of the material of R_2 is $-\beta$. The resistance of the series combination of R_1 and 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) $\frac{\beta}{\alpha}$

40. The resistance of a metal increases with increasing temperature because

(a) The collisions of the conducting electrons with the electrons increase

(b) The collisions of the conducting electrons with the lattice consisting of the ions of the metal increase

(c) The number of conduction electrons decreases

(d) The number of conduction electrons increases

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

(a) Relaxation time increases

(b) Mass of electron increases

(c) Electron density decreases

(d) Relaxation time decreases

(e) Relaxation time remains constant

42. If the resistance of a conductor is 5 Ω at 50°C and 7 Ω at 100°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) 0.01/°C

43. The resistance of a wire at room temperature 30^oC is found to be 10Ω. Now to increase the resistance by 10%, the temperature of the wire must be [The temperature coefficient of resistance of the material of the wire is 0.002 per ^oC]

(a) 36^oC (b) 83^oC

(c) 63^oC (d) 33^oC

44. A metallic block has no potential difference applied 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

45. A metal wire is subjected to a constant potential difference. When the temperature of the metal wire increases, the drift velocity of the electron in it

(a) Increases, thermal velocity of the electron increases

(b) Decreases, thermal velocity of the electron increases

(c) Increases, thermal velocity of the electron decreases

(d) Decreases, thermal velocity of the electron decreases

46. The drift velocity of the electrons in a copper wire of length $2m$ under the application of a potential difference of 200 V is $0.5\,ms^{-1}$. Their mobility is (in $m^2V^{-1}s^{-1}$)

(a) 2.5×10^{-3} (b) 2.5×10^{-2}

(c) 5×10^{2} (d) 5×10^{-3}

(e) 5×10^{-2}

47. A colour coded carbon resistor has the colours orange, blue, green and silver. Its resistance value and tolerance percentage respectively are

(a) $36\times10^5\Omega$ and 10% (b) $36\times10^4\Omega$ and 5%

(c) $63\times10^5\Omega$ and 10% (d) $35\times10^6\Omega$ and 5%

48. The colour code for a resistor of resistance $3.5k\Omega$ with 5% tolerance is

(a) Orange, green, red and gold

(b) Red, yellow, black and gold

(c) Orange, green, orange and silver

(d) Orange, green, red and silver

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

(a) 100 Ω (b) 1000 Ω

(c) 10 Ω (d) 1 Ω

50. When an electrical appliance is switched on, it responds almost immediately, because

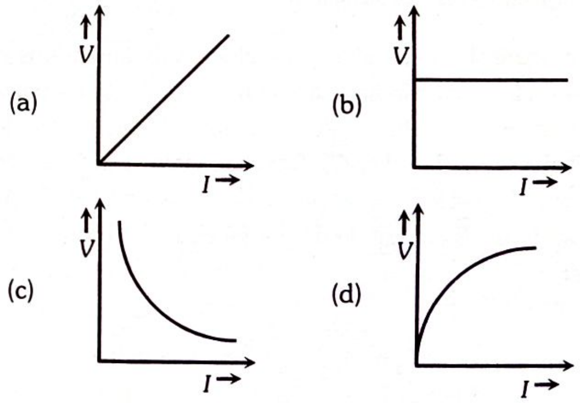
(a) The electrons in the connecting wires move with the speed of light

(b) The electrical signal is carried by electromagnetic waves moving with the speed of light

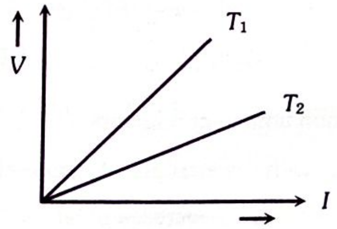
(c) The electrons move with speed which is close to but less than speed of light

(d) The electron are stagnant

51. Which of the adjoining graphs represents *ohmic* resistance?



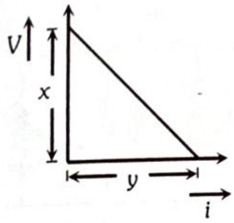
52. The voltage V and current I graph for a conductor at two different temperatures T_1 and T_2 are shown in the figure. The relation between T_1 and T_2 is

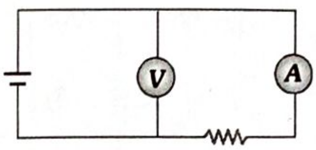


(a) $T_1 > T_2$ (b) $T_1 \approx T_2$

(c) $T_1 = T_2$ (d) $T_1 < T_2$

53. 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

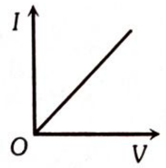




(a) xy (b) $\frac{y}{x}$

(c) $\frac{x}{y}$ (d) $(x-y)$

54. I-V characteristic of a copper wire of length L and area of cross-section A is shown in figure. The slope of the curve becomes



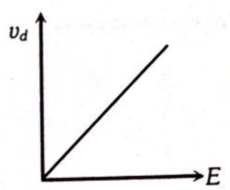
(a) More if the experiment is performed at higher temperature

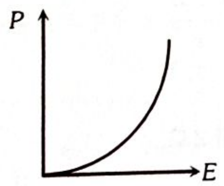
(b) More if a wire of steel of same dimension is used

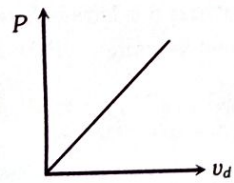
(c) More if the length of the wire is increased

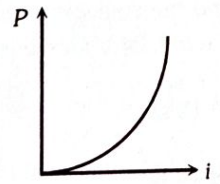
(d) Less if the length of the wire is increased

55. E denotes electric field in a uniform conductor, I corresponding current through it, v_d drift velocity of electrons and P denotes thermal power produced in the conductor, then which of the following graph is incorrect

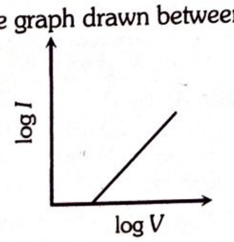
(a) 

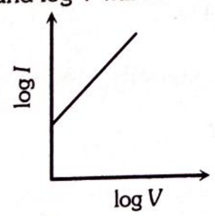
(b) 

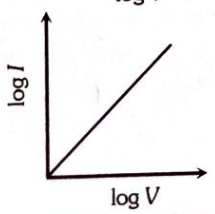
(c) 

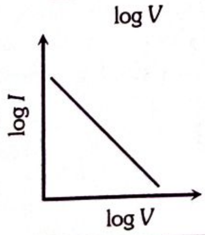
(d) 

56. 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

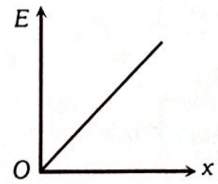
(a) 

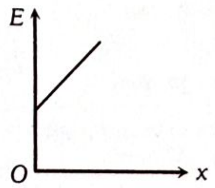
(b) 

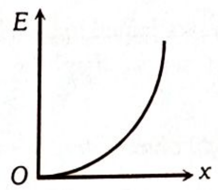
(c) 

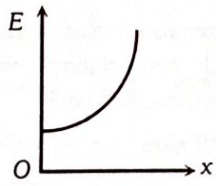
(d) 

57. A cylindrical conductor has uniform cross-section. Resistivity of its material increases 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) 

2. Grouping of Resistances

1. 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) $R < R_1$

2. 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) $1/10\Omega$

3. 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^2x

(c) x/n (d) nx

4. How many minimum number of 2Ω resistance can be connected to have an effective resistance of 1.5Ω

(a) 3 (b) 2

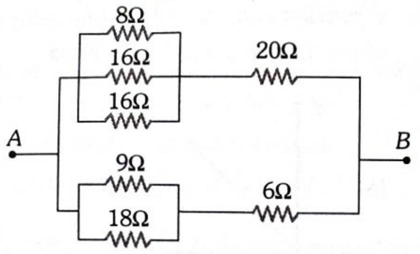
(c) 6 (d) 4

5. A metallic wire of resistance of 12Ω is bent to form a square. The resistance between two diagonal points would be

(a) 12Ω (b) 24Ω

(c) 6Ω (d) 3Ω

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



(a) 6 *ohm*

(b) 8 *ohm*

(c) 16 *ohm*

(d) 24 *ohm*

7. 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*

8. 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 combinations are joined in parallel. The new combination will have a resistance

(a) R (b) $\frac{R}{4}$

(c) $\frac{R}{5}$ (d) $\frac{R}{25}$

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

(a) 2 Ω (b) 5 Ω

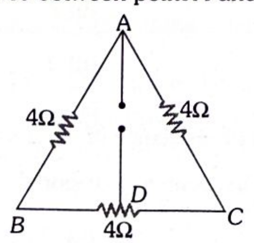
(c) 7 Ω (d) 10 Ω

10. 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) $\frac{5}{8}$ *ohm* (b) $\frac{8}{5}$ *ohm*

(c) $\frac{3}{8}$ *ohm* (d) $\frac{8}{3}$ *ohm*

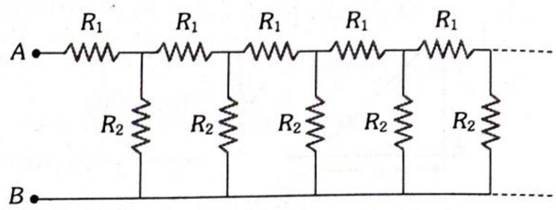
11. Three resistances of 4 Ω each are connected as shown in figure. If the point D divides the resistance into two equal halves, the resistance between point A and D will be



(a) 12 Ω (b) 6 Ω

(c) 3 Ω (d) 1/3 Ω

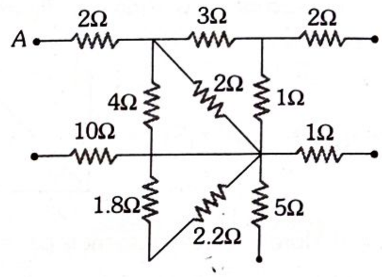
12. An infinite sequence of resistances is shown in the figure. The resultant resistance between A and B will be, when $R_1 = 1\,ohm$ and $R_2 = 2\,ohm$



(a) Infinity (b) 1Ω

(c) 2Ω (d) 1.5Ω

13. What is the equivalent resistance between the points A and B of the network



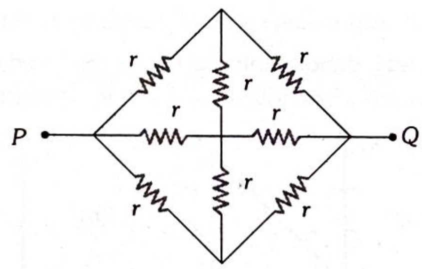
(a) $\frac{57}{7}$ Ω

(b) 8 Ω

(c) 6 Ω

(d) $\frac{57}{5}$ Ω

14. The equivalent resistance between the points P and Q in the network given here is equal to (given $r = \frac{3}{2}\Omega$)



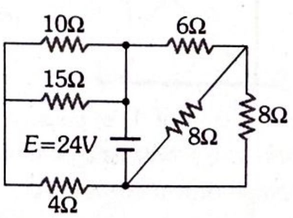
(a) $\frac{1}{2}$ Ω

(b) 1 Ω

(c) $\frac{3}{2}$ Ω

(d) 2 Ω

15. Find the equivalent resistance across the terminals of source of e.m.f. 24 V for the circuit shown in figure



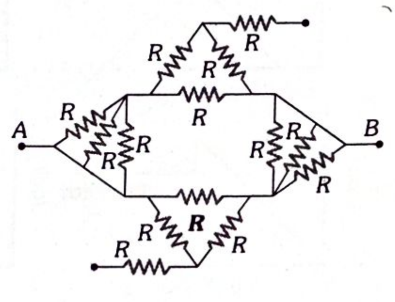
(a) 15 Ω

(b) 10 Ω

(c) 5 Ω

(d) 4 Ω

16. Find equivalent resistance between A and B



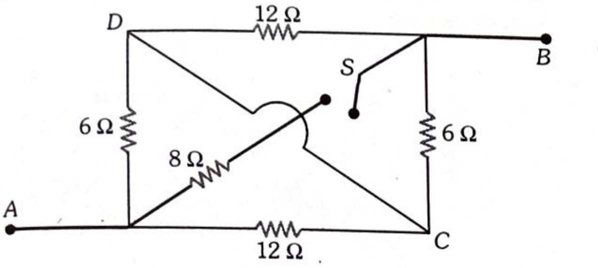
(a) R

(b) $\frac{3R}{4}$

(c) $\frac{R}{2}$

(d) $2R$

17. The equivalent resistance between points A and B with switch S open and closed are respectively



(a) 4 Ω, 8 Ω (b) 8 Ω, 4 Ω

(c) 6 Ω, 9 Ω (d) 9 Ω, 6 Ω

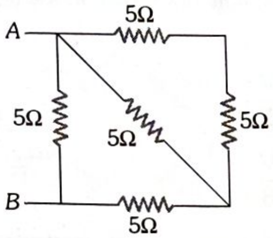
18. The equivalent resistance between the points A and B in the following circuit is

(a) 3.12 Ω

(b) 1.56 Ω

(c) 6.24 Ω

(d) 12.48 Ω



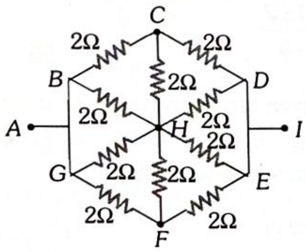
19. The effective resistance across the points A and I is

(a) 2 Ω

(b) 1 Ω

(c) 0.5 Ω

(d) 5 Ω



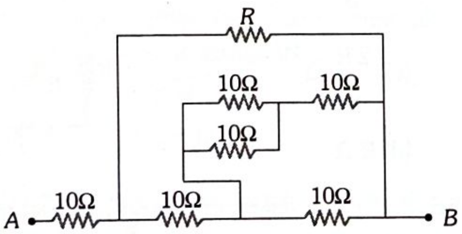
20. For what value of R the net resistance of the circuit will be 18 *ohms*

(a) 8 Ω

(b) 10 Ω

(c) 16 Ω

(d) 24 Ω



21. Two wires of equal diameters, of resistivities ρ_1 and ρ_2 and lengths l_1 and l_2, respectively, are joined in series. The equivalent resistivity of the combination is

(a) $\frac{\rho_1 l_1 + \rho_2 l_2}{l_1 + l_2}$ (b) $\frac{\rho_1 l_2 + \rho_2 l_1}{l_1 - l_2}$

(c) $\frac{\rho_1 l_2 + \rho_2 l_1}{l_1 + l_2}$ (d) $\frac{\rho_1 l_1 - \rho_2 l_2}{l_1 - l_2}$

22. Three unequal resistors 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 the three resistances in *ohm* is

(a) 4 (b) 6

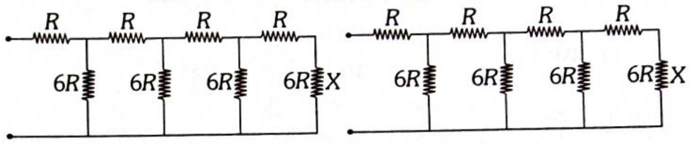
(c) 8 (d) 12

23. If σ_1, σ_2 and σ_3 are the conductances of three conductors, then their equivalent conductance, when they are joined in series, will be

(a) $\sigma_1 + \sigma_2 + \sigma_3$ (b) $\frac{1}{\sigma_1} + \frac{1}{\sigma_2} + \frac{1}{\sigma_3}$

(c) $\frac{\sigma_1 \sigma_2 \sigma_3}{\sigma_1 + \sigma_2 + \sigma_3}$ (d) None of these

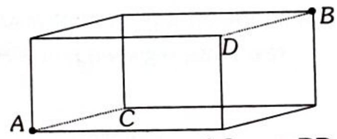
24. For what value of the resistor X will the equivalent resistance of the two circuits shown the same



(a) R (b) $6R$

(c) $2R$ (d) $\frac{\sqrt{5}-1}{2}R$

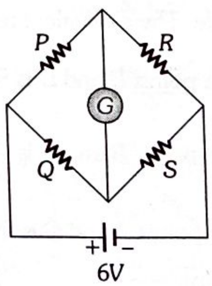
25. As shown in the figure elow, a cube is formed with ten identical resistance R (thick lines) and two shorting wires (dotted lines) along the arms AC and BD. Resistance between point A and B is



(a) $\frac{R}{2}$ (b) $\frac{5R}{6}$

(c) $\frac{3R}{4}$ (d) R

26. In the Wheatstone's network given, $P = 10\,\Omega$, $Q = 20\,\Omega$, $R = 15\,\Omega$, $S = 30\,\Omega$. The current passing through the battery (of negligible internal resistance) is



(a) 0.36 A (b) 0 A

(c) 0.18 A (d) 0.72 A

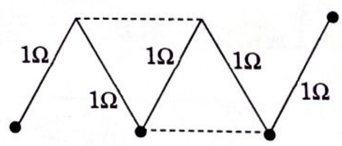
27. A circuit consists of five identical conductors as shown in figure. The two similar conductors are added as indicated by the dotted lines. The ratio of resistances before and after addition will be

