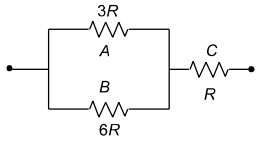
GPLUS EDUCATION

Date :
Time : **PHYSICS**
Marks :

CURRENT ELECTRICITY

Single Correct Answer Type

1. Figure shows a network of three resistance. When some potential difference is applied across the network, the thermal powers dissipated by A,B and C in the ratio



a) 2 : 3 : 4 b) 2 : 4 : 3 c) 4 : 2 : 3 d) 3 : 2 : 4

2. If an increase in length of copper wire is 0.5% due to stretching, the percentage increase in its resistance will be

a) 0.1% b) 0.2% c) 1% d) 2%

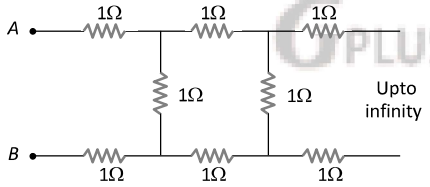
3. Thermoelectric constant of a thermocouple are α and β. Thermoelectric power at inversion temperature is

a) α b) $-\alpha$ c) $\frac{\alpha}{\beta}$ d) $-\frac{\alpha}{\beta}$

4. A current of 1.5 A flows through a copper voltameter. The thickness of copper deposited on the electrode surface of size 50 cm × 10 cm is 20 min will be (density of copper = 9000 kg − m^{-3} and ECE of copper = 0.00033gC^{-1})

a) 3.3×10^{-6} m b) 6.6×10^{-6} m c) 1.3×10^{-5} m d) 2.6×10^{-5} m

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

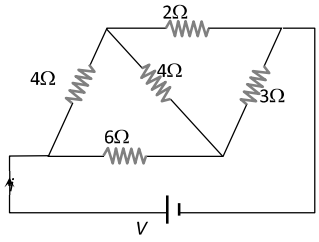


a) $(\sqrt{3}-1)$ b) $(1-\sqrt{3})$ c) $(1+\sqrt{3})$ d) $(2+\sqrt{3})$

6. A battery of emf E and internal resistance r is connected to an external resistance R the condition for maximum power transfer is

a) r<R b) r>R c) r=1/R d) R=R

7. 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) $\frac{18V}{5}$

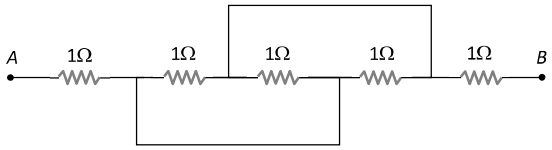
8. A resistor has a colour code of green, blue, brown and silver. What is its resistance?

a) $5600\Omega \pm 10\%$ b) $560\Omega \pm 5\%$ c) $560\Omega \pm 10\%$ d) $56\Omega \pm 5\%$

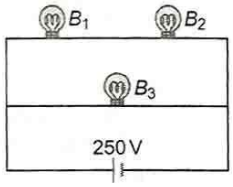
9. A battery having e.m.f. $5V$ and internal resistance 0.5 Ω is connected with a resistance of 4.5 Ω then the voltage at the terminals of battery is

a) 4.5 V b) 4 V c) 0 V d) 2 V

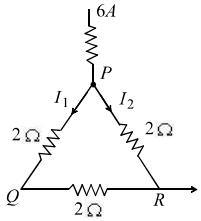
10. The temperature of cold junction of thermocouple is 0°C. If the neutral temperature is 270°C, then the inversion temperature is
    a) 540°C b) 520°C c) 640°C d) 58°C
11. The length of a conductor is doubled and its radius is halved, its specific resistance is
    a) Unchanged b) Halved c) Doubled d) Quadrupled
12. In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in USA. If the resistance of a 60 W bulb for use in India is R,the resistance of a 60 W bulb for use in USA will be
    a) R b) $2\,R$ c) $R/4$ d) $R/2$
13. Equivalent resistance between the points A and B is (in Ω)



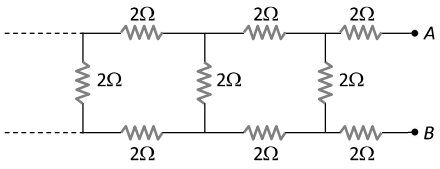
    a) $\frac{1}{5}$ b) $1\frac{1}{4}$ c) $2\frac{1}{3}$ d) $3\frac{1}{2}$
14. A 100 W bulb B_1 and two 60 W bulbs B_2 and B_3 are connected to a 250 V source as shown in figure. Now W_1, W_2 and W_3 are the output powers of the bulbs B_1, B_2 and B_3respectively, then



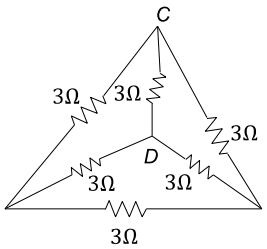
    a) $W_1 > W_2 = W_3$ b) $W_1 > W_2 > W_3$ c) $W_1 < W_2 = W_3$ d) $W_1 < W_2 < W_3$
15. A current of $6A$ enters one corner P of an equilateral triangle PQR having 3 wires of resistances 2Ω each and leaves by the corner R. Then the current I_1 and I_2 are



    a) $2A, 4A$ b) $4A, 2A$ c) $1A, 2A$ d) $2A, 3A$
16. A cell can be balanced against 110cm and 100cm of potentiometer wire, respectively with and without being short circuited through a resistance of 10 Ω. Its internal resistance is
    a) 1.0 Ω b) 0.5 Ω c) 2.0 Ω d) Zero
17. The equivalent resistance of the following infinite network of resistance is



    a) Less than 4Ω b) 4Ω
    c) More than 4Ω but less than 12Ω d) 12Ω
18. The equivalent resistance between A and B in the given circuit is

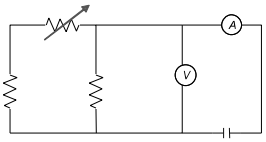


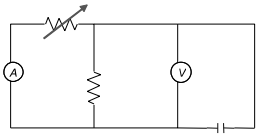
a) 3Ω b) 6Ω c) 12Ω d) 1.5Ω

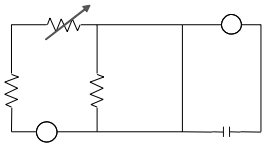
19. The chemical equivalent of silver is 108. If the current in a silver voltmeter is 2 *amp*, the time required to deposit 27 *grams* of silver will be

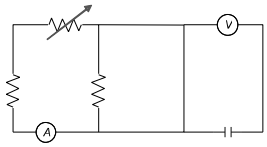
a) 8.57 *hrs* b) 6.70 *hrs* c) 3.35 *hrs* d) 12.50 *hrs*