(a) 7 / 5

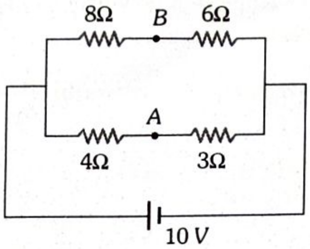
(b) 3 / 5

(c) 5 / 3

(d) 6 / 5



28. The potential difference between point A & B is



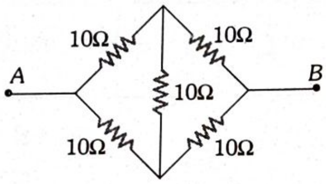
(a) $\frac{20}{7}V$

(b) $\frac{40}{7}V$

(c) $\frac{10}{7}V$

(d) 0

29. The effective resistance between points A and B is



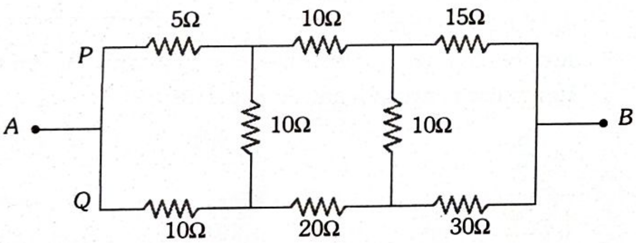
(a) 10Ω

(b) 20Ω

(c) 40Ω

(d) None of the above three values

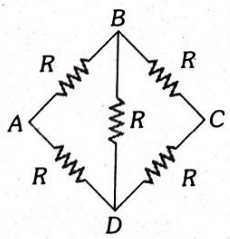
30. In the arrangement of resistances shown below, the effective resistance between points A and B is



(a) 20Ω (b) 30Ω

(c) 90Ω (d) 110Ω

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



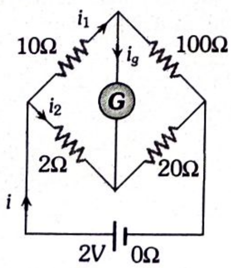
(a) Between the points B and D is R

(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 $\frac{R}{2}$

32. In the circuit shown below the resistance of the galvanometer is 20 Ω. In which of the following alternatives are the currents arranged strictly in the decreasing order



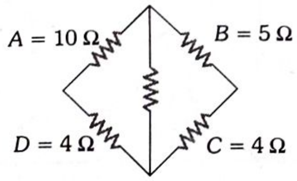
(a) i, i_1, i_2, i_g

(b) i, i_2, i_1, i_g

(c) i, i_2, i_g, i_1

(d) i, i_1, i_g, i_2

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



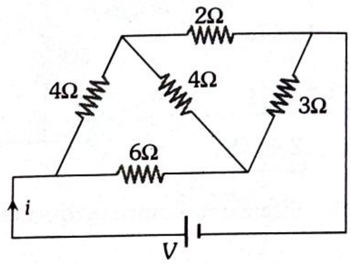
(a) 10 Ω should be connected in parallel with A

(b) 10 Ω should be connected in series with A

(c) 5 Ω should be connected in series with B

(d) 5 Ω should be connected in parallel with B

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



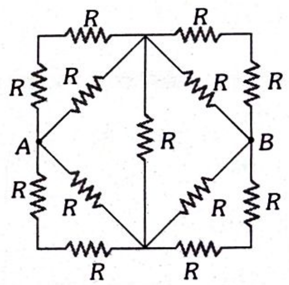
(a) $\frac{9V}{35}$

(b) $\frac{5V}{18}$

(c) $\frac{5V}{9}$

(d) $\frac{18V}{5}$

35. 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



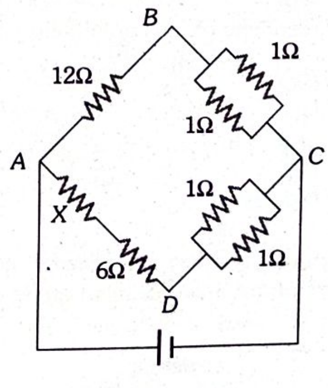
(a) $2R$ Ω

(b) $\frac{4R}{3}$ Ω

(c) $\frac{2R}{3}$ Ω

(d) R Ω

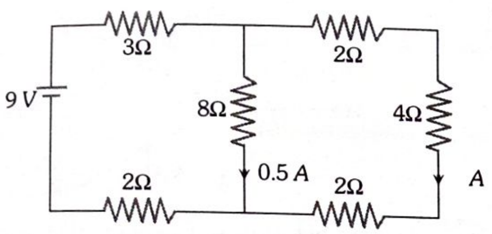
36. For what value of unknown resistance X, the potential difference between B and D will be zero in the circuit shown in the figure



(a) 4 Ω (b) 6 Ω

(c) 2 Ω (d) 5 Ω

37. In the electrical circuit shown in figure, the current through the 4Ω resistor is



(a) $1\,A$ (b) $0.5\,A$

(c) $0.25\,A$ (d) $0.1\,A$

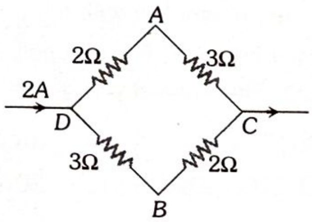
38. A current of 2 A flows in a system of conductors as shown. The potential difference $(V_A - V_B)$ will be

(a) $+2V$

(b) $+1V$

(c) $-1V$

(d) $-2V$



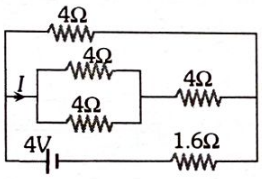
39. In the circuit shown the value of I in ampere is

(a) 1

(b) 0.60

(c) 0.4

(d) 1.5

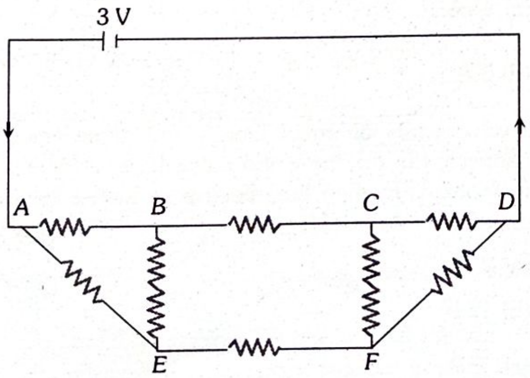


40. A uniform wire of resistance $9\,\Omega$ is cut into 3 equal parts. They are connected in the form of equilateral triangle ABC. A cell of e.m.f. 2 V and negligible internal resistance is connected across B and C. Potential difference across AB is

(a) 1 V (b) 2 V

(c) 3 V (d) 0.5 V

41. Figure shows a network of eight resistors, each equal to 2Ω, connected to a 3 V battery of negligible internal resistance. The current I in the circuit is



(a) 0.25 A (b) 0.50 A

(c) 0.75 A (d) 1.0 A

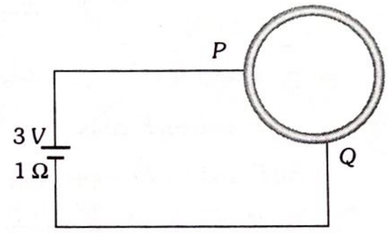
42. A wire of resistance $10\,\Omega$ is bent to form a circle. P and Q are points on the circumference of the circle dividing it into a quadrant and are connected to a battery of 3 V and internal resistance $1\,\Omega$ as shown in the figure. The currents in the two parts of the circle are

(a) $\frac{6}{23}A$ and $\frac{18}{23}A$

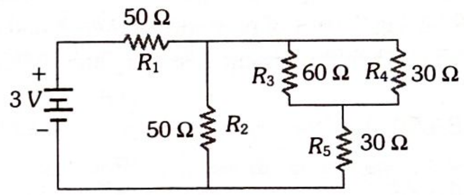
(b) $\frac{5}{26}A$ and $\frac{15}{26}A$

(c) $\frac{4}{25}A$ and $\frac{12}{25}A$

(d) $\frac{3}{25}A$ and $\frac{9}{25}A$



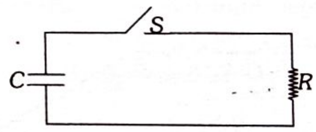
43. In circuit shown below, the resistances are given in ohm and the battery is assumed ideal with emf equal to 3 *volt*. The voltage across the resistance R_4 is



(a) 0.4 V (b) 0.6 V

(c) 1.2 V (d) 1.5 V

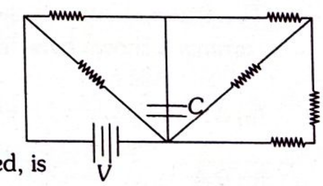
44. The capacitor of capacitance C in the circuit shown is fully charged initially, resistance is R. After the switch S is closed, the time taken to reduce the stored energy in the capacitor to half its initial value is



(a) $\frac{RC}{2}$ (b) $RC\ln 2$

(c) $2RC\ln 2$ (d) $\frac{RC\ln 2}{2}$

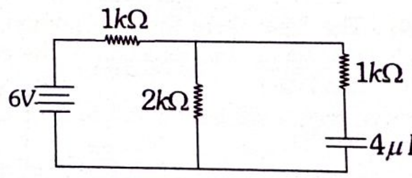
45. Consider the circuit shown in the figure below:
All the resistors are identical.
The charge stored in the capacitor, once it is fully charged, is



(a) 0 (b) $\frac{5}{13}CV$

(c) $\frac{2}{3}CV$ (d) $\frac{5}{8}CV$

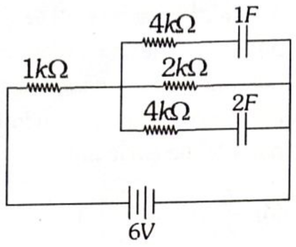
46. The circuit shown has been connected for a long time. The voltage across the capacitor is



(a) 1.2 V (b) 2.0 V

(c) 2.4 V (d) 4.0 V

47. What are the charges stored in the $1\mu F$ and $2\mu F$ capacitors in the circuit below, ones the currents become steady



(a) $8\mu F$ and $4\mu F$ respectively

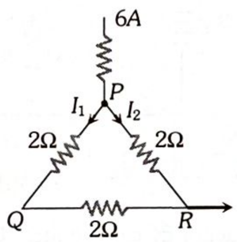
(b) $4\mu F$ and $8\mu F$ respectively

(c) $3\mu F$ and $6\mu F$ respectively

(d) $6\mu F$ and $3\mu F$ respectively

3. Kirchhoff's Law, Cells

1. A current of 6A enters one corner P of an equilateral triangle PQR having 3 wires of resistances 2Ω each and leaves by the corner R. Then the current I_1 and I_2 are



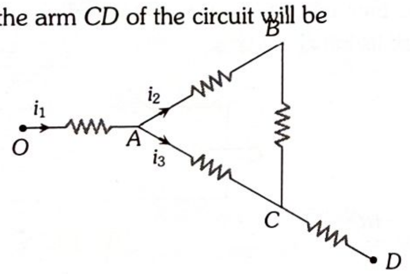
(a) 2A,4A

(b) 4A,2A

(c) 1A,2A

(d) 2A,3A

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



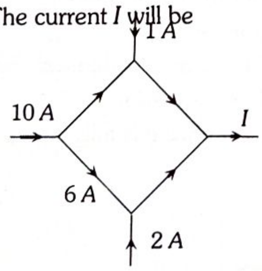
(a) $i_1 + i_2$

(b) $i_2 + i_3$

(c) $i_1 + i_3$

(d) $i_1 - i_2 + i_3$

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



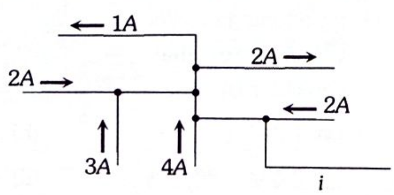
(a) 3 A

(b) 9 A

(c) 13 A

(d) 19 A

4. 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



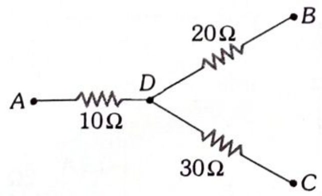
(a) 7 A

(b) 8 A

(c) 6 A

(d) 2 A

5. In the circuit given here, the points A, B and C are 70 V, zero, 10 V respectively. Then



(a) The point D will be at a potential of 60 V

(b) The point D will be at a potential of 20 V

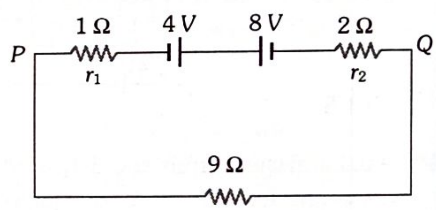
(c) Currents in the paths AD, DB and DC are in the ratio of 1 : 2 : 3

(d) Currents in the paths AD, DB and DC are in the ratio of 3 : 2 : 1

6. A battery of emf 8 V with internal resistance 0.5Ω is being charged by a 120 V d.c. supply using a series resistance of 15.5Ω. The terminal voltage of the battery is

(a) 20.5 V
(b) 15.5 V
(c) 11.5 V
(d) 2.5 V

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



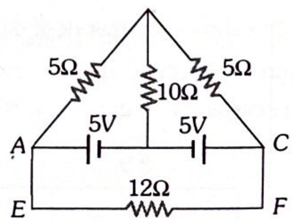
(a) $\frac{1}{3}$ A and 3V

(b) $\frac{1}{6}$ A and 4V

(c) $\frac{1}{9}$ A and 9V

(d) $\frac{1}{2}$ A and 12V

8. In the circuit of adjoining figure the current through 12 Ω resister will be



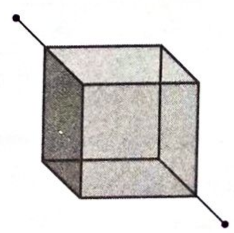
(a) 1 A

(b) $\frac{1}{5}$ A

(c) $\frac{2}{5}$ A

(d) 0 A

9. 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) $8R$

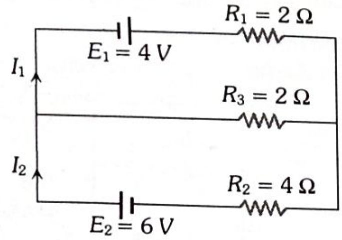
10. In the circuit shown below $E_1 = 4.0$ V, $R_1 = 2\ \Omega$, $E_2 = 6.0$ V, $R_2 = 4\ \Omega$ and $R_3 = 2\ \Omega$. The current I_1 is

(a) 1.6 *A*

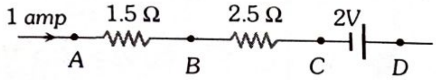
(b) 1.8 *A*

(c) 1.25 *A*

(d) 1.0 *A*



11. 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) $V_A = -1.5V, V_D = +2V$ (b) $V_A = +1.5V, V_D = +2V$

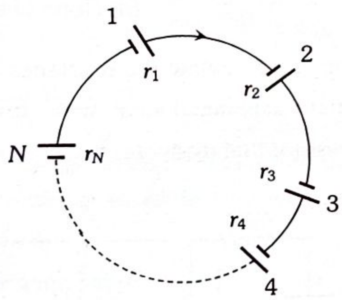
(c) $V_A = +1.5V, V_D = +0.5V$ (d) $V_A = +1.5V, V_D = -0.5V$

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

(c) $\frac{(V-E)R}{V}$ (d) $\frac{(V-E)R}{E}$

13. A group of *N* cells whose *emf* varies directly with the internal resistance as per the equation $E_N = 1.5\ r_N$ are connected as shown in the figure below. The current *I* in the circuit is



(a) 0.51 *amp* (b) 5.1 *amp*

(c) 0.15 *amp* (d) 1.5 *amp*

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

(a) 4.5 *ohm* (b) 2 *ohm*

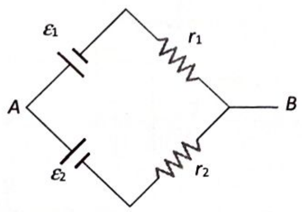
(c) 0.5 *ohm* (d) 1/4.5 *ohm*

15. A 50V battery is connected across a 10 *ohm* resistor. The current is 4.5 *ampere*. The internal resistance of the battery is

(a) Zero (b) 0.5 *ohm*

(c) 1.1 *ohm* (d) 5.0 *ohm*

16. Two batteries of emf ε_1 and ε_2 $(\varepsilon_2 > \varepsilon_1)$ and internal resistances r_1 and r_2 respectively are connected in parallel as shown in figure



(a) Two equivalent emf ε_{eq} of the two cells is between ε_1 and ε_2, i.e., $\varepsilon_1 < \varepsilon_{eq} < \varepsilon_2$

(b) The equivalent emf ε_{eq} is smaller than ε_1

(c) The ε_{eq} is given by $\varepsilon_{eq} = \varepsilon_1 + \varepsilon_2$ always

(d) ε_{eq} is independent of internal resistances r_1 and r_2

17. Two identical cells 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

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

(a) 5 V (b) 14 V

(c) 15 V (d) 16 V

19. The number of dry cells, each of e.m.f. 1.5 *volt* and internal resistance 0.5 *ohm* 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

20. 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*

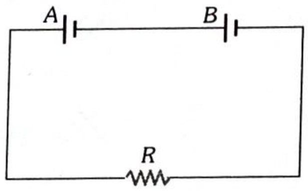
(c) 90 *AH* (d) 15 *AH*

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

(a) 4.5 V (b) 4 V

(c) 0 V (d) 2 V

22. 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 *ohm* and that of B is 0.9 *ohm*, what is the potential difference between the terminals of battery A



(a) 2 V

(b) 3.8 V

(c) Zero

(d) None of the above

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

(a) 1.5 Ω (b) 2 Ω

(c) 2.5 Ω (d) 3.5 Ω

24. To draw maximum current from a combination of cells, how should the cells be grouped

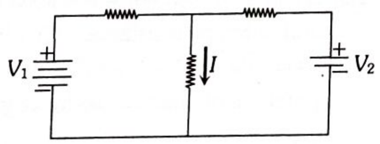
(a) Series

(b) Parallel

(c) Mixed

(d) Depends upon the relative values of external and internal resistance

25. Two batteries V_1 and V_2 are connected to three resistors as shown below



If $V_1 = 2V$ and $V_2 = 0V$, the current $I = 3mA$. If $V_1 = 0V$ and $V_2 = 4V$. The current $I = 4mA$. Now, if $V_1 = 10V$ and $V_2 = 10V$, the current I will be

26. 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 0.5 Ω then

(a) $m=8, n=3$ (b) $m=6, n=4$

(c) $m=12, n=2$ (d) $m=2, n=12$

27. A battery of emf E has an internal resistance 'r'. A variable resistance R is connected to the terminals of the battery. A current I is drawn from the battery. V is the terminal P.D. If R alone is gradually reduced to zero, which of the following best describes I and V

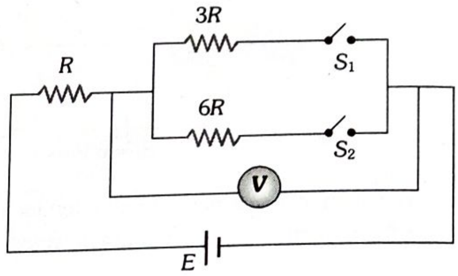
(a) I approaches zero, V approaches E

(b) I approaches E/r, V approaches zero

(c) I approaches E/r, V approaches E

(d) I approaches infinity, V approaches E

28. 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) $V_3 > V_2 > V_1$ (b) $V_2 > V_1 > V_3$

(c) $V_3 > V_1 > V_2$ (d) $V_1 > V_2 > V_3$

29. Two cells, each of e.m.f. E and internal resistance r are connected in parallel between the resistance R. The maximum energy given to the resistor will be, only when

(a) $R = r/2$ (b) $R = r$

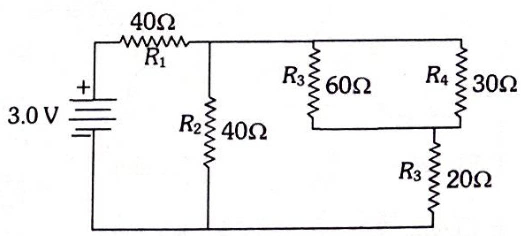
(c) $R = 2r$ (d) $R = 0$

30. The emf of a battery is 2 V and its internal resistance is 0.5 Ω. 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

31. In the circuit shown below the resistance are given in ohms and the battery is assumed ideal with *emf* equal to 3.0 volts. The resistor that dissipates the most power is



(a) R_1 (b) R_2

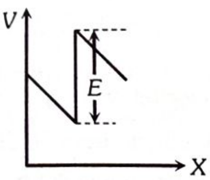
(c) R_3 (d) R_4

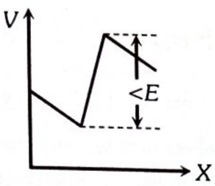
32. A steady current I flows through a wire of radius r, length L and resistivity ρ. The current produces heat in the wire. The rate of heat loss in a wire is proportional its surface area. The steady temperature of the wire is independent of

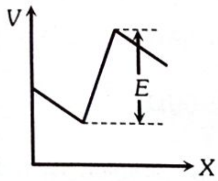
(a) L (b) r

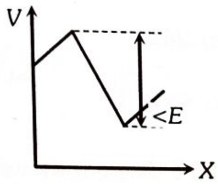
(c) I (d) ρ

33. 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 represents the resulting curve

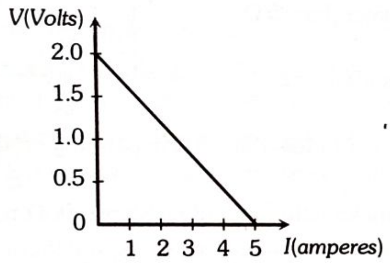
(a)


(b)


(c)


(d)


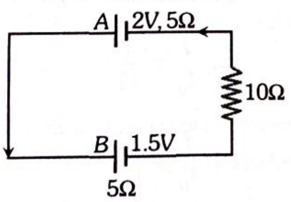
34. For a cell, the graph between the potential difference (V) across the terminals of the cell and the current (I) drawn from the cell is shown in the figure. The e.m.f. and the internal resistance of the cell are



(a) 2V, 0.5Ω (b) 2V, 0.4Ω

(c) > 2V, 0.5Ω (d) > 2V, 0.4Ω

35. Two cells A and B of e.m.f. 2V and 1.5V respectively, are connected as shown in figure through an external resistance 10Ω. The internal resistance of each cell is 5Ω. The potential difference E_A and E_B across the terminals of the cells A and B respectively are



(a) $E_A = 2.0V, E_B = 1.5V$

(b) $E_A = 2.12V, E_B = 1.375V$

(c) $E_A = 1.875V, E_B = 1.625V$

(d) $E_A = 1.875V, E_B = 1.375V$

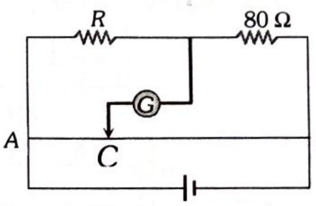
4. Different Measuring Instruments

1. 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*

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



(a) 2 Ω

(b) 8 Ω

(c) 20 Ω

(d) 40 Ω

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

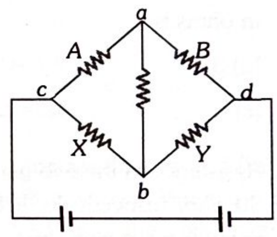
(a) Network is not balanced

(b) Network is still balanced

(c) Galvanometer shows zero deflection

(d) Galvanometer and the cell must be interchanged to balance

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



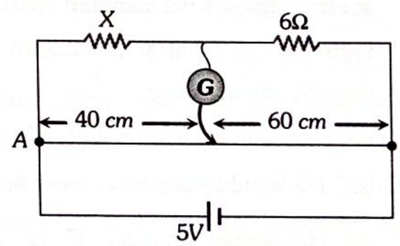
(a) From a to b

(b) From b to a

(c) From b to a through c

(d) From a to b through c

5. In the circuit shown, a *meter* bridge is in its balanced state. The *meter* bridge wire has a resistance 0.1 *ohm/cm*. The value of unknown resistance X and the current drawn from the battery of negligible resistance is



(a) 6 Ω, 5 *amp*

(b) 10 Ω, 0.1 *amp*

(c) 4 Ω, 1.0 *amp*

(d) 12 Ω, 0.5 *amp*

6. The resistance in left and right gap of a meter bridge are 20Ω and 30Ω respectively. When the resistance in the left gap is reduced to half its value, the balance point shifts by

(a) 15 *cm* to the right (b) 15 *cm* to the left

(c) 20 *cm* to the right (d) 20 *cm* to the left

7. In meter bridge or Wheatstone bridge for measurement of resistance, the known and the unknown resistances are interchanged. The error so removed is

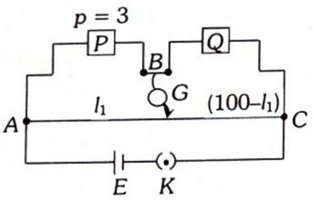
(a) End correction

(b) Index error

(c) Due to temperature effect

(d) Random error

8. In a metre bridge experiment, resistances are connected as shown in figure. The balancing length l_1 is 55 *cm*. Now an unknown resistance x is connected in series with P and the new balancing length is found to be 75 *cm*. The value of x is



(a) $\frac{54}{12}\Omega$ (b) $\frac{20}{11}\Omega$

(c) $\frac{48}{11}\Omega$ (d) $\frac{11}{48}\Omega$

(e) 5Ω

9. Two resistances are connected in two gaps of a metre bridge. The balance point is 20 *cm* from the zero end. A resistance of 15 *ohms* is connected in series with the smaller of the two. The null point shifts to 40 *cm*. The value of the smaller resistance in ohms is

(a) 3 (b) 6

(c) 9 (d) 12

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

(a) 33.3 *cm* (b) 66.67*cm*

(c) 25 *cm* (d) 50 *cm*

11. A resistance R is to be measured using a meter bridge, student chooses the standard resistance S to be 100Ω. He finds the null point at $l_1 = 2.9 cm$. He is told to attempt to improve the accuracy.

Which of the following is a useful way?

(a) He should measure l_1 more accurately

(b) He should changes S to 1000Ω and repeat the experiment

(c) He should changes S to 3Ω and repeat the experiment

(d) He should given up hope of a more accurate measurement with a meter bridge

12. An unknown resistance R_1 is connected in series with a resistance of $10\ \Omega$. This combinations is connected to one gap of a metre bridge while a resistance R_2 is connected in the other gap. The balance point is at 50 *cm*. Now, when the 10 Ω resistance is removed the balance point shifts to 40 *cm*. The value of R_1 is (in *ohm*)

(a) 60 (b) 40

(c) 20 (d) 10

13. 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

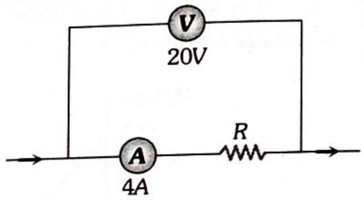
(d) High resistance in series

14. When a 12Ω resistor is connected with a moving coil galvanometer then its deflection reduces from 50 divisions to 10 divisions. The resistance of the galvanometer is

(a) 24Ω (b) 36Ω

(c) 48Ω (d) 60Ω

15. 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 than 5Ω

(c) Less than 5Ω

(d) Greater or less than 5Ω depending on the material of *R*

16. 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) 1.85 *A* (b) Greater than 1.85 *A*

(c) Less than 1.85 *A* (d) None of these

17. 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) $\frac{I}{I_0} = \frac{4}{11}$

18. 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) $R/5$ (b) $R/4$

(c) $R/3$ (d) $4R$

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

(a) Current (b) Voltage

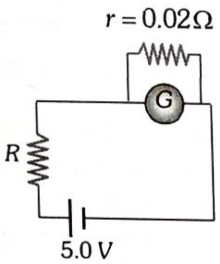
(c) Resistance (d) All of these

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

(a) 9 Ω (b) 90 Ω

(c) 1000 Ω (d) 10 Ω

21. In the circuit shown, the galvanometer G of resistance 60Ω is shunted by a resistance $r = 0.02\Omega$. The current through R is nearly 1 A. The value of resistance R is (in ohms) is nearly



(a) 1.00Ω (b) 5.00Ω

(c) 11.0Ω (d) 60.00Ω

22. A galvanometer, having a resistance of 50 Ω gives a full scale deflection for a current of 0.05 *A*. The length in *meter* of a resistance wire of area of cross-section 2.97×10^{-2} cm^2 that can be used to convert the galvanometer into an ammeter which can read a maximum of 5 *A* current is (Specific resistance of the wire = 5×10^{-7} Ω*m*)

(a) 9 (b) 6

(c) 3 (d) 1.5

23. 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* is connected across the terminals of the cell. The current flowing through this resistance will be

(a) 2.5 *A* (b) 2.0 *A*

(c) 5.0 *A* (d) 7.5 *A*

24. 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) 118 Ω (b) 120 Ω

(c) 124 Ω (d) 114 Ω

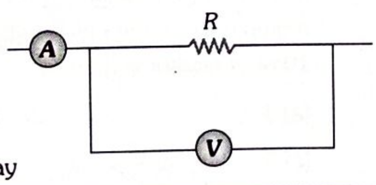
25. The ammeter *A* reads 2 *A* and the voltmeter *V* reads 20 *V*. The value of resistance *R* is (Assuming finite resistance's of ammeter and voltmeter)

(a) Exactly 10 *ohm*

(b) Less than 10 *ohm*

(c) More than 10 *ohm*

(d) We cannot definitely say



26. Voltmeters V_1 and V_2 are connected in series across a *D.C.* line. V_1 reads 80 *volt* and has a per *volt* resistance of 200 *ohm*. V_2 has a total resistance of 32 *kilo ohm*. The line voltage is

(a) 120 *volt* (b) 160 *volt*

(c) 220 *volt* (d) 240 *volt*

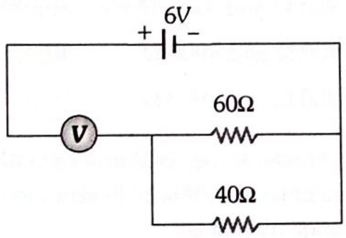
27. The measurement of voltmeter in the following circuit is

(a) 2.4 V

(b) 3.4 V

(c) 4.0 V

(d) 6.0 V



28. An ammeter and a voltmeter of resistance *R* are connected in series to an electric cell of negligible internal resistance. Their readings are *A* and *V* respectively. 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 and *V* will decrease

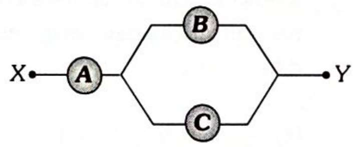
29. Three voltmeters *A*, *B* and *C* having resistances *R*, 1.5*R* and 3*R* respectively are used in a circuit as shown. When a P.D. is applied between *X* and *Y*, the reading of the voltmeters are V_1, V_2 and V_3 respectively. Then

(a) $V_1 = V_2 = V_3$

(b) $V_1 < V_2 = V_3$

(c) $V_1 > V_2 > V_3$

(d) $V_1 > V_2 = V_3$



30. A voltmeter of resistance 280Ω reads the voltage across the terminals of an old dry cell to be $1.40V$, while a potentiometer reads its voltage equal to $1.55V$. To draw maximum power from the battery, the load resistance must have the value

(a) 60Ω (b) 45Ω

(c) 35Ω (d) 30Ω

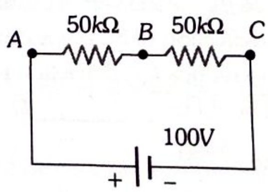
31. In the adjacent shown circuit, a voltmeter of internal resistance *R*, when connected across *B* and *C* reads $\frac{100}{3}V$. Neglecting the internal resistance of the battery, the value of *R* is

(a) 100 kΩ

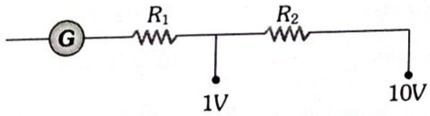
(b) 75 kΩ

(c) 50 kΩ

(d) 25 kΩ



32. The resistance of a galvanometer is 50 Ω and it shows full scale deflection for a current of $1mA$. To convert it into a voltmeter to measure $1V$ and as well as $10V$ (refer circuit diagram) the resistances R_1 and R_2 respectively are



(a) 950 Ω and 9150 Ω (b) 900 Ω and 9950 Ω

(c) 900 Ω and 9900 Ω (d) 950 Ω and 9000 Ω

(e) 950 Ω and 9950 Ω

33. A voltmeter has a resistance of G *ohm* and range V *volt*. The value of resistance used in series to convert it into a voltmeter of range nV volt is

(a) nG (b) $(n-1)G$

(c) $\frac{G}{n}$ (d) $\frac{G}{(n-1)}$

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

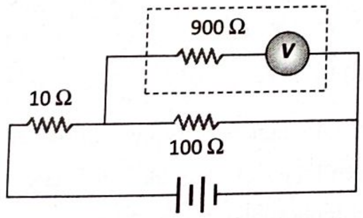
(a) Resistance nearly 6 $k\Omega$ in series

(b) $6k\Omega$ in parallel

(c) 500Ω in series

(d) It cannot be converted

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



(a) $\frac{10}{9}$

(b) 0.1

(c) 1.0

(d) 10.0

36. Two resistances of 400 Ω and 800 Ω are connected in series with 6 *volt* battery of negligible internal resistance. A voltmeter of resistance 10,000 Ω is used to measure the potential difference across 400 Ω. The error in the measurement of potential difference in *volt* approximately is

(a) 0.01 (b) 0.02

(c) 0.03 (d) 0.05

37. A galvanometer of resistance 50Ω is connected to a battery of $8V$ along with a resistance of 3950Ω in series. A full scale deflection of 30 div is obtained in the galvanometer. In order to reduce this deflection to 15 division, the resistance in series should be __________ Ω

(a) 7900 (b) 1950

(c) 2000 (d) 7950

38. In a potentiometer of one metre length, an unknown *e.m.f.* voltage source is balanced at 60 cm length of potentiometer wire, while a 3 volt battery is balanced at 45 cm length. Then the *e.m.f.* of the unknown voltage source is

(a) 3V (b) 2.25V

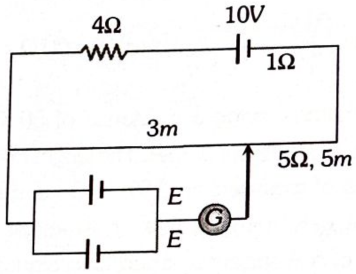
(c) 4V (d) 4.5V

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

(a) 0.5 *ohm* (b) 1.5 *ohm*

(c) 1.25 *ohm* (d) 4/5 *ohm*

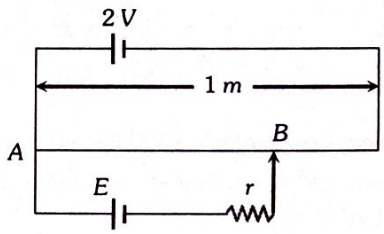
40. A resistance of 4Ω and a wire of length 5 *metres* and resistance 5Ω are joined in series and connected to a cell of e.m.f. 10 V and internal resistance 1Ω. A parallel combination of two identical cells is balanced across 300 *cm* of the wire. The e.m.f. E of each cell is



(a) 1.5 V (b) 3.0 V

(c) 0.67 V (d) 1.33 V

41. In the given figure, battery E is balanced on 55 *cm* length of potentiometer wire but when a resistance of 10 Ω 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) 1 Ω (b) 3 Ω

(c) 10 Ω (d) 5 Ω

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

(a) 1 (b) 2

(c) 5 (d) 10

43. Two resistances R_1 and another R_2 of the same material but twice the length and half the thickness are connected in series with a standard battery E of internal resistance r. The balancing point is

(a) $\frac{1}{8l}$ (b) $\frac{1}{4l}$

(c) $8l$ (d) $16l$

44. A cell in secondary circuit gives null deflection for $2.5m$ length of potentiometer having $10m$ length of wire. If the length of the potentiometer wire is increased by $1m$ without changing the cell in the primary, the position of the null point now is