20. Which of the following set up can be used to verify the Ohm's law?

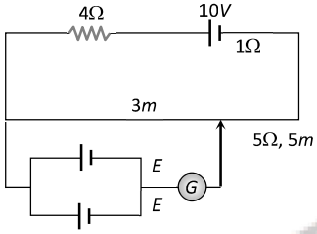
a) 

b) 

c) 

d) 

21. 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

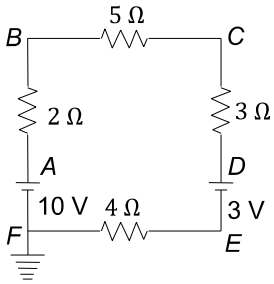


a) 1.5 *V* b) 3.0 *V* c) 0.67 V d) 1.33 *V*

22. 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*

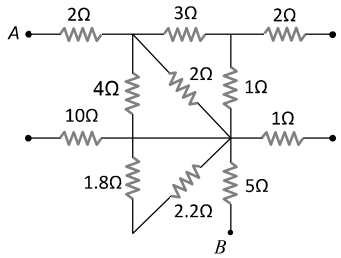
23. In the circuit shown in figure, the points *F* is grounded. Which of the following is wrong statement?



a) *D* is at 5V b) *E* is at zero potential

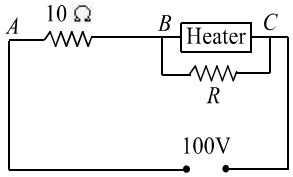
c) The current in the circuit will be 0.5 A d) The potential at *E* is same whether or not *F* is rounded

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



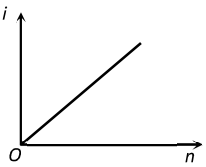
a) $\frac{57}{7}\Omega$ b) $8\ \Omega$ c) $6\ \Omega$ d) $\frac{57}{5}\Omega$

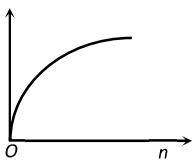
25. Which of the following statements is correct
    a) Liquids obey fully the $ohm's$ law
    b) Liquids obey partially the $ohm's$ law
    c) There is no relation between current and p.d. for liquids
    d) None of the above
26. In a Wheatstone bridge, $P = 90\Omega, Q = 110\Omega, R = 40\Omega$ and $S = 60\Omega$ and a cell of 4 V emf. Then the potential difference between the diagonal along which a galvanometer is connected is
    a) -0.2 V b) $+0.2$ V c) -1 V d) $+1$ V
27. Two electric bulbs, one of 200 $volt$ 40 $watt$ and the other 200 $volt$ 100 $watt$ are connected in a house wiring circuit
    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
28. An electric current passes through a circuit containing two wires of the same material connected in parallel. If the lengths of the wires are in the ratio of 4/3 and radius of the wires are in the ratio of 2/3, then the ratio of the current passing through the wires will be
    a) 3 b) 1/3 c) 8/9 d) None of these
29. A heater is operated with a power of $1000W$ in a $100V$ line. It is connected in combination with a resistance of 10Ω and a resistance R to a $100V$ line as shown in figure. What should be the value of R so, that the heater operates with a power of $62.5W$

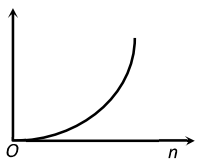


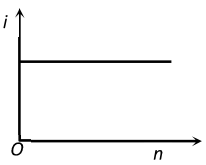
a) 10Ω b) 62.5Ω c) $\frac{1}{5}\Omega$ d) 5Ω

30. A 100 $watt$ bulb working on 200 $volt$ and a 200 $watt$ bulb working on 100 $volt$ have
    a) Resistances in the ratio of 4 :1
    b) Maximum current ratings in the ratio of 1 :4
    c) Resistances in the ratio of 2 :1
    d) Maximum current ratings in the ratio of 1 :2
31. A battery consists of a variable number $'n'$ of identical cells having internal resistances connected in series. The terminals of battery are short circuited and the current i is measured. Which of the graph below slows the relationship between i and n

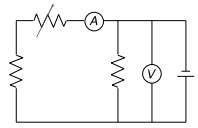
a) 

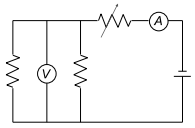
b) 

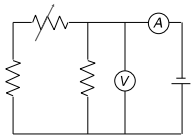
c) 

d) 

32. Which of the following circuits is correct for verification of Ohm's law?

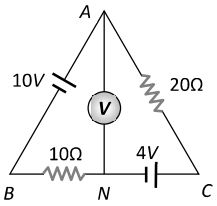
a) 

b) 

c) 

d) None of these

33. The reading of the ideal voltmeter in the adjoining diagram will be

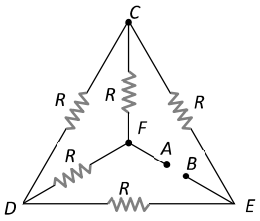


a) 4 V b) 8 V c) 12 V d) 14 V

34. Masses of the three wires of same material are in the ratio of 1: 2: 3 and their lengths in the ratio of 3: 2: 1. Electrical resistance of these wires will be in the ratio of

a) 1: 1: 1 b) 1: 2: 3 c) 9: 4: 1 d) 27: 6: 1

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



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

36. Two conductors of the same material have their diameters in the ratio 1 : 2 and their lengths in the ratio 2 : 1. If the temperature difference between their ends is the same, then the ratio of amounts of heat conducted per second through them will be

a) 4 : 1 b) 1 : 4 c) 8 : 1 d) 1 : 8

37. The emf of a generator is 6 V and internal resistance is 0.5 kΩ. The reading of a voltmeter having an internal resistance of 2.5 kΩ is

a) 10^{-3}V b) 10 V c) 5 V d) 0.5 V

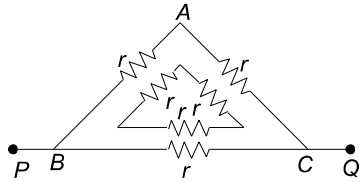
38. A railway compartment is lit up by thirteen lamps each taking 2.1 A at 15 V. The heat generated per second in each lamp will be

a) 4.35 cal b) 5.73 cal c) 7.5 cal d) 2.5 cal

39. Potential gradient is defined as

a) Fall of potential per unit length of the wire
b) Fall of potential per unit area of the wire
c) Fall of potential between two ends of the wire
d) Potential at any one end of the wire