(a) 3.5 *m* (b) 3 *m*

(c) 2.75 *m* (d) 2.0 *m*

45. A potentiometer wire of length L and resistance $10\,\Omega$ is connected in series with a battery of e.m.f. 2.5 *V* and a resistance in its primary circuit. The null point corresponding to a cell of e.m.f. 1 *V* is obtained at a distance $\frac{L}{2}$. If the resistance in the primary circuit is doubled then the position of new null point will be

(a) 0.4 *L* (b) 0.5 *L*

(c) 0.6 *L* (d) 0.8 *L*

46. A potentiometer wire of length $1m$ and resistance $10\,\Omega$ is connected in series with a cell of *emf* 2*V* with internal resistance $1\,\Omega$ 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) $20000\,\Omega$ (b) $19989\,\Omega$

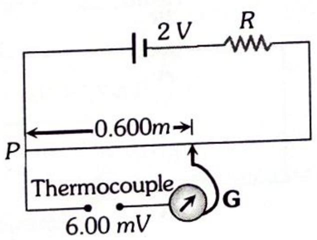
(c) $10000\,\Omega$ (d) $9989\,\Omega$

47. 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

48. Figure shows a simple potentiometer circuit for measuring a small e.m.f. produced by a thermocouple. The meter wire *PQ* has a resistance $5\,\Omega$ and the driver cell has an e.m.f. of 2 *V*. If a balance point is obtained 0.600 *m* along *PQ* when measuring an e.m.f. of 6.00 *mV*, what is the value of resistance *R*



(a) $995\,\Omega$ (b) $1995\,\Omega$

(c) $2995\,\Omega$ (d) None of these

5. Heating Effect of Current

1. Forty electric bulbs are connected in series across a 220 V supply. After one bulb is fused, the remaining 39 are connected again in series across the same supply. The illumination will be

(a) More with 40 bulbs than with 39

(b) More with 39 bulbs than with 40

(c) Equal in both the cases

(d) In the ratio of $49^2 : 39^2$

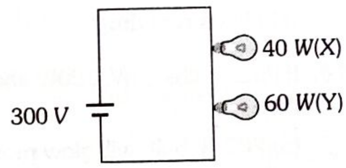
2. Two bulbs X and Y having same voltage rating and of power 40 watt and 60 watt respectively are connected in series across a potential difference of 300 volt, then

(a) X will glow brighter

(b) Resistance of Y is greater than X

(c) Heat produced in Y will be greater than X

(d) Voltage drop in X will be greater than Y



3. If current in an electric bulb changes by 1%, then the power will change by

(a) 1% (b) 2%

(c) 4% (d) $\frac{1}{2}$%

4. Three bulbs of 40 *W*, 60 *W*, 100 *W* are arranged in series with 220 *volt* supply. Which bulb has minimum resistance

(a) 100 *W* (b) 40 *W*

(c) 60 *W* (d) Equal in all bulbs

5. Two resistors having equal resistances are joined in series and a current is passed through the combination. Neglect any variation in resistance as the temperature changes. In a given time interval

(a) Equal amounts of thermal energy must be produced in the resistors

(b) Unequal amounts of thermal energy may be produced

(c) The temperature must rise equally in the resistors

(d) The temperature must rise unequally in the resistors

6. Pick out the wrong statement

(a) In a simple battery circuit, the point of lowest potential is the negative terminal of the battery

(b) The resistance of an incandescent lamp is greater when the lamp is switched off

(c) An ordinary 100 *W* lamp has less resistance than a 60 *W* lamp

(d) At constant voltage, the heat developed in a uniform wire varies inversely as the length of the wire used

7. A piece of fuse wire melts when a current of 15 *ampere* flows through it. With this current, if it dissipates 22.5 *W*, the resistance of fuse wire will be

(a) Zero (b) $10\,\Omega$

(c) 1Ω (d) $0.10\,\Omega$

8. Two wires 'A' and 'B' of the same material have their lengths in the ratio 1 : 2 and radii in the ratio 2 : 1. The two wires are connected in parallel across a battery. The ratio of the heat produced in 'A' to the heat produced in 'B' for the same time is

(a) 1 : 2 (b) 2 : 1

(c) 1 : 8 (d) 8 : 1

9. If a high power heater is connected to electric mains, then the bulbs in the house become dim, because there is a

(a) Current drop (b) Potential drop

(c) No current drop (d) No potential drop

10. If three bulbs 60*W*, 100*W* and 200*W* are connected in parallel, then

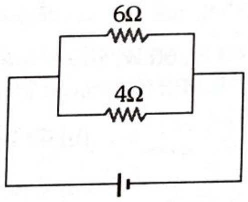
(a) 200 *W* bulb will glow more

(b) 60 *W* bulb will glow more

(c) 100 *W* bulb will glow more

(d) All the bulbs will glow equally

11. In the circuit shown below, the power developed in the 6Ω resistor is 6 watt. The power in watts developed in the 4Ω resistor is



(a) 16 (b) 9

(c) 6 (d) 4

12. If two electric bulbs have 40 *W* and 60 *W* rating at 220 *V*, then the ratio of their resistances will be

(a) 9 : 4 (b) 4 : 3

(c) 3 : 8 (d) 3 : 2

13. An electric bulb rated 220 V, 100 W is connected in series with another bulb rated 220 V, 60 W. If the voltage across the combination is 220 V, the power consumed by the 100 W bulb will be about

(a) 25 W (b) 14 W

(c) 60 W (d) 100 W

(e) 80 W

14. Ten identical cells connected in series are needed to heat a wire of length one meter and radius '*r*' by 10° *C* in time '*t*'. How many cells will be required to heat the wire of length two meter of the same radius by the same temperature in time '*t*'

(a) 20 (b) 30

(c) 40 (d) 10

15. Two wires *A* and *B* of same material and mass have their lengths in the ratio 1 : 2. On connecting them to the same source, the rate of heat dissipation in *B* is found to be 5*W*. The rate of heat dissipation in *A* is

(a) 10*W* (b) 5*W*

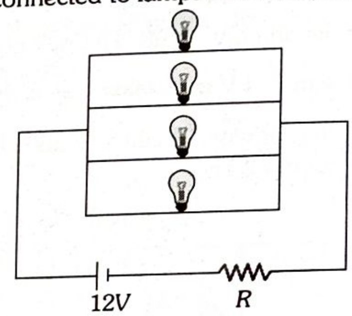
(c) 20*W* (d) None of these

16. Electric bulb 50 *W*-100 *V* glowing at full power are to be used in parallel with battery 120 *V*, 10 Ω. Maximum number of bulbs that can be connected so that they glow in full power is

(a) 2 (b) 8

(c) 4 (d) 6

17. Four identical electrical lamps are labelled 1.5*V*, 0.5*A* which describes the condition necessary for them to operate at normal brightness. A 12*V* battery of negligible internal resistance is connected to lamps as shown, then



(a) The value of *R* for normal brightness of each lamp is (3/4) Ω

(b) The value of *R* for normal brightness of each lamp is (21/4) Ω

(c) Total power dissipated in circuit when all lamps are normally bright is 24*W*

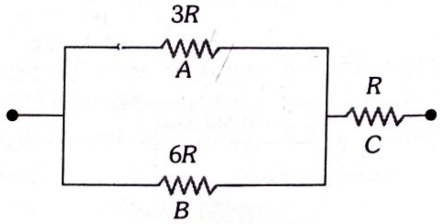
(d) Power dissipated in *R* is 21*W* when all lamps are normally bright

18. The wiring of a house has resistance $6\,\Omega$. A 100 *W* bulb is glowing. If a geyser of 1000 *W* is switched on, the change in potential drop across the bulb is nearly when 220 *V* is the supplied voltage

(a) Nil (b) 23 *V*

(c) 32 *V* (d) 12 *V*

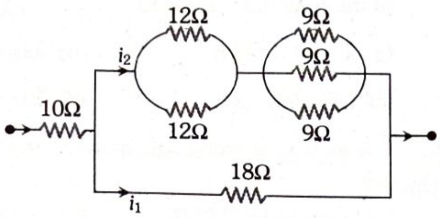
19. Three resistances *A*, *B* and *C* have values 3*R*, 6*R* and *R* respectively. When some potential difference is applied across the network, the thermal powers dissipated by *A*, *B* and *C* are in the ratio



(a) 2 : 3 : 4 (b) 2 : 4 : 3

(c) 4 : 2 : 3 (d) 3 : 2 : 4

20. In the following circuit, 18Ω resistor develops $2\ J/sec$ due to current flowing through it. The power developed across 10Ω resistance is



(a) 125 W

(b) 10 W

(c) $\frac{4}{5} W$

(d) 25 W

21. If resistance of the filament increases with temperature, what will be power dissipated in a 220 V- 100 W lamp when connected to 110 V power supply

(a) 25 W (b) < 25 W

(c) > 25 W (d) None of these

22. A 100 W bulb produces an electric field of 2.9 V/m at a point 3 m away. If the bulb is replaced by 400 W bulb without disturbing other conditions, then the electric field produced at the same point is

(a) 2.9 V/m (b) 3.5 V/m

(c) 5 V/m (d) 5.8 V/m

(e) 1.45 V/m

23. An electrical cable having a resistance of $0.2\ \Omega$ delivers 10 kW at 200 V DC to a factory. What is the efficiency of transmission

(a) 65% (b) 75%

(c) 85% (d) 95%

24. How much energy in kilowatt hour is consumed in operating ten 50 watt bulbs for 10 hours per day in a month (30 days).

(a) 1500 (b) 5,000

(c) 15 (d) 150

25. (1) The product of a volt and a coulomb is a joule.

(2) The product of a volt and an ampere is a joule/second.

(3) The product of volt and watt is horse power.

(4) Watt-hour can be measured in terms of electron volt.

State if

(a) All four are correct

(b) (1), (2) and (4) are correct

(c) (1) and (3) are correct

(d) (3) and (4) are correct

26. A 5.0 amp current is setup in an external circuit by a 6.0 $volt$ storage battery for 6.0 minutes. The chemical energy of the battery is reduced by

(a) $1.08 \times 10^4\ J$ (b) $1.08 \times 10^{-4}\ volt$

(c) $1.8 \times 10^4\ J$ (d) $1.8 \times 10^4\ volt$

27. The electric current passing through a metallic wire produces heat because of

(a) Collisions of conduction electrons with each other

(b) Collisions of the atoms of the metal with each other

(c) The energy released in the ionization of the atoms of the metal

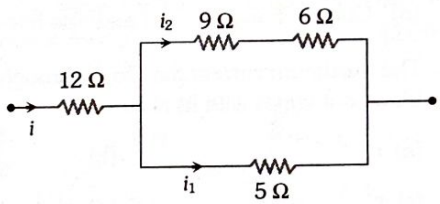
(d) Collisions of the conduction electrons with the atoms of the metallic wires

28. If a 2 kW boiler is used everyday for 1 hour, then electrical energy consumed by boiler in thirty days is

(a) 15 unit (b) 60 unit

(c) 120 unit (d) 240 unit

29. In the following circuit, 5 Ω resistor develops 45 J/s due to current flowing through it. The power developed per second across 12 Ω resistor is



(a) 16 W

(b) 192 W

(c) 36 W

(d) 64 W

30. A heater of 220 V heats a volume of water in 5 minute time. A heater of 110 V heats the same volume of water in

(a) 5 minutes (b) 8 minutes

(c) 10 minutes (d) 20 minutes

31. Three electric bulbs with same voltage ratings of 110 volts but wattage ratings of 40, 60 and 100 watts respectively are connected in series across a 220 volt supply line. If their brightness are B_1, B_2, B_3 respectively, then

(a) $B_1 > B_2 > B_3$

(b) $B_1 > B_2 < B_3$

(c) $B_1 = B_2 = B_3$

(d) Bulbs will burn out due to the high voltage supply

32. Two bulbs of 100 W and 200 W working at 220 $volt$ are joined in series with 220 $volt$ supply. Total power consumed will be approximately

(a) 65 $watt$ (b) 33 $watt$

(c) 300 $watt$ (d) 100 $watt$

33. 3 identical bulbs are connected in series and these together dissipate a power P. If now the bulbs are connected in parallel, then the power dissipated will be

(a) $\frac{P}{3}$ (b) $3P$

(c) $9P$ (d) $\frac{P}{9}$

34. A coil takes 15 *min* to boil a certain amount of water, another coil takes 20 *min* for the same process. Time taken to boil the same amount of water when both coils are connected in series

(a) 5 *min* (b) 8.6 *min*

(c) 35 *min* (d) 30 *min*

35. A coil of wire of resistance 50Ω is embedded in a block of ice. If a potential difference of 210 *V* is applied across the coil, the amount of ice melted per second will be

(a) 4.12 *g* (b) 4.12 *kg*

(c) 3.68 *kg* (d) 2.625 *g*

36. Flash light equipped with a new set of batteries, produces bright white light. As the batteries wear out

(a) The light intensity gets reduced with no change in its colour

(b) Light colour changes first to yellow and then red with no change in intensity

(c) It stops working suddenly while giving white light

(d) Colour changes to red and also intensity gets reduced

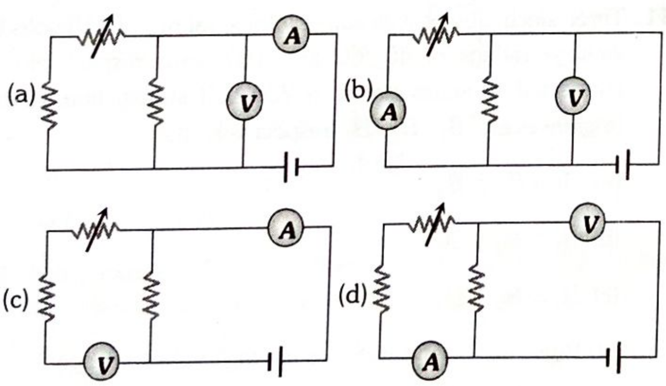
37. The maximum current that flows through a fuse wire before it blows out varies with its radius as

(a) $r^{3/2}$ (b) r

(c) $r^{2/3}$ (d) $r^{1/2}$

6. IIT-JEE/AIEEE

1. Express which of the following setups can be used to verify Ohm's law **[2003]**



2. If the ratio of the concentration of electron to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of current is $\frac{7}{4}$, then what is the ratio of their drift velocities **[2006]**

(a) $4/5$ (b) $5/4$

(c) $4/7$ (d) $5/8$

3. A steady current flows in a metallic conductor of non-uniform cross-section. The quantity/ quantities constant along the length of the conductor is/are **[1997]**

(a) Current, electric field and drift speed

(b) Drift speed only

(c) Current and drift speed

(d) Current only

4. When $5V$ potential difference is applied across a wire of length $0.1m$, the drift speed of electrons is $2.5\times10^{-4}ms^{-1}$. If the electron density in the wire is $8\times10^{28}m^{-3}$, the resistivity of the material is close to **[2015]**

(a) $1.6\times10^{-8}\Omega m$ (b) $1.6\times10^{-7}\Omega m$

(c) $1.6\times10^{-6}\Omega m$ (d) $1.6\times10^{-5}\Omega m$

5. If a wire is stretched to make it 0.1% longer, its resistance will **[2011]**

(a) Increase by 0.05% (b) Increase by 0.2%

(c) Decrease by 0.2% (d) Decrease by 0.05%

6. A material 'B' has twice the specific resistance of 'A'. A circular wire made of 'B' has twice the diameter of a wire made of 'A'. Then for the two wires to have the same resistance, the ratio $\frac{l_B}{l_A}$ of their respective lengths must be **[2006]**

(a) $1/2$ (b) $1/4$

(c) 2 (d) 1

7. 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 %

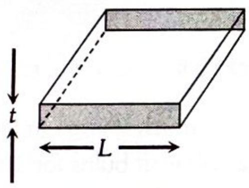
8. Consider a thin square sheet of side *L* and thickness *t*, made of a material of resistivity ρ. The resistance between two opposite faces, shown by the shaded areas in the figure is **[2010]**

(a) Directly proportional to *L*

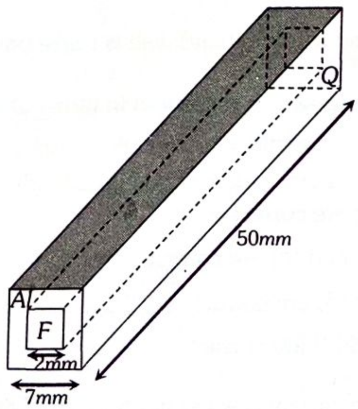
(b) Directly proportional to *t*

(c) Independent of *L*

(d) Independent of *t*



9. In an aluminium (Al) bar of square cross section, a square hole is drilled and is filled with iron (Fe) as shown in the figure. The electrical resistivities of *Al* and *Fe* are $2.7\times10^{-8}\Omega$ and $1.0\times10^{-7}\Omega m$, respectively. The electrical resistance between the two faces *P* and *Q* of the composite bar is **[2015]**



(a) $\frac{2475}{64}\mu\Omega$ (b) $\frac{1875}{64}\mu\Omega$

(c) $\frac{1875}{49}\mu\Omega$ (d) $\frac{2475}{132}\mu\Omega$

10. By increasing the temperature, the specific resistance of a conductor and a semiconductor **[2002]**

(a) Increases for both

(b) Decreases for both

(c) Increases, decreases

(d) Decreases, increases

11. A strip of copper and another of germanium are cooled from room temperature to 80 K. The resistance of **[2003]**

(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

12. The temperature coefficient of resistance for a wire is $0.00125/°C$. At $300K$ its resistance is 1 *ohm*. The temperature at which the resistance becomes 2 *ohm* is **[1980]**

(a) 1154 K (b) 1100 K

(c) 1400 K (d) 1127 K

13. The resistance of a conductor is 5 *ohm* at 50°C and 6 *ohm* at 100°C. Its resistance at 0°C is **[2002]**

(a) 1 *ohm* (b) 2 *ohm*

(c) 3 *ohm* (d) 4 *ohm*

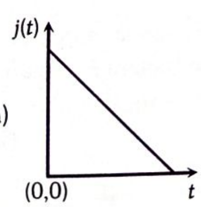
14. Two conductors have the same resistance at $0°C$ but their temperature coefficients of resistance are α_1 and α_2. The respective temperature coefficients of their series and parallel combinations are nearly **[2010]**

(a) $\frac{\alpha_1+\alpha_2}{2}, \frac{\alpha_1+\alpha_2}{2}$ (b) $\frac{\alpha_1+\alpha_2}{2}, \alpha_1+\alpha_2$

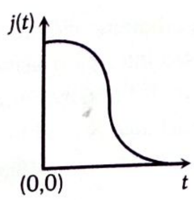
(c) $\alpha_1+\alpha_2, \frac{\alpha_1+\alpha_2}{2}$ (d) $\alpha_1+\alpha_2, \frac{\alpha_1\alpha_2}{\alpha_1+\alpha_2}$

15. An infinite line charge of uniform electric charge density λ lies along the axis of an electrically conducting infinite cylindrical shell of radius R. At time $t=0$, the space inside the cylinder is filled with a material of permittivity ε and electrical conductivity σ. The electrical conduction in the material follows Ohm's law. Which one of the following graphs best describes the subsequency variation of the magnitude of current density $f(t)$ at any point in the material **[2016]**

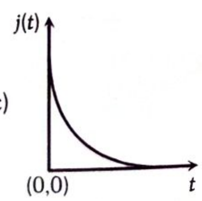
(a)



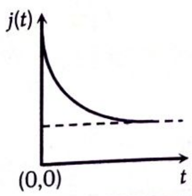
(b)



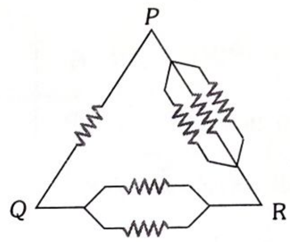
(c)



(d)



16. Six equal resistances are connected between points P, Q and R as shown in the figure. Then the net resistance will be maximum between **[2004]**



(a) P and Q

(b) Q and R

(c) P and R

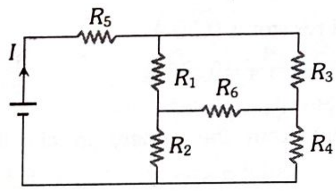
(d) Any two points

17. 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 **[2004]**

(a) 4 (b) 3

(c) 2 (d) 1

18. 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 **[2001]**



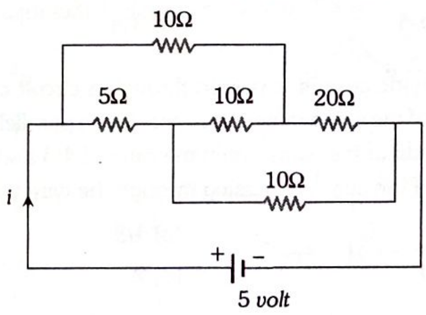
(a) $R_1R_2R_5 = R_3R_4R_6$

(b) $\frac{1}{R_5}+\frac{1}{R_6} = \frac{1}{R_1+R_2}+\frac{1}{R_3+R_4}$

(c) $R_1R_4 = R_2R_3$

(d) $R_1R_3 = R_2R_4 = R_5R_6$

19. The current I drawn from the 5 volt source will be



(a) 0.5 A (b) 0.67 A

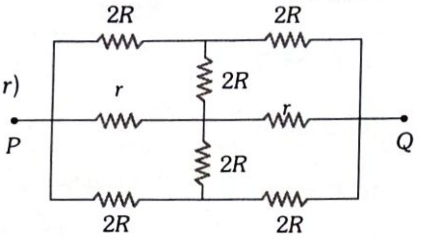
(c) 0.17 A (d) 0.33 A

20. In a Wheatstone's bridge, three resistance P, Q and R are connected in the three arms and the fourth arm is formed by two resistances S_1 and S_2 connected in parallel. The condition for the bridge to be balanced will be **[2006]**

(a) $\frac{P}{Q}=\frac{R(S_1+S_2)}{S_1S_2}$ (b) $\frac{P}{Q}=\frac{R(S_1+S_2)}{2S_1S_2}$

(c) $\frac{P}{Q}=\frac{R}{S_1+S_2}$ (d) $\frac{P}{Q}=\frac{2R}{S_1+S_2}$

21. The effective resistance between points P and Q of the electrical circuit shown in the figure is **[2002]**



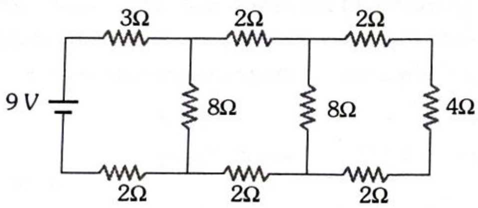
(a) $2Rr/(R+r)$

(b) $8R(R+r)/(3R+r)$

(c) $2r+4R$

(d) $5R/2+2r$

22. In the circuit shown in the figure, the current through **[1998]**



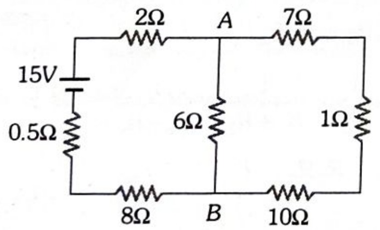
(a) The 3Ω resistor is $0.50\,A$

(b) The 3Ω resistor is $0.25\,A$

(c) The 4Ω resistor is $0.50\,A$

(d) The 4Ω resistor is $0.25\,A$

23. The current from the battery in circuit diagram shown is **[1989]**



(a) $1\,A$ (b) $2\,A$

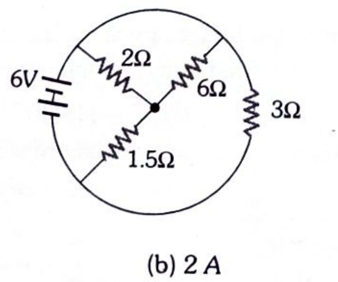
(c) $1.5\,A$ (d) $3\,A$

24. 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 wires are in the ratio of 4/3 and 2/3, then the ratio of the currents passing through the wire will be **[2004]**

(a) 3 (b) 1/3

(c) 8/9 (d) 2

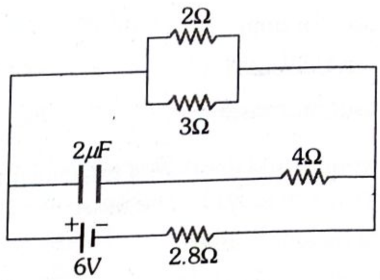
25. The total current supplied to the circuit by the battery is **[2004]**



(a) $1\,A$ (b) $2\,A$

(c) $4\,A$ (d) $6\,A$

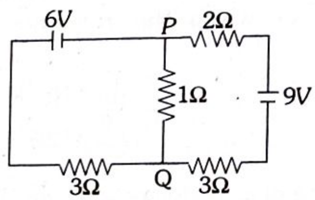
26. In the figure shown, the capacity of the condenser C is $2\mu F$. The current in 2Ω resistor is **[1982]**



(a) $9\,A$ (b) $0.9\,A$

(c) $\frac{1}{9}A$ (d) $\frac{1}{0.9}A$

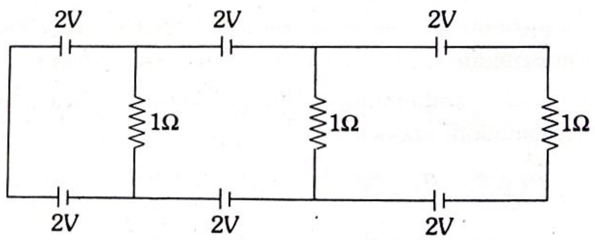
27. In the circuit shown, the current in the 1Ω resistor is **[2015]**



(a) $1.3\,A$, from P to Q (b) $0\,A$

(c) $0.13\,A$, from Q to P (d) $0.13\,A$, from P to Q

28.



In the above circuit the current in each resistance is **[2017]**

(a) $0\,A$ (b) $1\,A$

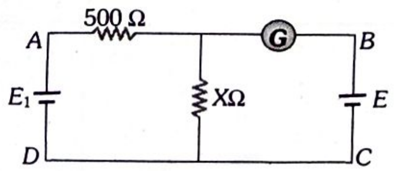
(c) $0.25\,A$ (d) $0.5\,A$

29. Two batteries with $e.m.f.$ of $12V$ and $13V$ are connected in parallel across a load resistor of 10Ω. The internal resistance of the two batteries are 1Ω and 2Ω respectively. The voltage across the load lies between **[2018]**

(a) $11.4V$ and $11.5V$ (b) $11.7V$ and $11.8V$

(c) $11.6V$ and $11.7V$ (d) $11.5V$ and $11.6V$

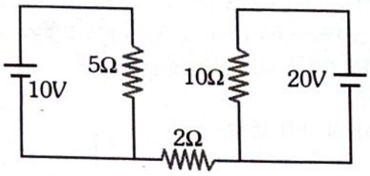
30. In the adjoining circuit, the battery E_1 has an $e.m.f.$ of 12*volt* and zero internal resistance while the battery E has an $e.m.f.$ of 2*volt*. If the galvanometer G reads zero, then the value of the resistance X in *ohm* is **[2005]**



(a) 10 (b) 100

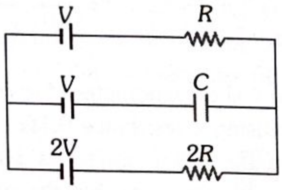
(c) 500 (d) 200

31. Find out the value of current through 2Ω resistance for the given circuit **[2005]**



(a) 5 A
(b) 2 A
(c) Zero
(d) 4 A

32. In the given circuit, with steady current, the potential drop across the capacitor must be **[2001]**

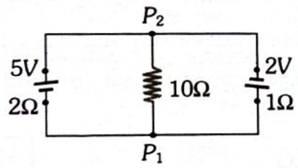


(a) V
(b) $V/2$
(c) $V/3$
(d) $2V/3$

33. A wire of length L and 3 identical cells of negligible internal resistances are connected in series. Due to current, the temperature of the wire is raised by ΔT in 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 **[2001]**

(a) 4 (b) 6
(c) 8 (d) 9

34. A 5 V battery with internal resistance 2 Ω and a 2 V battery with internal resistance 1Ω are connected to a 10Ω resistor as shown in the figure



The current in the 10Ω resistor is **[2008]**

(a) 0.03 A P_1 to P_2 (b) 0.03 A P_2 to P_1
(c) 0.27 A P_1 to P_2 (d) 0.27 A P_2 to P_1

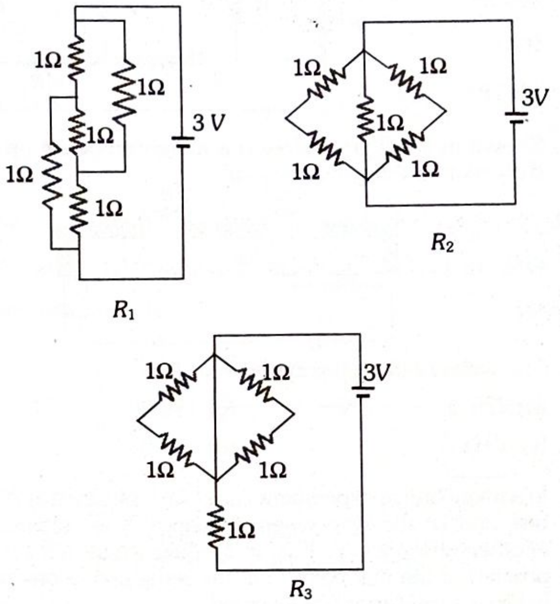
35. Two sources of equal emf are connected to an external resistance R. The internal resistances of the two sources are R_1 and $R_2 (R_2 > R_1)$. If the potential difference across the source having internal resistance R_2 is zero, then **[2005]**

(a) $R = R_1R_2/(R_1 + R_2)$
(b) $R = R_1R_2/(R_2 - R_1)$
(c) $R = R_2 \times (R_1 + R_2)/(R_2 - R_1)$
(d) $R = R_2 - R_1$

36. An energy source will supply a constant current into the load if its internal resistance is **[2005]**

(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

37. Figure shows three resistor configurations R_1, R_2 and R_3 connected to 3V battery. If the power dissipated by the configuration R_1, R_2 and R_3 is P_1, P_2 and P_3, respectively, then **[2008]**

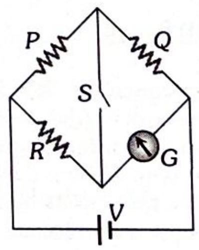


(a) $P_1 > P_2 > P_3$ (b) $P_1 > P_3 > P_2$
(c) $P_2 > P_1 > P_3$ (d) $P_3 > P_2 > P_1$

38. Which of the following statements is false **[2017]**

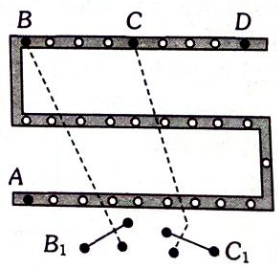
(a) Kirchhoff's second law represents energy conservation
(b) Wheatstone bridge is the most sensitive when all the four resistance are of the same order of magnitude
(c) In a balanced Wheatstone bridge if the cell and the galvanometer are exchanged, the null point is disturbed
(d) A rheostat can be used as a potential divider

39. In the circuit shown $P \neq R$, the reading of the galvanometer is same with switch S open or closed. Then **[1999]**



(a) $I_R = I_G$
(b) $I_P = I_G$
(c) $I_Q = I_G$
(d) $I_Q = I_R$

40. For the post office box arrangement to determine the value of unknown resistance the unknown resistance should be connected between **[2004]**



(a) B and C
(b) C and D
(c) A and D
(d) B_1 and C_1

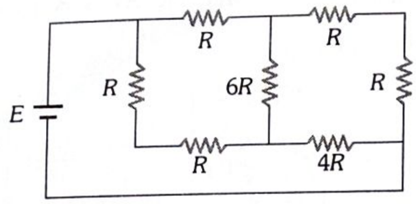
41. A battery of internal resistance 4Ω is connected to the network of resistances as shown. In order to give the maximum power to the network, the value of R (in Ω) should be **[1995]**

(a) 4/9

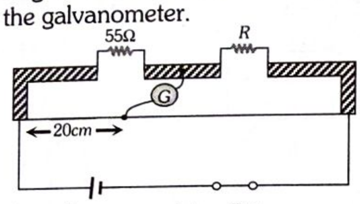
(b) 8/9

(c) 2

(d) 18



42. Shown in the figure below is a meter-bridge set up with null deflection in the galvanometer.



The value of the unknown resistor R is **[2008]**

(a) 220 Ω (b) 110 Ω

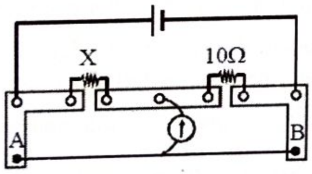
(c) 55 Ω (d) 13.75 Ω

43. In a metre bridge experiment null point is obtained at 20 *cm* from one end of the wire when resistance X is balanced against another resistance Y. If $X < Y$, then where will be the new position of the null point from the same end, if one decides to balance a resistance of $4X$ against Y **[2004]**

(a) 50 *cm* (b) 80 *cm*

(c) 40 *cm* (d) 70 *cm*

44. A meter bridge is set-up as shown, to determine an unknown resistance 'X' using a standard 10 *ohm* resistor. The galvanometer shows null point when tapping-key is at 52*cm* mark. The end-corrections are 1*cm* and 2*cm* respectively for the ends A and B. The determined value of 'X' is **[2011]**



(a) 10.2 *ohm* (b) 10.6 *ohm*

(c) 10.8 *ohm* (d) 11.1 *ohm*

45. A resistance of 2Ω is connected across one gap of a meter–bridge (the length of the wire is 100*cm*) and an unknown resistance, greater than 2Ω, is connected across the other gap. When these resistances are interchanged, the balance point shifts by 20*cm*. Neglecting any corrections, the unknown resistance is **[2007]**

(a) 3 Ω (b) 4 Ω

(c) 5 Ω (d) 6 Ω

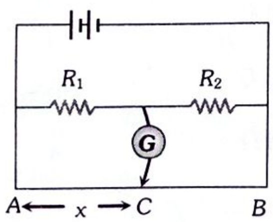
46. In the shown arrangement of the experiment of the meter bridge if AC corresponding to null deflection of galvanometer is x, what would be its value if the radius of the wire AB is doubled **[2003]**

(a) x

(b) $x/4$

(c) $4x$

(d) $2x$



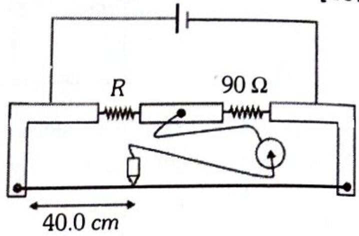
47. During experiment with a metre bridge, the galvanometer shows a null point when the jockey is pressed at 40.0 *cm* using a standard resistance of 90 Ω, as shown in the figure. The least count of the scale used in the meter bridge is 1*mm*. The unknown resistance is **[2014]**

(a) 60 ± 0.15Ω

(b) 135 ± 0.56Ω

(c) 60 ± 0.25Ω

(d) 135 ± 0.23Ω



48. A moving coil galvanometer of resistance 100Ω is used as an ammeter using a resistance 0.1Ω. The maximum deflection current in the galvanometer is 100μA. Find the minimum current in the circuit so that the ammeter shows maximum deflection **[2005]**