40. The resistance across R and Q in the figure.



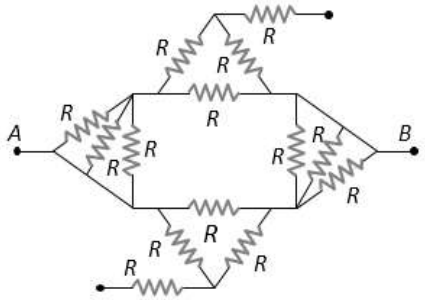
a) $r/3$ b) $r/2$ c) $2r$ d) $6r$

41. By using only two resistances coils-singly, in series or in parallel one should be able to obtain resistance of

3,4,12 and 16 ohm. The separate resistance of the coil are

a) 3 and 4 b) 4 and 12 c) 12 and 16 d) 16 and 13

42. Find equivalent resistance between A and B



a) R b) $\frac{3R}{4}$ c) $\frac{R}{2}$ d) $2R$

43. There are two electric bulbs of 40 W and 100 W. Which one will be brighter when first connected in series and then in parallel

a) 40 W in series and 100 W in parallel

b) 100 W in series and 40 W in parallel

c) 40 W both in series and parallel will be uniform

d) 100 W both in series and parallel will be uniform

44. The power of heater is 750 W at 1000°C. What will be its power at 200°C if $a = 4 \times 10^{-4}$ per°C ?

a) 400 W b) 990 W c) 250 W d) 1500 W

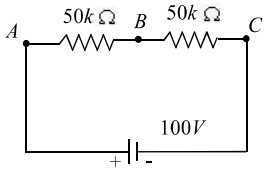
45. The deflection in a moving coil galvanometer is reduced to half when it is shunted with a 40 Ω coil. The resistance of the galvanometer is

a) 15 Ω b) 20 Ω c) 40 Ω d) 80 Ω

46. A copper voltmeter is connected in series with a heater coil of resistance 0.1Ω. A steady current flows in the circuit for twenty minutes and mass of 0.99 g of copper is deposited at the cathode. If electrochemical equivalent of copper is 0.00033 gm/C, then heat generated in the coil is

a) 750 J b) 650 J c) 350 J d) 250 J

47. 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 $k\Omega$ b) 75 $k\Omega$ c) 50 $k\Omega$ d) 25 $k\Omega$

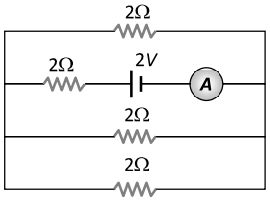
48. The reciprocal of resistance is

a) Conductance b) Resistivity c) Voltage d) None of the above

49. To decrease the range of an ammeter, its resistance need to be increased. An ammeter has resistance $R_0$and range I. Which of the following resistance can be connected in series with it to decreases its range to I/n?

a) $\frac{R_0}{n}$ b) $\frac{R_0}{(n-1)}$ c) $\frac{R_0}{(n+1)}$ d) None of these

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



a) $\frac{1}{8}A$ b) $\frac{3}{4}A$ c) $\frac{1}{2}A$ d) $2\ A$

51. The accurate measurement of emf can be obtained using
a) Multimeter b) Voltmeter c) Voltameter d) Potentiometer

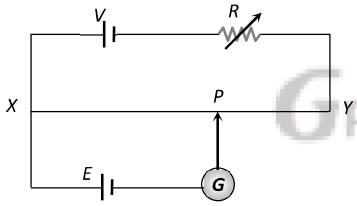
52. Three unequal resistors in parallel are equivalent to a resistance 1 Ω. If two of them are in the ratio 1:2 and if no resistance value is fractional, the largest of the three resistance in ohm is
a) 4 b) 6 c) 8 d) 12

53. A current of 2 A passing through conductor produces 80 J of heat in 10 $seconds$. The resistance of the conductor is
a) 0.5 Ω b) 2 Ω c) 4 Ω d) 20 Ω

54. In a copper voltmeter , if the current (I) and time (t) variations of the type as shown in figure, the mass deposited in 30 min is [Atomic weight of copper is 63.5 and Faraday constant is 96500 C per g equivalent]
a) 0.078 g b) 0.054 g c) 0.039 g d) 0.0195 g

55. The graph between resistivity and temperature, for a limited range of temperatures, is a straight line for a material like
a) Copper b) Nichrome c) Silicon d) Mercury

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

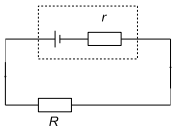


a) Decreases the resistance R b) Increase the resistance R
c) Reverse the terminals of battery V d) Reverse the terminals of cell E

57. The relation between Seeback coefficient (or thermo electric power) S and Peltier coefficient π is given by
a) $S = \pi T$ b) $S = \frac{\pi}{T}$ c) $S = \frac{\pi^2}{T}$ d) $S = \frac{\pi}{T^2}$

58. Electromotive force is the force, which is able to maintain a constant
a) Current b) Resistance c) Power d) Potential difference

59. A cell of internal resistance r is connected to a load of resistance R. Energy is dissipated in the load, but some thermal energy is also wasted in the cell. The efficiency of such an arrangement is found from the expression

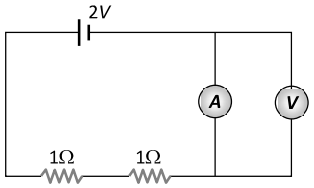


$$\frac{\text{energy dissipated in the load}}{\text{energy dissipatd in the compete circuit}}.$$

Which of the following gives the efficiency in this case?
a) $\frac{r}{R}$ b) $\frac{R}{r}$ c) $\frac{r}{R+r}$ d) $\frac{R}{R+r}$

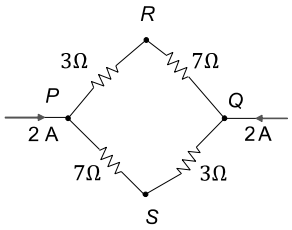
60. In the circuit shown, A and V are ideal ammeter and voltmeter respectively. Reading of the voltmeter will

be



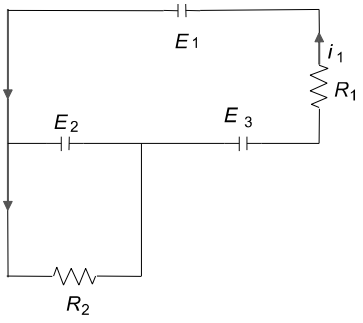
a) 2 V b) 1 V c) 0.5 V d) Zero

61. 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
62. The current in a simple series circuit is 5.0.A. when an additional resistance of 2.0 Ω is inserted, the current drops to 4.0 A. the original resistance of the circuit in ohm was
a) 1.25 b) 8 c) 10 d) 20
63. A current of 2A flows in an electric circuit as shown in figure. The potential difference($V_R - V_S$), in volts($V_R - V_S$ are potentials at R and S respectively) is



a) -4 b) +2 c) +4 d) -2

64. A house wife uses a 100 W bulb 8 h a day , and an electric heater of 300 W for 4 h a day. The total cost for the month of June at the rate of 0.05 rupee per unit will be
a) Rs 20 b) Rs 25 c) Rs 30 d) Rs 30 paise 50
65. 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) $R = 0$
66. The current $i_1$and $i_2$through the resistor $R_1(= 10\Omega)$and $R_2(= 30\Omega)$in the circuit diagram with $E_1 = 3V, E_2 = 3\ and\ E_3 = 2V$are respectively.