(a) 100.1 *mA* (b) 1000.1 *mA*

(c) 10.01 *mA* (d) 1.01 *mA*

49. If an ammeter is to be used in place of a voltmeter then we must connect with the ammeter a **[2002]**

(a) Low resistance in parallel

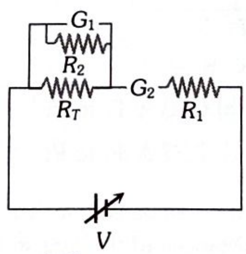
(b) High resistance in parallel

(c) High resistance in series

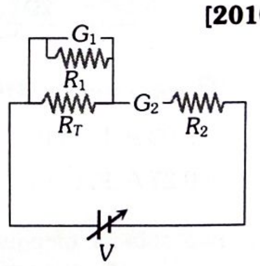
(d) Low resistance in series

50. To verify ohm's law, a student is provided with a test resistor R_T, a high resistance R_1, a small resistance R_2, two identical galvanometers G_1 and G_2, and a variable voltage source V. The correct circuit to carry out the experiment is **[2010]**

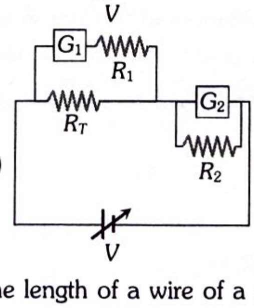
(a)



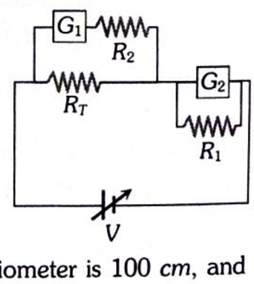
(b)



(c)



(d)



51. The length of a wire of a potentiometer is 100 *cm*, and the *emf* of its standard cell is *E volt*. It is employed to measure the *e.m.f.* of a battery whose internal resistance is 0.5 Ω. If the balance point is obtained at $l = 30$ *cm* from the positive end, the e.m.f. of the battery is **[2003]**

(a) $\frac{30E}{100}$ (b) $\frac{30E}{100.5}$

(c) $\frac{30E}{(100-0.5)}$ (d) $\frac{30(E-0.5i)}{100}$

52. 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 **[2016]**

(a) $2\ \Omega$ (b) $0.1\ \Omega$

(c) $3\ \Omega$ (d) $0.01\ \Omega$

53. When a current of $5mA$ is passed through a galvanometer having a coil of resistance 15Ω, it shows full scale defection. The value of the resistance to be put in series with the galvanometer to convert it into a voltmeter of range $0.10\ V$ is **[2017]**

(a) $4.005\times10^3\Omega$ (b) $1.985\times10^3\Omega$

(c) $2.045\times10^3\Omega$ (d) $2.535\times10^3\Omega$

54. In a potentiometer experiment, it is found that no current passes through the galvanometer when the terminals of the cell are connected across $52\,cm$ of the potentiometer wire. If the cell is shunted by resistance of 5Ω, a balance is found when the cell is connected across $40\,cm$ of the wire. Find the internal resistance of the cell **[2018]**

(a) 2Ω (b) 2.5Ω

(c) 1Ω (d) 1.5Ω

55. On interchanging the resistances, the balance point of a meter bridge shifts to the left by $10\,cm$. The resistance of their series combination is $1K\Omega$. How much was the resistance on the left slot before interchanging the resistances **[2018]**

(a) 550Ω (b) 910Ω

(c) 990Ω (d) 505Ω

56. An electric bulb is rated 220 *volt* and 100 *watt*. Power consumed by it when operated on 110 *volt* is **[2006]**

(a 50 watt (b) 75 watt

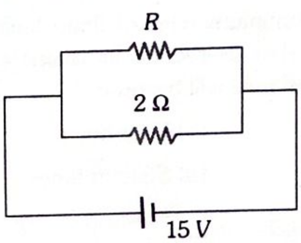
(c) 90 watt (d) 25 watt

57. The resistance of hot tungsten filament is about 10 times the cold resistance. What will be the resistance of 100 *W* and 200 *V* lamp when not in use **[2005]**

(a) 400Ω (b) 200Ω

(c) $40\ \Omega$ (d) 20Ω

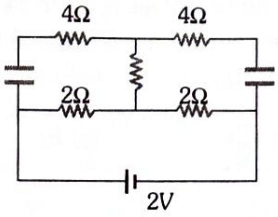
58. If in the circuit, power dissipation is 150 *W*, then *R* is **[2002]**



(a) $2\ \Omega$ (b) $6\ \Omega$

(c) $5\ \Omega$ (d) $4\ \Omega$

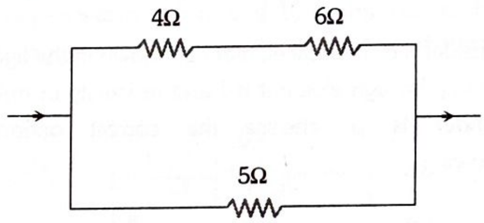
59. Find the power of the circuit **[2002]**



(a) 1.5 W (b) 2 W

(c) 1 W (d) None of these

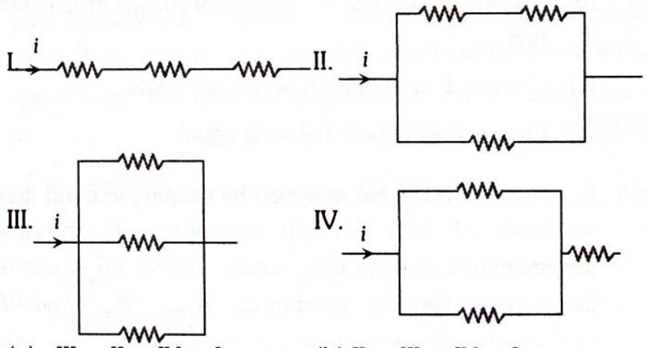
60. In the circuit shown in figure, the heat produced in 5 *ohm* resistance is 10 *calories* per *second*. The heat produced in 4 *ohm* resistance is **[1981]**



(a) $1\ cal/sec$ (b) $2\ cal/sec$

(c) $3\ cal/sec$ (d) $4\ cal/sec$

61. The three resistances of equal values are arranged in different combinations shown below. Arrange them in increasing order of power dissipation **[2003]**



(a) III < II < IV < I (b) II < III < IV < I

(c) I < IV < III < II (d) I < III < II < IV

62. A wire when connected to $220V$ mains supply has power dissipation P_1. Now the wire is cut into two equal pieces which are connected in parallel to the same supply. Power dissipation in this case is P_2. Then $P_2 : P_1$ is **[2002]**

(a) 1 (b) 4

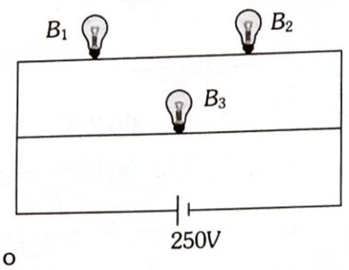
(c) 2 (d) 3

63. In a large building, there are 15 bulbs of $40W$, 5 bulbs of $100W$, 5 fans of $80W$ and 1 heater of $1kW$. The voltage of the electric mains is 220 *V*. The minimum capacity of the main fuse of the building will be **[2014]**

(a) 8 *A* (b) 10 *A*

(c) 12 *A* (d) 14 *A*

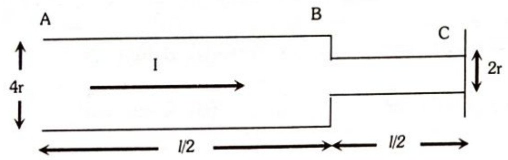
64. A 100 W bulb B_1, and two 60-W bulbs B_2 and B_3, are connected to a 250 V source, as shown in the figure. Now W_1, W_2 and W_3 are the output powers of the bulbs B_1, B_2 and B_3, respectively. Then **[2002]**



(a) $W_1 > W_2 = W_3$ (b) $W_1 > W_2 > W_3$

(c) $W_1 < W_2 = W_3$ (d) $W_1 < W_2 < W_3$

65. Consider a cylindrical element as shown in the figure. Current flowing through element is I and resistivity of material of the cylinder is ρ. choose the correct option out the following **[2006]**



(a) Power loss in second half is four times the power loss in first half

(b) Voltage drop in first half is twice of voltage drop in second half

(c) Current density in both halves are equal

(d) Electric field in both halves is equal

66. Incandescent bulbs are designed by keeping in mind that the resistance of their filament increases with increase in temperature. If at room temperature, 100 W, 60 W and 40 W bulbs have filament resistances R_{100}, R_{60} and R_{40}, respectively, the relation between these resistances is **[2010]**

(a) $\frac{1}{R_{100}} = \frac{1}{R_{40}} + \frac{1}{R_{60}}$ (b) $R_{100} = R_{40} + R_{60}$

(c) $R_{100} > R_{60} > R_{40}$ (d) $\frac{1}{R_{100}} > \frac{1}{R_{60}} > \frac{1}{R_{40}}$

67. A heater coil is cut into two parts of equal length and one of them is used in the heater. The ratio of the heat produced by this half coil to that by the original coil is **[2005]**

(a) 2 : 1 (b) 1 : 2

(c) 1 : 4 (d) 4 : 1

68. An immersion heater is rated 836 *watt*. It should heat 1 *litre* of water from 10°C to 40°C in about **[2004]**

(a) 200 *sec* (b) 150 *sec*

(c) 836 *sec* (d) 418 *sec*

69. Water of volume 2 *litre* in a container is heated with a coil of 1 *kW* at 27 °C. The lid of the container is open and energy dissipates at rate of 160 *J/s*. In how much time temperature will rise from 27°C to 77°C [Given specific heat of water is 4.2 *kJ/kg*] **[2005]**

(a) 8 *min* 20 *s* (b) 6 *min* 2 *s*

(c) 7 *min* (d) 14 *min*

70. A wire of length L and 3 identical cells of negligible internal resistances 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 **[2001]**

(a) 4 (b) 6

(c) 8 (d) 9

7. NEET/AIPMT

1. 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^3. The electrons are moving at 0.4 *m/s*. The current density from anode to cathode is 4 $\mu A/m^2$. The velocity of positive ions moving towards cathode is **[1992]**

(a) 0.4 *m/s* (b) 16 *m/s*

(c) Zero (d) 0.1 *m/s*

2. 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 **[2013]**

(a) 6.67 *ohm* (b) 60.0 *ohm*

(c) 120 *ohm* (d) 180.0 *ohm*

3. A wire of a certain material is stretched slowly by ten percent. Its new resistance and specific resistance become respectively **[2008]**

(a) Both remain the same (b) 1.1 times, 1.1 times

(c) 1.2 times, 1.1 times (d) 1.21 times, same

4. A wire of resistance R is elongated n – fold to make a new uniform wire. The resistance of new wire **[2017]**

(a) nR (b) n^2R

(c) $2nR$ (d) $2n^2R$

5. When a piece of aluminium wire of finite length is drawn through a series of dies to reduce its diameter to half its original value, its resistance will become **[2002]**

(a) Two times (b) Four times

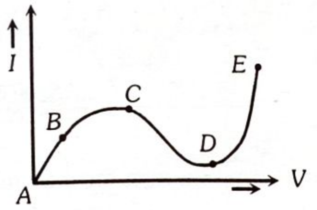
(c) Eight times (d) Sixteen times

6. The resistance of a discharge tube is **[1999]**

(a) *Ohmic* (b) Non-*ohmic*

(c) Both (a) and (b) (d) Zero

7. From the graph between current I and voltage V shown below, identify the portion corresponding to negative resistance **[1997]**



(a) AB (b) BC

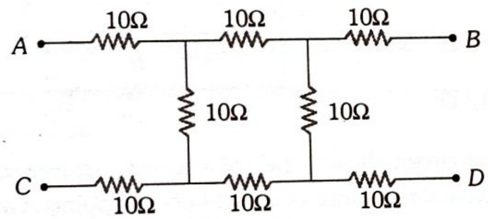
(c) CD (d) DE

8. Two wires of same metal have the same length but their cross-sections are in the ratio $3:1$. They are joined in series. The resistance of the thicker wire is 10Ω. The total resistance of the combination will be **[1995]**

(a) 40Ω (b) $\frac{40}{3}\Omega$

(c) $\frac{5}{2}\Omega$ (d) 100Ω

9. What will be the equivalent resistance between the two points A and D **[1996]**



(a) 10Ω (b) 20Ω

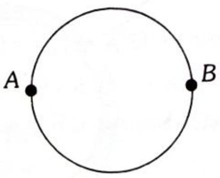
(c) 30Ω (d) 40Ω

10. 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 **[2005]**

(a) $\frac{R}{4}$ (b) $\frac{R}{8}$

(c) $4R$ (d) $\frac{R}{2}$

11. A wire of resistance 12 ohms per meter is bent to form a complete circle of radius 10 cm. The resistance between its two diametrically opposite points A and B as shown in the figure, is **[2009]**



(a) $0.6\,\pi\,\Omega$ (b) 3Ω

(c) $6\,\pi\Omega$ (d) 6Ω

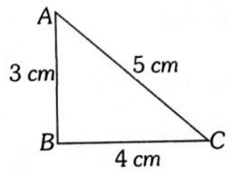
12. A 12 cm wire is given a shape of a right angled triangle ABC having sides 3 cm, 4 cm and 5 cm, as shown in the figure. The resistance between two ends (AB, BC, CA) of the respective sides are measured one by one by a multi-meter. The resistances will be in the ratio **[2013]**

(a) 9 : 16 : 25

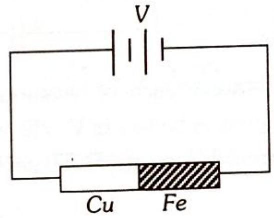
(b) 27 : 32 : 35

(c) 21 : 24 : 25

(d) 3 : 4 : 5



13. Two rods are joined end to end, as shown. Both have a cross-sectional area of 0.01 cm^2. Each is 1 meter long. One rod is of copper with a resistivity of 1.7×10^{-6} ohm-centimeter, the other is of iron with a resistivity of 10^{-5} ohm-centimeter. How much voltage is required to produce a current of 1 ampere in the rods **[2013]**



(a) 0.00145 V (b) 0.0145 V

(c) $1.7\times10^{-6}V$ (d) 0.117 V

14. Two metal wires of identical dimension are connected in series. If σ_1 and σ_2 are the conductivities of the metal wires respectively, the effective conductivity of the combination is **[2015]**

(a) $\frac{\sigma_1+\sigma_2}{2\sigma_1\sigma_2}$ (b) $\frac{\sigma_1+\sigma_2}{\sigma_1\sigma_2}$

(c) $\frac{\sigma_1\sigma_2}{\sigma_1+\sigma_2}$ (d) $\frac{2\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

15. Three resistance P, Q, R each of 2Ω and an unknown resistance S form the four arms of a Wheatstone bridge circuit. When a resistance of 6Ω is connected in parallel to S the bridge gets balanced. What is the value of S **[2007]**

(a) $2\ \Omega$ (b) $3\ \Omega$

(c) $6\ \Omega$ (d) $1\ \Omega$

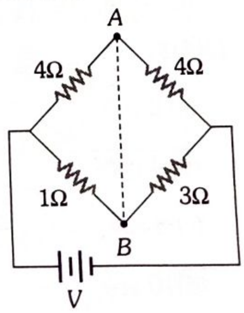
16. In the circuit shown, if a conducting wire is connected between points A and B, the current in this wire will **[2006]**

(a) Be zero

(b) Flow from B to A

(c) Flow from A to B

(d) Flow in the direction which will be decided by the value of V



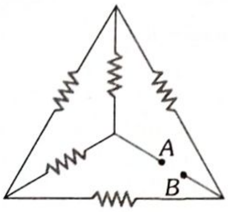
17. In the network shown in the figure, each of the resistance is equal to 2Ω. The resistance between the points A and B is **[1995]**

(a) 1Ω

(b) 4Ω

(c) 3Ω

(d) 2Ω



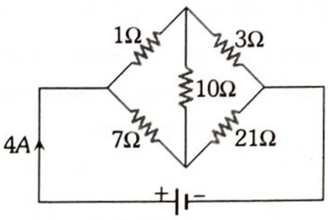
18. In the circuit shown in figure, the current drawn from the battery is 4A. If 10 Ω resistor is replaced by 20 Ω resistor, then current drawn from the circuit will be **[2001]**

(a) 1 A

(b) 2 A

(c) 3 A

(d) 0 A



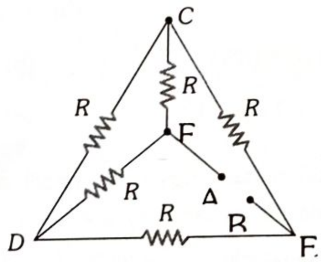
19. Five equal resistances each of resistance R are connected as shown in the figure. A battery of V volts is connected between A and B. The current flowing in $AFCEB$ will be **[2004]**

(a) $\frac{3V}{R}$

(b) $\frac{V}{R}$

(c) $\frac{V}{2R}$

(d) $\frac{2V}{R}$



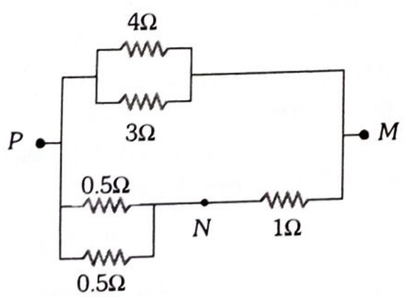
20. In the circuit shown, the current through the 4 Ω resistor is 1 amp when the points P and M are connected to a d.c. voltage source. The potential difference between the points M and N is **[2008]**

(a) 0.5 V

(b) 3.2 V

(c) 1.5 V

(d) 1.0 V



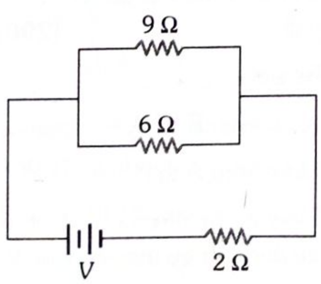
21. If power dissipated in the $9\ \Omega$ resistor in the circuit shown is 36 Watt, the potential difference across the 2Ω resistor is **[2011]**