a) 02.A, 0.1A b) 0.4A, 0.2A c) 0.1A, 0.2A d) 0.2A, 0.4A

67. An electric bulb is rated $60W, 220V$. The resistance of its filament is
a) 708 Ω b) 870 Ω c) 807 Ω d) 780 Ω
68. A certain electrical conductor has a square cross-section, 2.0 mm on side, and is 12 m long. The resistance between its ends is 0.072Ω. The resistivity of its material is equal to
a) $2.4 \times 10^{-6}\Omega$m b) $1.2 \times 10^{-6}\Omega$m c) $1.2 \times 10^{-8}\Omega$m d) $2.4 \times 10^{-8}\Omega$m
69. A wire 20 cm long and 1 mm^2in cross-section carries a current of 4A when connected to a 2V battery. The resistivity of the wire is

a) $2 \times 10^{-7}\Omega$ m b) $5 \times 10^{-7}\Omega$ m c) $4 \times 10^{-6}\Omega$ m d) $1 \times 10^{-6}\Omega$ m

70. A thermo-*e*mf V appears across a conductor maintained at a temperature difference T. The thomson coefficient is then given by

a) $-T^2\frac{d^2V}{dT^2}$ b) $T^2\frac{dV}{dT}$ c) $-T\frac{d^2V}{dT^2}$ d) $-\frac{1}{T^2}\frac{dV}{dT}$

71. The tolerance level of a resistor with the colour code red, blue, orange, gold is

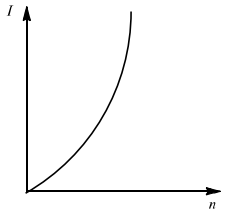
a) $\pm 5\%$ b) $\pm 10\%$ c) $\pm 20\%$ d) $\pm 40\%$

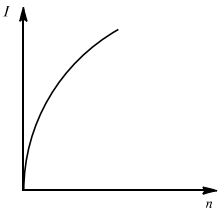
72. For a given thermocouple neutral temperature

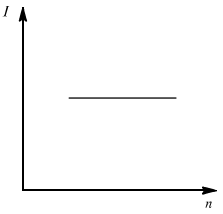
a) Is a constant b) Depends on cold junction temperature

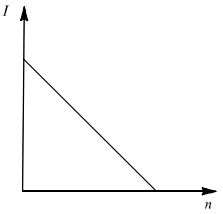
c) Depends on inversion temperature d) Double that of cold junction temperature

73. A battery consists of a variable number (n) of identical cells, each having an internal resistance r connected in series. The terminal of the battery is short-circuited. A graph of current *versus* the number of cells will be as shown in figure

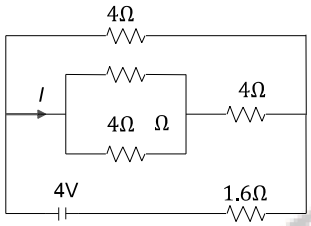
a) 

b) 

c) 

d) 

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



a) 1 b) 060 c) 0.4 d) 1.5

75. 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) $4.5V$

76. x g of Ag is deposited by passing 4 A of current of for 1 h. How many gram of Ag will be deposited by passing 6 A for 40 min?

a) $2x$ g b) $4x$ g c) x g d) $5x$ g

77. The main supply voltage to a room is 120 V. The resistance of the lead wires is 6Ω. A 60 W bulb is already giving light. What is the decrease in voltage across the bulb when a 240 W heater is switched on?

a) No change b) 10 V c) 20 V d) More than 10 V

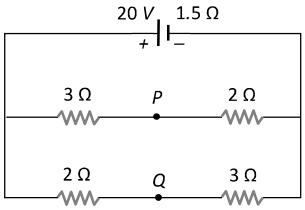
78. Two bulbs 40 W and 60 W and rated voltage 240 V are connected in series across a potential difference of 420 V. Which bulb will work at above its rated voltages?

a) 40 W bulb b) 60 W bulb c) Both will work d) None of these

79. A current of 1.5 A flows through a copper voltmeter. The thickness of copper deposited on the electrode surface of area 50 cm^2in 20 min is (density of Cu=9000 kgm^{-3}; ECE of Cu $= 3.3 \times 10^{-7} kgC^{-1}$)

a) 1.3×10^{-4} m b) 1.3×10^{-5} m c) 2.6×10^{-4} m d) 2.6×10^{-5} m

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



a) Zero b) 4 $volts$ $(V_P > V_Q)$ c) 4 $volts$ $(V_Q > V_P)$ d) 2.5 $volts$ $(V_Q > V_P)$

81. A certain charge liberates 0.8 gm of O_2. The same charge will liberate how many gm of silver

a) 108 gm b) 10.8 gm c) 0.8 gm d) $\frac{108}{0.8}\,gm$

82. $Watt\text{-}hour$ meter measures

a) Electric energy b) Current c) Voltage d) Power

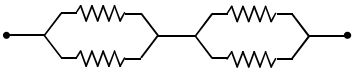
83. A potentiometer having the potential gradient of 2 mV/cm is used to measure the difference of potential across a resistance of 10 ohm. If a length of 50 cm of the potentiometer wire is required to get the null point, the current passing through the 10 ohm resistor is (in mA)

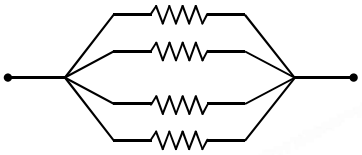
a) 1 b) 2 c) 5 d) 10

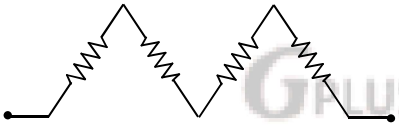
84. Two electric lamps of 40 watt each are connected in parallel. The power consumed by the combination will be

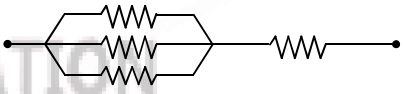
a) 20 $watt$ b) 60 $watt$ c) 80 $watt$ d) 100 $watt$

85. Which arrangement of four identical resistance should be used to draw maximum energy from a cell of voltage V

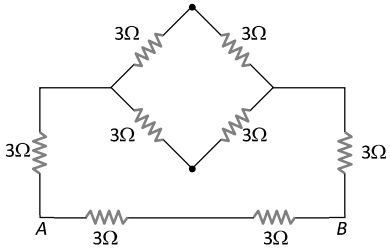
a) 

b) 

c) 

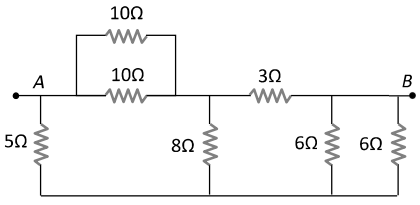
d) 

86. Equivalent resistance between A and B will be



a) 2 ohm b) 18 ohm c) 6 ohm d) 3.6 ohm

87. Seven resistance are connected as shown in the figure. The equivalent resistance between A and B is

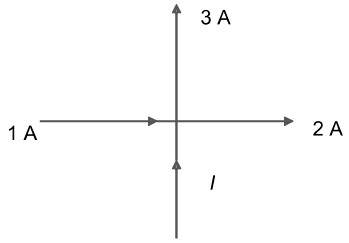


a) 3 Ω b) 4 Ω c) 4.5 Ω d) 5 Ω

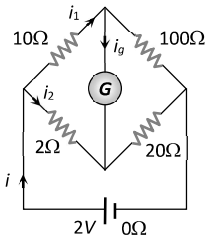
88. To get maximum current through a resistance of 2.5 Ω, one can use m rows of cells, each row having n cells. The internal resistance of each cell is 0.5 Ω. What are the values of n and m, if the total number of cell is 45?

a) $m = 3, n = 15$ b) $m = 5, n = 9$ c) $m = 9, n = 5$ d) $m = 15, n = 3$

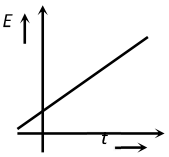
89. Voltmeters V_1 and V_2 are connected in series across a DC line. V_1 reads 80V and has a resistance of $200\Omega V^{-1}$ and V_2 has a total resistance of 32k Ω. The line voltage is
    a) 240 V b) 220 V c) 160 V d) 120 V
90. The length of the wire is doubled. Its conductance will be
    a) Unchanged b) Halved
    c) Quadrupled d) 1/4 of the original value
91. A student has 10 resistors of resistance $'r'$. The minimum resistance made by him from given resistors is
    a) $10\,r$ b) $\frac{r}{10}$ c) $\frac{r}{100}$ d) $\frac{r}{5}$
92. The value of current I in figure is

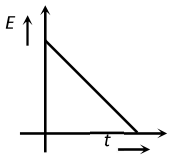


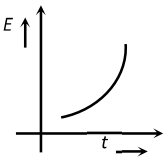
    a) 4A b) 6A c) 3A d) 5A
93. Which of the following relation is wrong?
    a) 1 ampere ×1 ohm=1 volt b) 1 watt ×1 sec=1 joule
    c) 1 newton per coulomb =1 volt per metre d) 1 columb ×1 volt=1 watt
94. In the circuit shown below the resistance of the galvanometer is 20 Ω. In which of the following alternative are the currents arranged strictly in the decreasing order

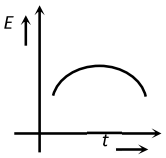


    a) i, i_1, i_2, i_g b) i, i_2, i_1, i_g c) i, i_2, i_g, i_1 d) i, i_1, i_g, i_2
95. A potentiometer wire of length $1m$ and resistance 10 Ω is connected in series with a cell of emf $2V$ with internal resistance 1 Ω and a resistance box including a resistance R. If potential difference between the ends of the wire is 1 mV, the value of R is
    a) 20000 Ω b) 19989 Ω c) 10000 Ω d) 9989 Ω
96. An ammeter reads 0.90 A when connected in series with a silver voltmeter that deposits 2.60 g of silver in 40 min. By what percentage is the ammeter reading is correct? Atomic weight of silver = 108 and 1 F=96500 C?
    a) 5% b) 7% c) -5% d) -7%
97. The following four wires are made of the same material and are at the same temperature. Which one of them has the 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
98. A battery of 24 cells, each of emf 1.5 V and internal resistance 2Ω is to be connected in order to send the maximum current through a 12Ω resistor. The correct arrangement of cells will be
    a) 2 rows of 12 cells connected in parallel b) 3 rows of 8 cells connected in parallel
    c) 4 rows of 6 cells connected in parallel d) All of these
99. Two different metals are joined end to end. One end is kept at constant temperature and the other end is heated to a very high temperature. The high depicting the thermo e.m.f. is

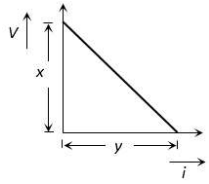
a) 

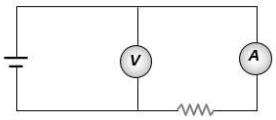
b) 

c) 

d) 

100. 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) $(x-y)$

101. A metallic block has no potential difference applied across it, then the mean velocity of free electrons at absolute temperature T is

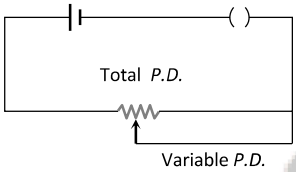
a) Proportional to T b) Proportional to $\sqrt{T}$

c) Zero d) Finite but independent of T

102. Two bulbs of 500 W and 200 W are manufactured to operate on 220 V line. The ratio of heat produced in 500 W and 200 W, in two cases, when firstly they are connected in parallel and secondly in series will be

a) $\frac{5}{2}:\frac{2}{5}$ b) $\frac{5}{2}:\frac{5}{2}$ c) $\frac{2}{5}:\frac{5}{2}$ d) $\frac{2}{5}:\frac{2}{5}$

103. The arrangement as shown in figure is called as



a) Potential divider b) Potential adder c) Potential substracter d) Potential multiplier

104. A fuse wire with radius 1 mm blows at 1.5 A. The radius of the fuse wire of the same material to blow at 3 A will be

a) $3^{1/4}$ mm b) $4^{1/3}$ mm c) $3^{1/2}$ mm d) $2^{1/3}$ mm

105. Two cells of same emf E but of different internal resistances r_1 and r_2 are connected in series with an external resistance R. The potential drop across the first cell is found to be zero. The external resistance R is

a) $r_1 + r_2$ b) $r_1 - r_2$ c) $r_2 - r_1$ d) $r_1 r_2$

106. In a conductor if 3000 coulomb of charge enters and 3000 coulomb of charge exits in time 10 minutes, then the current is

a) 5 ampere b) 10 ampere c) 2.5 ampere d) Zero

107. The resistivity of alloys $= R_{\text{alloy}}$; the resistivity of constituent metals R_{metal}. Then, usually

a) $R_{\text{alloy}} = R_{\text{metal}}$ b) $R_{\text{alloy}} < R_{\text{metal}}$

c) There is no simple relation between R_{alloy} and R_{metal} d) $R_{\text{alloy}} > R_{\text{metal}}$