(a) 2 *volt*

(b) 4 *volt*

(c) 8 *volt*

(d)10 *volt*



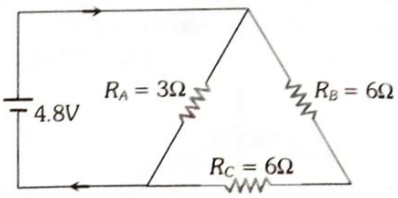
22. The current in the given circuit is **[1999]**

(a) 8.31 A

(b) 6.82 A

(c) 4.92 A

(d) 2 A



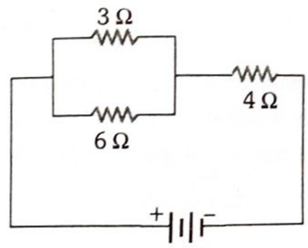
23. In the figure, current through the 3Ω resistor is 0.8 *ampere*, then potential drop through $4\ \Omega$ resistor is **[1993]**

(a) 9.6 V

(b) 2.6 V

(c) 4.8 V

(d) 1.2 V



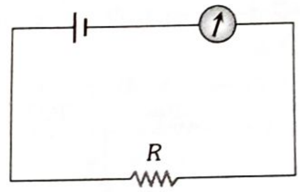
24. A battery of *emf* 10 V and internal resistance 3Ω is connected to a resistor as shown in the figure. If the current in the circuit is 0.5 A, then the resistance of the resistor will be **[2013]**

(a) 19 Ω

(b) 17 Ω

(c) 10 Ω

(d) 12 Ω



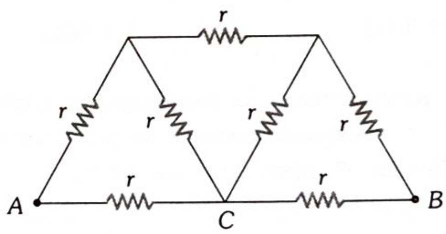
25. In the circuit shown, the value of each resistance is *r*, then equivalent resistance of circuit between points *A* and *B* will be **[1999]**

(a) (4/3) *r*

(b) 3*r* / 2

(c) *r* / 3

(d) 8*r* / 7



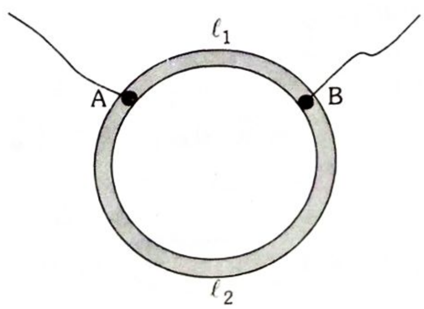
26. A ring is made of a wire having a resistance $R_0 = 12\Omega$. Find the points A and B as shown in the figure, at which a current carrying conductor should be connected so that the resistance R of the sub circuit between these points is equal to $\frac{8}{3}\Omega$ **[2012]**

(a) $\frac{\ell_1}{\ell_2} = \frac{5}{8}$

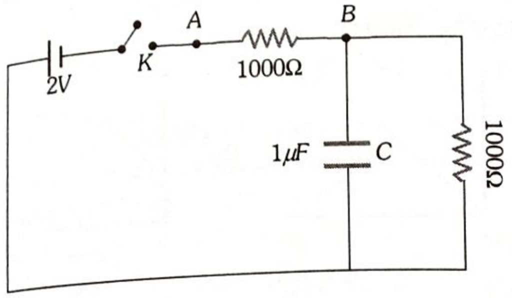
(b) $\frac{\ell_1}{\ell_2} = \frac{1}{3}$

(c) $\frac{\ell_1}{\ell_2} = \frac{3}{8}$

(d) $\frac{\ell_1}{\ell_2} = \frac{1}{2}$



27. When the key K 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 **[1995]**



(a) $I = 2\ mA$ at all t

(b) I oscillates between $1\ mA$ and $2mA$

(c) $I = 1\ mA$ at all t

(d) At $t = 0$, $I = 2\ mA$ and with time it goes to $1\ mA$

28. A set of 'n' equal resistors, of value 'R' each, are connected in series to a battery of emf 'E' and internal resistance 'R'. The current drawn is 1. Now, the 'n' resistors are connected in parallel to the same battery. Then the current drawn from battery becomes 10.1. The value of 'n' is **[2018]**

(a) 10 (b) 11

(c) 20 (d) 9

29. A carbon resistor $(47 \pm 4.7)k\Omega$ is to be marked with rings of different colours for its identification. The colour code sequence will be **[2018]**

(a) Violet – Yellow – Orange – Silver

(b) Yellow – Violet – Orange – Silver

(c) Yellow – Green – Violet – Gold

(d) Green – Orange – Violet – Gold

30. Kirchhoff's first law *i.e.* $\Sigma i = 0$ at a junction is based on the law of conservation of **[1997]**

(a) Charge (b) Energy

(c) Momentum (d) Angular momentum

31. When a resistance of 2*ohm* is connected across the terminals of a cell, the current is 0.5 *ampere*. When the resistance is increased to 5 *ohm*, the current is 0.25 *ampere*. The internal resistance of the cell is **[2011]**

(a) 0.5 *ohm* (b) 1.0 *ohm*

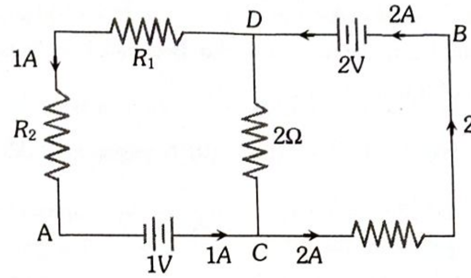
(c) 1.5 *ohm* (d) 2.0 *ohm*

32. A current 2 A flows through a 2Ω resistor when connected across a battery. The same battery supplies a current 0.5 A when connected across a 9Ω resistor. The internal resistance of the battery is **[2011]**

(a) 1Ω (b) 0.5Ω

(c) $1/3\Omega$ (d) $1/4\Omega$

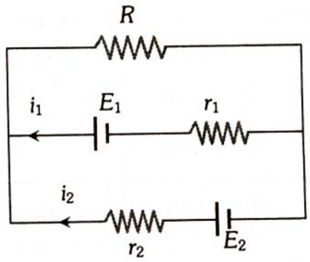
33. In the circuit shown in the figure, if the potential at point A is taken to be zero, the potential at point B is **[2011]**



(a) –2V (b) +1V

(c) –1V (d) +2V

34. See the electrical circuit shown in this figure. Which of the following equations is a *correct* equation for it **[2009]**



(a) $E_1 - (i_1 + i_2)R - i_1 r_1 = 0$

(b) $E_2 - i_2 r_2 - E_1 - i_1 r_1 = 0$

(c) $-E_2 - (i_1 + i_2)R + i_2 r_2 = 0$

(d) $E_1 - (i_1 + i_2)R + i_1 r_1 = 0$

35. A student measures the terminal potential difference (V) of a cell (of *emf* E and internal resistance r) as a function of the current (I) flowing through it. The slope, and intercept, of the graph between V and I, then, respectively, equal **[2009]**

(a) E and $-r$ (b) $-r$ and E

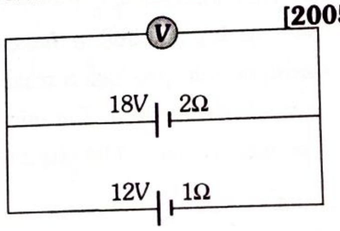
(c) r and $-E$ (d) $-E$ and r

36. The potential difference in open circuit for a cell is 2.2 *volt*. When a 4 *ohm* resistor is connected between its two electrodes the potential difference becomes 2 *volt*. The internal resistance of the cell will be **[2002]**

(a) 1 *ohm* (b) 0.2 *ohm*

(c) 2.5 *ohm* (d) 0.4 *ohm*

37. Two batteries, one of emf 18 *volt* and internal resistance 2Ω and the other of emf 12 *volt* and internal resistance 1Ω, are connected as shown. The voltmeter V will record a reading of **[2005]**



(a) 15 *volt*

(b) 30 *volt*

(c) 14 *volt*

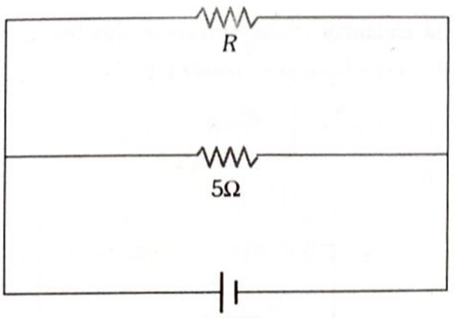
(d) 18 *volt*

38. Two cells of equal *e.m.f.* and of internal resistances r_1 and $r_2 (r_1 > r_2)$ are connected in series. On connecting this combination to an external resistance R, it is observed that the potential difference across the first cell becomes zero. The value of R will be **[2006]**

(a) $r_1 + r_2$ (b) $r_1 - r_2$

(c) $\frac{r_1 + r_2}{2}$ (d) $\frac{r_1 - r_2}{2}$

39. The power dissipated in the circuit shown in the figure is 30 Watts. The value of R is **[2012]**



10 V

(a) 20Ω (b) 15Ω

(c) 10Ω (d) 30Ω

40. Two cities are 150 km apart. Electric power is sent from one city to another city through copper wires. The fall of potential per km is 8 volt and the average resistance per km is 0.5 Ω. The power loss in the wire is **[2014]**

(a) 19.2 *J* (b) 12.2 *kW*

(c) 19.2 *W* (d) 19.2 *kW*

41. 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 terminal voltage during discharge is 14 *V*. The "*Watt-hour*" efficiency of the battery is **[2004]**

(a) 82.5% (b) 80 %

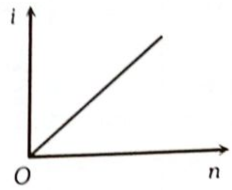
(c) 90% (d) 87.5%

42. You are given several identical resistances each of value $R = 10\Omega$ and each capable of carrying maximum current of 1 ampere. It is required to make a suitable combination of these resistances to produce a resistance of 5Ω which can carry a current of 4 ampere. The minimum number of resistances of the type R that will be required for this job **[1990]**

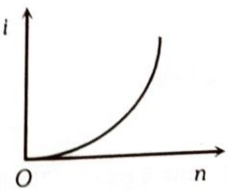
(a) 4 (b) 10

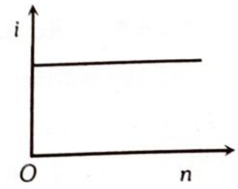
(c) 8 (d) 20

43. A battery consists of a variable number 'n' of identical cells (having internal resistance 'r' each) which are connected in series. The terminals of the battery are short –circuited and the current I is measured. Which of the graphs shows the correct relationship between I and n **[2018]**

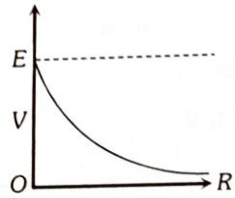
(a)


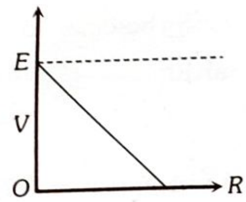
(b)

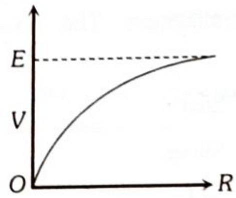

(c)


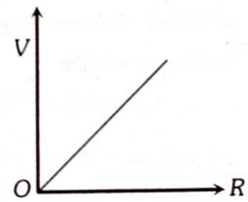
(d)


44. Cell having an *emf E* and internal resistance *r* is connected across a variable external resistance *R*. As the resistance *R* is increased, the plot of potential difference *V* across *R* is given by **[2012]**

(a)


(b)


(c)


(d)


45. The resistances of the four arms P, Q, R and S in a Wheatstone's bridge are 10 *ohm*, 30 *ohm*, 30 *ohm* are 90 *ohm*, respectively. The e.m.f. and internal resistance of the cell are 7 *volt* and 5 *ohm* respectively. If the galvanometer resistance is 50 *ohm*, the current drawn from the cell will be **[2013]**

(a) 2.0 *A* (b) 1.0 *A*

(c) 0.2 *A* (d) 0.1 *A*

46. In a meter bridge, the balancing length from the left end (standard resistance of one *ohm* is in the right gap) is found to be 20 *cm*. The value of the unknown resistance is **[1999]**

(a) 0.8 Ω (b) 0.5 Ω

(c) 0.4 Ω (d) 0.25 Ω

47. A galvanometer having a coil resistance of 60 Ω shows full scale deflection when a current of 1.0 amp passes through it. It can be converted into an ammeter to read currents upto 5.0 amp by **[2009]**

(a) Putting in parallel a resistance of 240Ω

(b) Putting in series a resistance of 15 Ω

(c) Putting in series a resistance of 240 Ω

(d) Putting in parallel a resistance of 15 Ω

48. 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 **[2007]**

(a) 2.5×10^{-4} *ohm* (b) 1.25×10^{-3} *ohm*

(c) 0.05 *ohm* (d) 2.5 *ohm*

49. 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 **[1998]**

(a) 0.25 *amp* (b) 0.8 *amp*

(c) 0.2 *amp* (d) 0.5 *amp*

50. A circuit contains an ammeter, a battery of 30 V and a resistance 40.8 ohm all connected in series. If the ammeter has a coil of resistance 480 ohm and a shunt of 20 ohm, the reading in the ammeter will be **[2015]**

(a) 0.25A (b) 2A

(c) 1A (d) 0.5A

51. A milli voltmeter of 25 milli volt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be **[2012]**

(a) 0.001 (b) 0.01

(c) 1 (d) 0.05

52. A galvanometer of resistance, *G*, is shunted by a resistance *S* *ohm*. To keep the main current in the circuit unchanged, the resistance to be put in series with the galvanometer is **[2011]**

(a) $\frac{G^2}{(S+G)}$ (b) $\frac{G}{(S+G)}$

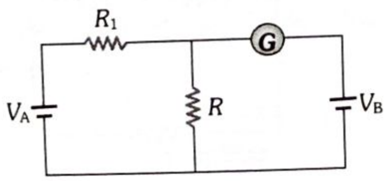
(c) $\frac{S^2}{(S+G)}$ (d) $\frac{SG}{(S+G)}$

53. A galvanometer can be used as a voltmeter by connecting a **[2004]**

(a) High resistance in series (b) Low resistance in series

(c) High resistance in parallel (d) Low resistance in parallel

54. In the circuit shown the cells *A* and *B* have negligible resistances. For $V_A = 12V, R_1 = 500\Omega$ and $R = 100\Omega$ the galvanometer (G) shows no deflection. The value of V_B is **[2012]**



(a) 4V (b) 2V

(c) 12V (d) 6V

55. To convert a 800 *mV* range *milli voltmeter* of resistance 40 Ω into a galvanometer of 100 *mA* range, the resistance to be connected as shunt is **[2002]**

(a) 10 Ω (b) 20 Ω

(c) 30 Ω (d) 40 Ω

56. A galvanometer of 50 *ohm* resistance has 25 divisions. A current of 4×10^{-4} *ampere* gives a deflection of one division. To convert this galvanometer into a voltmeter having a range of 25 *volts*, it should be connected with a resistance of **[2004]**

(a) 2500 Ω as a shunt (b) 2450 Ω as a shunt

(c) 2550 Ω in series (d) 2450 Ω in series

57. A galvanometer of resistance 50Ω is connected to a battery of 3V along with a resistance of 2950Ω in series. A full scale deflection of 30 divisions is obtained in the galvanometer. In order to reduce this deflection to 20 divisions, the resistance in series should be **[2008]**

(a) 6050Ω (b) 4450Ω

(c) 5050Ω (d) 5550Ω

58. If voltage across a bulb rated 220 Volt – 100 Watt drops by 2.5% of its rated value, the percentage of the rated value by which the power would decrease is **[2012]**

(a) 20 % (b) 2.5 %

(c) 5 % (d) 10 %

59. A battery of 6 volts is connected to the terminals of a three metre long wire of uniform thickness and resistance of the order of 100Ω. The difference of potential between two points separated by 50 *cm* on the wire will be **[2004]**

(a) 1 V (b) 1.5 V

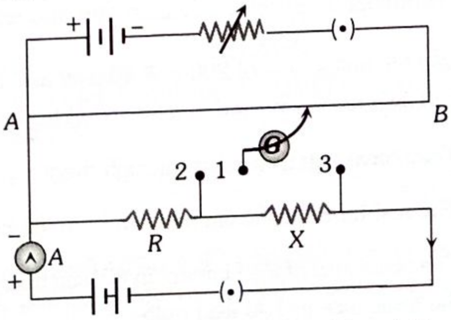
(c) 2 V (d) 3 V

60. A potentiometer wire has length 4*m* and resistance 8Ω. The resistance that must be connected in series with the wire and an accumulator of emf 2V, so as to get a potential gradient 1*mV* per *cm* on the wire is **[2015]**

(a) 40 Ω (b) 44 Ω

(c) 48 Ω (d) 32 Ω

61. A potentiometer circuit is set up as shown. The potential gradient, across the potentiometer wire, is *k* volt/*cm* and the ammeter, present in the circuit, reads 1.0 *A* when two way key is switched off. The balance points, when the key between the terminals (i) 1 and 2 (ii) 1 and 3, is plugged in, are found to be at lengths l_1 *cm* and l_2*cm* respectively. The magnitudes, of the resistors *R* and *X*, in ohms, are then, equal, respectively, to **[2010]**