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

a) Increases b) Approaches inversion temperature

c) Decreases d) Remains the same

109. For obtaining chlorine by electrolysis a current of 100 kW and 125 V is used. (Electro chemical equivalent of chlorine is $0.367 \times \text{kgC}^{-1}$). The amount of chlorine obtained in one minute will be

a) 1.7616 g b) 17.616 g c) 0.17161 g d) 1.7616 kg

110. The current in a conductor varies with time t as $I = 2t + 3t^2$ where I is in *ampere* and t in *seconds*.

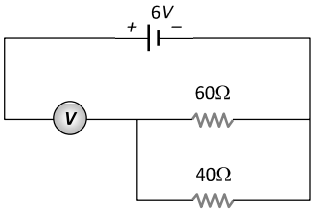
Electric charge flowing through a section of the conductor during $t = 2\ sec$ to $t = 3\ sec$ is

a) $10\ C$ b) $24\ C$ c) $33\ C$ d) $44\ C$

111. A wire of length $5m$ 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) $20\ m$

112. The measurement of voltmeter in the following circuit is

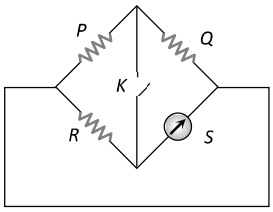


a) $2.4\ V$ b) $3.4\ V$ c) $4.0\ V$ d) $6.0\ V$

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

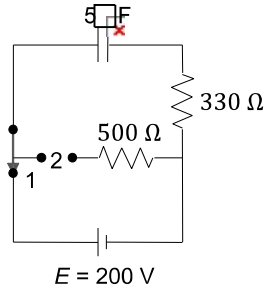
a) $5.1 \times 10^{-3} amp$ b) $6.8 \times 10^{-3} amp$ c) $1.1 \times 10^{-3} amp$ d) $2.2 \times 10^{-3} amp$

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



a) In left side b) In right side c) No deflection d) In either side

115. The amount of heat generated in 500Ω resistance, when the key is thrown over from contact 1 to 2, as shown in figure is



a) 10°C b) 7.5°C c) 5.0°C d) 2.5°C

116. In potentiometer a balance point is obtained, when

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

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

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

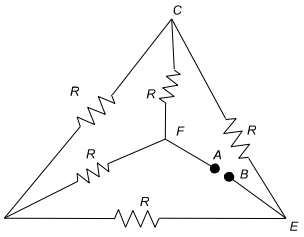
d) The p.d. across the potentiometer wire becomes equal to the e.m.f. of the battery

117. With the rise of temperature the resistivity of a semiconductor

a) Remains unchanged b) Increases

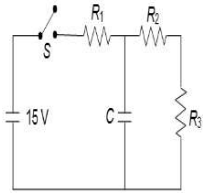
c) Decreases d) First increases and then decreases

118. Five equal resistances, each of resistance R,are connected as shown in figure below. A bettery of V volt is connected between A and B. The current flowing in FC will be



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

119. $I-V$ 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 increased
d) Less if the length of the wire increased

120. If 2.2 *kilowatt* power is transmitted through a 10 *ohm* line at 22000 *volt*, the power loss in the form of heat will be
a) 0.1 *watt* b) 1 *watt* c) 10 *watt* d) 100 *watt*

121. The resistor of resistance R is connected to 25 V supply and heat produced in it is 25 Js^{-1}. The value of R is
a) 225 Ω b) 1 Ω c) 25 Ω d) 50 Ω

122. A galvanometer can be converted into a voltmeter by connecting
a) Low residence in parallel
b) Low residence in series
c) High residence in parallel
d) High residence in series

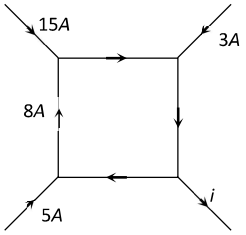
123. An electric heater of 1.08 Kw is immersed in water. After the water has reached a temperature of 100°C, how much time will be required to produce 100 g of steam?
a) 420 s b) 210 s c) 105 s d) 50 s

124. Two voltameters, one of copper and another of silver, are joined in paralleled. When a total charge q flows through the voltameters, equal amount of metals are deposited. If the electrochemical equivalents of copper and silver are z_1 and z_2 respectively, the charge which flows through the silver voltameter is
a) $\frac{q}{1+\frac{z_1}{z_2}}$ b) $\frac{q}{1+\frac{z_2}{z_1}}$ c) $q\frac{z_1}{z_2}$ d) $q\ z_2/z_1$

125. 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*

126. An immersion heater is rated 418 W. It should heat a litre of water from 10°C to 30°C in nearly
a) 44 s b) 100 s c) 200 s d) 400 s

127. The figure shows a network of currents. The magnitude of currents is shown here. The current i will be

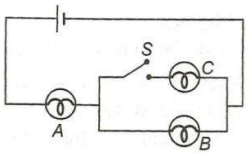


a) $3\ A$ b) $13\ A$ c) $23\ A$ d) $-3\ A$

128. A block has dimensions $1\ cm, 2\ cm, 3\ cm$. Ratio of the maximum resistance to minimum resistance between any point of opposite faces of this block is

a) $9:1$ b) $1:9$ c) $18:1$ d) $1:6$

129. In the given figure. A, B and C are three identical bulbs. When the switch S is closed



a) The brightness of bulb A does not change and that of B decreases

b) The brightness of bulb A increases and that of B decreases

c) The brightness of A increases bulb B does not glow

d) The brightness of both bulbs A not B decrease

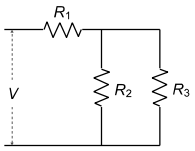
130. The length of a potentiometer wire is 5m. An electron in this wire experiences a force of 4.8×10^{-19}N, emf of the main cell used in potentiometer is

a) 3 V b) 15 V c) 1.5 V d) 5 V

131. 4 cells each of emf 2 V and internal resistance of 1Ω are connected in parallel to a load resistor of 2Ω. Then the current through the load resistor is

a) $2\ A$ b) $1.5\ A$ c) $1\ A$ d) $0.888\ A$

132. For ensuring dissipation of same energy in all three resistors (R_1, R_2, R_3)connected as shown in figure, their values be related as



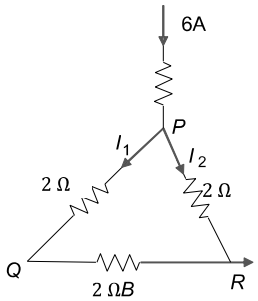
a) $R_1 = R_2 = R_3$ b) $R_2 = R_3$ and $R_1 = 4\,R_2$

c) $R_2 = R_3$ and $R_1 = R_2/4$ d) $R_1 = R_2 + R_3$

133. n identical cells, each of emf E and internal resistance r, are connected in series a cell A is joined with reverse polarity. The potential difference across each cell, except A is

a) $\frac{2nE}{n-2}$ b) $\frac{(n-2)E}{n}$ c) $\frac{(n-1)E}{n}$ d) $\frac{2E}{n}$

134. A current of A enters one corner one corner P of an equilateral triangle PQRhaving 3 wires of resistance 2 Ωeach 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

135. 160W-60V lamp is connected at 60 V DC supply. The number of electrons passing through the lamp in 1 min is (the charge of electron $e = 1.6 \times 10^{-19}$C)

a) 10^{19} b) 10^{21} c) 1.6×10^{19} d) 1.4×10^{20}

136. If a $30\ V, 90\ W$ bulb is to be worked on a $120\ V$ line, a resistance of how many ohms should be connected in series with the bulb

a) $10\ ohm$ b) $20\ ohm$ c) $30\ ohm$ d) $40\ ohm$

137. In a thermo-couple, one junction which is at 0°C and the othe at t°C the emf is given by $E = at^2 - bt^2$. The neutral temperature is given by
a) a/b b) $2\,a/3b$ c) $3a/2b$ d) $b/2a$

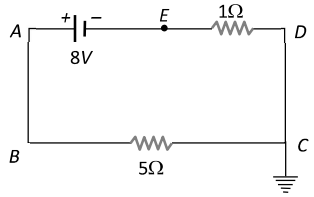
138. 5 cells, each of emf $0.2V$ and internal resistance 1Ω are connected to an external circuit of resistance of 10Ω. Find the current through external circuit
a) $\frac{1}{2.5}A$ b) $\frac{1}{10}A$ c) $\frac{1}{15}A$ d) $\frac{1}{2}A$

139. 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
a) 1 : 4 b) 4 : 1 c) 1 : 2 d) 2 : 1

140. A combination of two resistance of 2 W and 2/3 W connected in parallel is joined across a battery of emf of 3 V and of negligible internal resistance. The energy given out per sec will be
a) $\frac{1}{2} \times 3 \times 3$ J b) $\frac{1}{2} \times \frac{1}{3} \times 3 \times 3$ J c) 2×3 J d) $3 \times 3 \times 2$ J

141. 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
a) Two times b) Four times c) Eight times d) Sixteen times

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



a) Zero b) $-8\,V$ c) $-4/3\,V$ d) $4/3\,V$

143. An electric fan and a heater are marked as 100 $watt$, 220 $volt$ and 1000 $watt$, 220 volt respectively. The resistance of the heater is
a) Zero b) Greater than that of the fan
c) Less than that of the fan d) Equal to that of the fan

144. In a thermocouple, the neutral temperature is 270°C and the temperature of inversion is 525°C. The temperature of cold junction would be
a) 30°C b) 255°C c) 15°C d) 25°C

145. 5 $ampere$ of current is passed through a metallic conductor. The charge flowing in one minute in coulomb will be
a) 5 b) 12 c) 1/12 d) 300

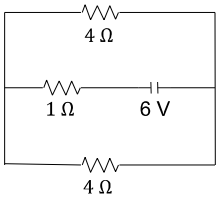
146. When the resistance of 9 Ω is connected at the ends of a battery, its potential difference decreases from 40 $volt$ to 30 $volt$. The internal resistance of the battery is
a) 6 Ω b) 3 Ω c) 9 Ω d) 15 Ω

147. A wire has a resistance of 6Ω. It is cut into two parts and both half values are connected in parallel. The new resistance is
a) 3Ω b) 6Ω c) 12Ω d) 1.5Ω

148. A conductor wire having 10^{29} free electrons/m^3 carries a current of 20A. If the cross-section of the wire is $1mm^2$, then the drift velocity of electrons will be
a) $6.25 \times 10^{-3} ms^{-1}$ b) $1.25 \times 10^{-5} ms^{-1}$ c) $1.25 \times 10^{-3} ms^{-1}$ d) $1.25 \times 10^{-4} ms^{-1}$

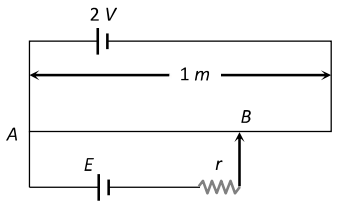
149. Above neutral temperature, thermo e.m.f. in a thermocouple
a) Decreases with rise in temperature b) Increases with rise in temperature
c) Remains constant d) Changes sign

150. The current in the 1Ω resistor shown in the circuit is



a) $\frac{2}{3}A$ b) 3A c) 6A d) 2A

151. 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

152. Which statement is true?
(i) Kirchoff's law is equally applicable to both AC and DC.
(ii) Semiconductors have a positive temperature coefficient of resistance.
(iii) Meter bridge is greater sensitive when the resistance of all four arms of the bridge is of the same order.
(iv) The emf of a cell depends upon the size and area of electrodes.
a) (i) and (iv) b) (ii) and (iv) c) (iii) and (iv) d) None of these

153. An electric iron draws 5 amp, a TV set draws 3 amp and refrigerator graws 2 amp from a 220 $volt$ main line. The three appliances are connected in parallel. If all the three are operating at the same time, the fuse used may be of
a) 20 amp b) 5 amp c) 15 amp d) 10 amp

154. The ratio of the amounts of heat developed in the four arms of a balanced Wheatstone bridge, when the arms have resistance $P = 100\ \Omega$; $Q = 10\ \Omega$; $R = 300\ \Omega$ and $S = 30\ \Omega$ respectively is
a) 3 : 30 : 1 : 10 b) 30 : 3 : 10 :1 c) 30 : 10 : 1 : 3 d) 30 : 1 : 3 : 10

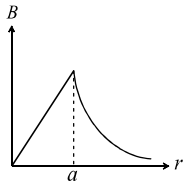
155. Length of a hollow tube is 5m, it's outer diameter is 10 cm and thickness of it's wall is 5 mm. If resistivity of the material of the tube is $1.7 \times 10^{-8}\Omega \times m$ then resistance of tube will be
a) $5.6 \times 10^{-5}\Omega$ b) $2 \times 10^{-5}\Omega$ c) $4 \times 10^{-5}\Omega$ d) None of these

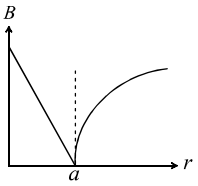
156. A milliammeter of range 0-30mA has internal resistance of 20 Ω. The resistance to be connected in series to convert it into a voltmeter of maximum reading 3V is
a) 49 Ω b) 80 Ω c) 40 Ω d) 30 Ω

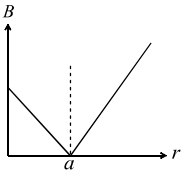
157. A lamp having tungsten filament consumes 50 W. Assume the temperature coefficient of resistance for tungsten is $4.5 \times 10^{-3}°C^{-1}$ and temperature of the surrounding is 20°C. When the lamp burns, the temperature of its filament becomes 2500°C , then the power consumed at the moment switch is on, is
a) 608 W b) 710 W c) 215 W d) 580 W