(a) kl_1 and kl_2 (b) $k(l_2-l_1)$ and kl_2

(c) kl_1 and $k(l_2-l_1)$ (d) $k(l_2-l_1)$ and kl_1

62. A potentiometer circuit has been set up for finding the internal resistance of a given cell. The main battery, used across the potentiometer wire, has an emf of 2.0 V and a negligible internal resistance. The potentiometer wire itself is 4 m long. When the resistance, R, connected across the given cell, has values of **[2014]**

(i) Infinity
(ii) 9.5 Ω

the 'balancing lengths', on the potentiometer wire are found to be 3 m and 2.85 m, respectively. The value of internal resistance of the cell is

(a) 0.5 Ω (b) 0.75 Ω
(c) 0.25 Ω (d) 0.95 Ω

63. A potentiometer wire of length L and a resistance r are connected in series with a battery of emf E_0 and a resistance r_1. An unknown emf E is balanced at a length l of the potentiometer wire. The emf E will be given by **[2015]**

(a) $\frac{E_0 r}{(r+r_1)} \cdot \frac{l}{L}$ (b) $\frac{E_0 l}{L}$
(c) $\frac{LE_0 r}{(r+r_1)l}$ (d) $\frac{LE_0 r}{lr_1}$

64. A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of emf's is **[2016]**

(a) 5 : 1 (b) 5 : 4
(c) 3 : 4 (d) 3 : 2

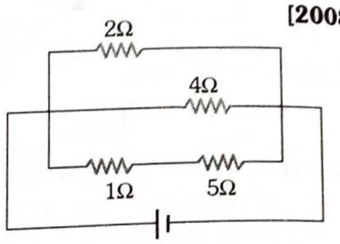
65. A potentiometer is an accurate and versatile device to make electrical measurements of E.M.F. because the method involves **[2017]**

(a) Cells
(b) Potential gradients
(c) A condition of no current flow through the galvanometer
(d) A combination of cells, galvanometer and resistance

66. Two electric bulbs, one of 200 *volt* 40 *watt* and the other 200 *volt* 100 *watt* are connected in a house wiring circuit **[2000]**

(a) They have equal currents through them
(b) The resistance of the filaments in both the bulbs is same
(c) The resistance of the filament in 40 *watt* bulb is more than the resistance in 100 *watt* bulb
(d) The resistance of the filament in 100 *watt* bulb is more than the resistance in 40 *watt* bulb

67. A current of 3 *amp*. flows through the 2Ω resistor shown in the circuit. The power dissipated in the 5Ω resistor is **[2008]**



(a) 1 watt
(b) 5 watt
(c) 4 watt
(d) 2 watt

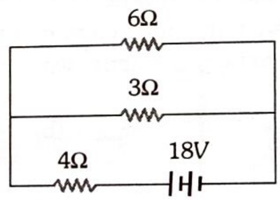
68. A 25 W, 220 V bulb and a 100 W, 220 V bulb are connected in parallel across a 440 V line **[2001]**

(a) Only 100 *watt* bulb will fuse
(b) Only 25 *watt* bulb will fuse
(c) Both bulbs will fuse
(d) None of the bulbs will fuse

69. Two identical batteries, each of e.m.f. 2 *volt* and internal resistance 1.0 ohm are available to produce heat in an external resistance $R = 0.5$ *ohm* by passing a current through it. The maximum Joulean power that can be developed across R using these batteries is **[1990]**

(a) 1.28 *watt* (b) 2.0 *watt*
(c) 8/9 *watt* (d) 3.2 *watt*

70. The total power dissipated in Watts in the circuit shown here is **[2007]**

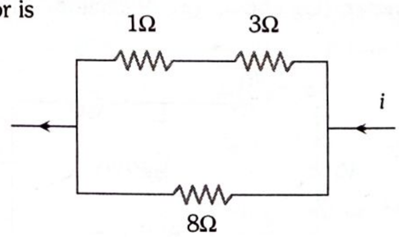


(a) 16
(b) 40
(c) 54
(d) 4

71. A battery of e.m.f. 10 V and internal resistance 0.5 *ohm* is connected across a variable resistance R. The value of R for which the power delivered in it is maximum is given by **[2001]**

(a) 2.0 *ohm* (b) 0.25 *ohm*
(c) 1.0 *ohm* (d) 0.5 *ohm*

72. Power dissipated across the 8Ω resistor in the circuit shown here is 2 *watt*. The power dissipated in watt units across the 3Ω resistor is **[2006]**



(a) 0.5 (b) 3.0
(c) 2.0 (d) 1.0

73. A heating coil is labelled 100 W, 220 V. The coil is cut in half and the two pieces are joined in parallel to the same source. The energy now liberated per second is **[1995]**

(a) 200 J (b) 400 J
(c) 25 J (d) 50 J

74. A battery is charged at a potential of 15 V in 8 hours when the current flowing is 10 A. The battery on discharge supplies a current of 5 A for 15 hours. The mean terminal voltage during discharge is 14 V. The "Watt–hour" efficiency of battery is **[2004]**

(a) 80% (b) 90%

(c) 87.5% (d) 82.5%

75. A current of 2 A passing through conductor produces 80 J of heat in 10 *seconds*. The resistance of the conductor is **[1993]**

(a) 0.5Ω (b) 2Ω

(c) 4Ω (d) 20Ω

76. A $4\mu F$ conductor is charged to 400 *volts* and then its plates are joined through a resistance of $1\,k\Omega$. The heat produced in the resistance is **[1994]**

(a) 0.16 J (b) 1.28 J

(c) 0.64 J (d) 0.32 J

77. Three electric bulbs of rating 60W each are joined in series and then connected to electric mains. The power consumed by these three bulbs will be **[2004]**

(a) 180 W (b) 60 W

(c) 20 W (d) $\frac{20}{3}W$

78. Three equal resistors connected in series across a source of e.m.f. together dissipate 10 watt. If the same resistors are connected in parallel across the same e.m.f., then the power dissipated will be **[1998]**

(a) 10 *watt* (b) 30 *watt*

(c) 10/3 *watt* (d) 90 *watt*

79. A $5°C$ rise in temperature is observed in a conductor by passing a current. When the current is doubled the rise in temperature will be approximately **[1998]**

(a) 16°C (b) 10°C

(c) 20°C (d) 12°C

80. The material of fuse wire should have **[2003]**

(a) A high specific resistance and high melting point

(b) A low specific resistance and low melting point

(c) A high specific resistance and low melting point

(d) A low specific resistance and a high melting point

81. A filament bulb (500 W, 100 V) is to be used in a 230 V main supply. When a resistance R is connected in series, it works perfectly and the bulb consumes 500W. The value of R is **[2016]**

(a) 13Ω (b) 230Ω

(c) 46Ω (d) 26Ω

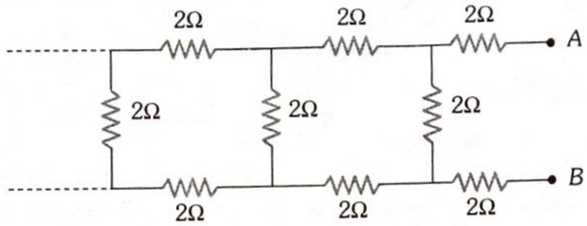
82. The charge flowing through a resistance R varies with time t as $Q = at - bt^2$, where a and b are positive constants. The total heat produced in R is

(a) $\frac{a^3R}{6b}$ (b) $\frac{a^3R}{3b}$

(c) $\frac{a^3R}{2b}$ (d) $\frac{a^3R}{b}$

8. AIIMS

1. The equivalent resistance of the following infinite network of resistances is **[1995]**



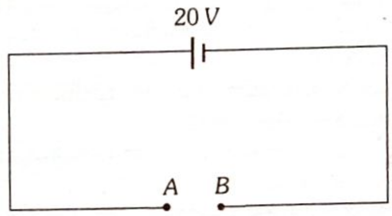
(a) Less than 4Ω

(b) 4Ω

(c) More than 4Ω but less than 12Ω

(d) 12Ω

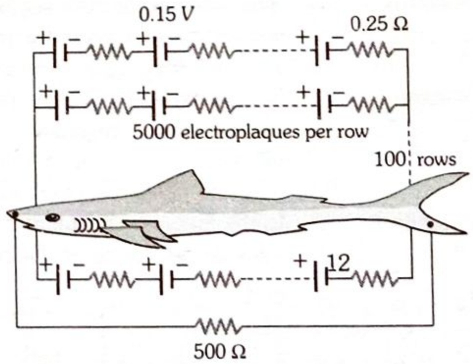
2. In the shown circuit, what is the potential difference across A and B **[1999]**



(a) 50 V (b) 45 V

(c) 30 V (d) 20 V

3. 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 arrangement is suggestively shown below. Each electroplaque has an emf of 0.15 V and internal resistance of 0.25 Ω **[2004]**



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

(a) 1.5 A (b) 3.0 A

(c) 15 A (d) 30 A

4. The resistance of 1 A ammeter is 0.018Ω. To convert it into 10 A ammeter, the shunt resistance required will be **[2007]**

(a) 0.18Ω (b) 0.0018Ω

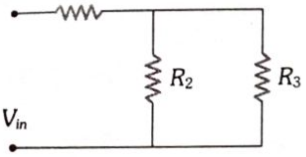
(c) 0.002Ω (d) 0.12Ω

5. What will happen when a 40 *watt*, 220 *volt* lamp and 100 *watt*, 220 *volt* lamp are connected in series across 40 *volt* supply **[2010]**

(a) 100 *watt* lamp will fuse (b) 40 *watt* lamp will fuse

(c) Both lamps will fuse (d) Neither lamp will fuse

6. For ensuring dissipation of same energy in all three resistors (R_1, R_2, R_3) connected as shown in figure, their values must be related as **[2005]**



(a) $R_1 = R_2 = R_3$
(b) $R_2 = R_3$ and $R_1 = 4R_2$
(c) $R_2 = R_3$ and $R_1 = \frac{1}{4}R_2$
(d) $R_1 = R_2 + R_3$

7. Two heater wires of equal length are first connected in series and then in parallel. The ratio of heat produced in the two cases is **[2000]**
(a) 2 : 1 (b) 1 : 2
(c) 4 : 1 (d) 1 : 4

8. A 12 *HP* motor has to be operated 8 *h/day*. How much will it cost at the rate of 50 *paise/kWh* in 10 *days* **[2010]**
(a) Rs 347 (b) Rs 358
(c) Rs 375 (d) Rs 397

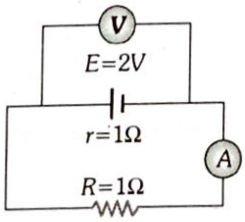
9. Assertion & Reason

Read the assertion and reason carefully to mark the correct option out of the options given below:
(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.
(e) If assertion is false but reason is true.

1. 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 to the positive terminal.

2. Assertion : The temperature coefficient of resistance is positive for metals and negative for p-type semiconductor.
Reason : The effective charge carriers in metals are negatively charged whereas in p-type semiconductor they are positively charged.

3. Assertion : 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 $R = 1\ \Omega$

4. Assertion : There is no current in the metals in the absence of electric field.
Reason : Motion of free electrons is random.

5. 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.

6. Assertion : Bending a wire does not effect electrical resistance.
Reason : Resistance of wire is proportional to resistivity of material.

7. Assertion : Voltameter measures current more accurately than ammeter.
Reason : Relative error will be small if measured from voltameter.

8. Assertion : The resistance of super-conductor is zero.
Reason : The super-conductors are used for the transmission of electric power.

9. Assertion : The possibility of an electric bulb fusing is higher at the time of switching ON and OFF
Reason : Inductive effects produce a surge at the time of switch ON and OFF

10. Assertion : Two electric bulbs of 50 and 100 W are given. When connected in series 50 W bulb glows more but when connected parallel 100 W bulb glows more.
Reason : In series combination, power is directly proportional to the resistance of circuit. But in parallel combination, power is inversely proportional to the resistance of the circuit.

11. Assertion : An electric bulb is first connected to a dc source and then to an ac source having the same brightness in both the cases.
Reason : The peak value of voltage for an A.C. source is times the root mean square voltage.

12. Assertion : An electric bulb becomes dim, when an electric heater in parallel circuit is switched on.
Reason : Dimness decreases after sometime.

13. Assertion : Though the same current flows through the line wires and the filament of the bulb but heat produced in the filament is much higher than that in line wires.
Reason : The filament of bulbs is made of a material of high resistance and high melting point.

14. Assertion : Heat is generated continuously is an electric heater but its temperature becomes constant after some time.
Reason : At the stage when heat produced in heater is equal to the heat dissipated to its surrounding the temperature of heater becomes constant.

15. 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 connections reduce heating of connecting cables.

16. Assertion : A laser beam of 0.2 W power can drill holes through a metal sheet, whereas 1000 W torch-light cannot.
Reason : The frequency of laser light is much higher than that of torch light.

17. Assertion : A domestic electrical appliance, working on a three pin will continue working even if the top pin is removed.
Reason : The third pin is used only as a safety device.

19. Current Electricity – Answers Keys

1. Electric Conduction, Ohm's Law and Resistance

1	c	2	b	3	c	4	b	5	c
6	a	7	c	8	b	9	d	10	a
11	c	12	b	13	d	14	a	15	d
16	b	17	a	18	a	19	a	20	a
21	c	22	b	23	a	24	a	25	a
26	d	27	b	28	b	29	c	30	a
31	a	32	c	33	b	34	c	35	c
36	d	37	d	38	a	39	d	40	a
41	d	42	d	43	b	44	b	45	b
46	d	47	a	48	a	49	a	50	b
51	a	52	a	53	b	54	d	55	c
56	a	57	b						

2. Grouping of Resistances

1	d	2	c	3	b	4	c	5	d
6	b	7	c	8	d	9	b	10	b
11	c	12	c	13	b	14	b	15	c
16	c	17	b	18	a	19	b	20	c
21	a	22	b	23	d	24	c	25	a
26	a	27	c	28	d	29	a	30	a
31	bc	32	b	33	a	34	b	35	c
36	b	37	b	38	b	39	c	40	a
41	d	42	a	43	a	44	d	45	d
46	d	47	b						

3. Kirchhoff's Law, Cells

1	a	2	b	3	c	4	b	5	d
6	c	7	a	8	d	9	c	10	b
11	d	12	b	13	d	14	c	15	c
16	a	17	b	18	b	19	c	20	c
21	a	22	c	23	c	24	d	25	d
26	c	27	b	28	b	29	a	30	c
31	a	32	a	33	b	34	b	35	c

4. Different Measuring Instruments

1	c	2	c	3	a	4	b	5	c
6	b	7	a	8	c	9	c	10	d
11	c	12	c	13	c	14	c	15	c
16	b	17	a	18	c	19	a	20	d
21	b	22	c	23	b	24	a	25	c
26	d	27	d	28	d	29	a	30	d
31	c	32	d	33	b	34	a	35	c
36	d	37	b	38	c	39	a	40	b
41	a	42	d	43	c	44	c	45	c
46	b	47	d	48	a				

5. Heating Effect of Current

1	b	2	a	3	b	4	a	5	a
6	b	7	d	8	d	9	b	10	a
11	b	12	d	13	b	14	a	15	c
16	c	17	bd	18	b	19	c	20	b
21	c	22	d	23	d	24	d	25	b
26	a	27	d	28	b	29	b	30	d
31	a	32	a	33	c	34	c	35	d
36	d	37	a						

6. IIT-JEE/AIEEE

1	a	2	b	3	d	4	c	5	b
6	c	7	a	8	c	9	b	10	c
11	d	12	d	13	d	14	a	15	c
16	a	17	a	18	c	19	a	20	a

21	a	**22**	d	**23**	a	**24**	b	**25**	c
26	b	**27**	c	**28**	a	**29**	d	**30**	b
31	c	**32**	c	**33**	b	**34**	b	**35**	d
36	d	**37**	c	**38**	c	**39**	a	**40**	c
41	c	**42**	a	**43**	a	**44**	b	**45**	a
46	a	**47**	c	**48**	a	**49**	c	**50**	c
51	a	**52**	d	**53**	b	**54**	d	**55**	a
56	d	**57**	a	**58**	b	**59**	c	**60**	c
61	a	**62**	b	**63**	c	**64**	d	**65**	a
66	d	**67**	a	**68**	b	**69**	a	**70**	b

7. NEET/AIPMT

1	d	**2**	d	**3**	d	**4**	b	**5**	d
6	b	**7**	c	**8**	a	**9**	c	**10**	a
11	a	**12**	b	**13**	d	**14**	d	**15**	b
16	b	**17**	d	**18**	d	**19**	c	**20**	b
21	d	**22**	d	**23**	c	**24**	b	**25**	d
26	d	**27**	d	**28**	a	**29**	b	**30**	a
31	b	**32**	c	**33**	b	**34**	a	**35**	b
36	d	**37**	c	**38**	b	**39**	c	**40**	d
41	d	**42**	c	**43**	d	**44**	c	**45**	c
46	d	**47**	d	**48**	a	**49**	b	**50**	d
51	a	**52**	a	**53**	a	**54**	b	**55**	a
56	d	**57**	b	**58**	c	**59**	a	**60**	d
61	c	**62**	a	**63**	a	**64**	d	**65**	c
66	c	**67**	b	**68**	c	**69**	b	**70**	c
71	d	**72**	b	**73**	b	**74**	c	**75**	b
76	d	**77**	c	**78**	d	**79**	d	**80**	c
81	d	**82**	a						

8. AIIMS

1	c	**2**	d	**3**	a	**4**	c	**5**	d
6	c	**7**	d	**8**	b				

9. Assertion and Reason

1	d	**2**	b	**3**	a	**4**	a	**5**	b
6	b	**7**	a	**8**	b	**9**	a	**10**	a
11	e	**12**	b	**13**	a	**14**	a	**15**	c
16	c	**17**	a						