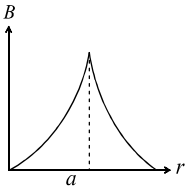
158. A heater coil cut into two equal parts and one part is connected with heater. Now heat generated in heater will be
a) Twice b) Half c) One-fourth d) Four times

159. A long straight wire of a circular cross section (radius a) carries a steady current I and the current I is uniformly distributed across this cross-section. Which of the following plots represents the variation of magnitude of magnetic field B with distance r from the centre of the wire

a) 

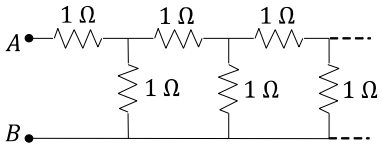
b) 

c) 

d) 

160. The resistance of a discharge tube is
a) *Ohmic* b) Non-*ohmic* c) Both (a) and (b) d) Zero

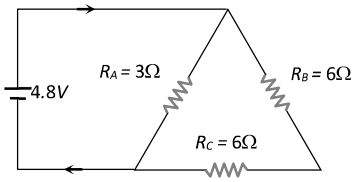
161. The equivalent resistance between points A and B of an infinite network of resistances each of 1Ω connected as shown in figure, is



a) Infinite b) Zero c) 2Ω d) $(1+\sqrt{5})/2\Omega$

162. By mistake a voltmeter is connected in series and an ammeter is connected in parallel with a resistance in an electrical circuit. What will happen to the instrument?
a) Voltmeter is damaged b) Ammeter is damaged
c) Both are damaged d) None is damaged

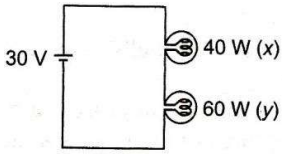
163. The current in the given circuit is



a) 8.31 A b) 6.82 A c) 4.92 A d) 2 A

164. Specific resistance of copper, constantan and silver are 1.78×10^{-8}, 39.1×10^{-8} and 10^{-8} Ω-m respectively. Which of these is the best conductor of heat and electricity?
a) Copper b) Constantan c) Silver d) All of them

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



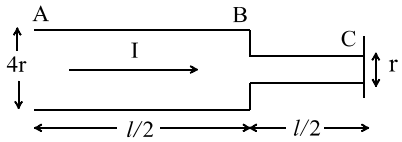
a) X will glow brighter b) Resistance of Y will be greater than X
c) Heat produced in Y will be greater than X d) Voltage drop in X will be greater than Y

166. A current passing through a copper voltmeter deposits 0.002 kg of copper on cathode plate in 100 min. If there are 10^{25} copper atoms in one kg of copper, the electric charge delivered to cathode by Cu^{++} ions per second will be
a) 0.53 C b) 0.71 C c) 1.06 C d) 10.06 C

167. The resistance of an ideal ammeter is
a) Infinite b) Very high c) Small d) Zero

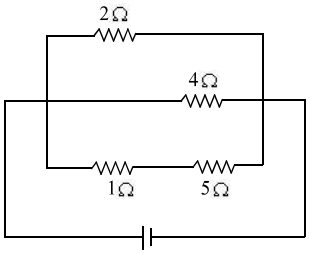
168. A potential difference of V is applied at the ends of a copper wire of length l and diameter d. On doubling only d, the drift velocity,
a) Becomes two times b) Becomes half c) Does not change d) Becomes one-fourth

169. 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



a) Power loss is second half is four times the power loss in first half
b) Voltage drop in first is twice of voltage drop in second half
c) Current density in both halves are equal
d) Electric field in both halves is equal

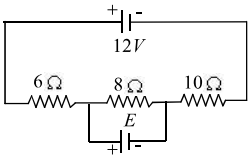
170. A current of 3 amp. flows through the 2Ω resistor shown in the circuit. The power dissipated in the 5Ω resistor is



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

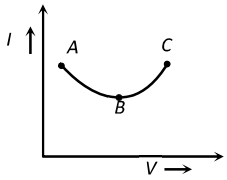
171. It is easier to start a car engine on a hot day than on a cold day. This is because the internal resistance of the car battery
a) Decreases with rise in temperature b) Increases with rise in temperature
c) Decreases with a fall in temperature d) Does not change with a change in temperature

172. In the circuit shown, the current though 8 ohm is same before and after connecting E. The value of E is



a) 12 V b) 6 V c) 4 V d) 2 V

173. Resistance as shown in figure is negative at



a) A b) B c) C d) None of these

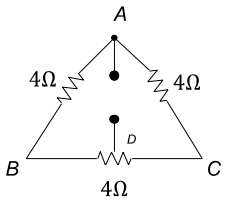
174. A thin wire of resistance 4 Ω is bent to form a circle. The resistance across any diameter is
a) 4 Ω b) 2 Ω c) 1 Ω d) 8 Ω

175. The current flowing through a wire depends on time as $I = 3t^2 + 2t + 5$. The charge flowing through the cross-section of the wire in time from $t = 0$ to $t = 2$ sec. is
a) 22 C b) 20 C c) 18 C d) 5 C

176. How much work is required to carry a 6 μC charge from the negative terminal to the positive terminal of a 9 V battery
a) $54 \times 10^{-3} J$ b) $54 \times 10^{-6} J$ c) $54 \times 10^{-9} J$ d) $54 \times 10^{-12} J$

177. The direction of current in an iron-copper thermocouple is
a) From copper to iron at the hot junction b) From iron to copper at the hot junction
c) From copper to iron at cold junction d) No current will flow

178. There 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 points A and D will be



a) 12 Ω b) 6 Ω c) 3 Ω d) $\frac{1}{3}\Omega$

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

a) 24 ohm b) 16 ohm c) $\frac{4}{3}$ ohm d) $\frac{8}{3}$ ohm

180. If the emf of a thermocouple, one junction of which is kept 0°C is given by $e = at + \frac{1}{2}bt^2$, then the neutral temperature will be

a) $\frac{a}{b}$ b) $-\frac{a}{b}$ c) $\frac{a}{2b}$ d) $-\frac{1}{ab}$

181. Corresponding to the resistance $4.7 \times 10^6\Omega \pm 5\%$, which is order of colour coding on carbon resistors?

a) Yellow, violet, blue, gold b) Yellow, violet, green, gold
c) Orange, blue, green, gold d) Orange, blue, violet, gold

182. A 25 W, 220 V bulb and a 100 W, 220 V bulb are connected in parallel across a 440 V line

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

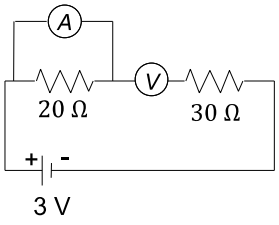
183. A battery of emf 2V and internal resistance 0.1 Ω is being charged by a current of 5A. the potential difference between the terminals of the battery is

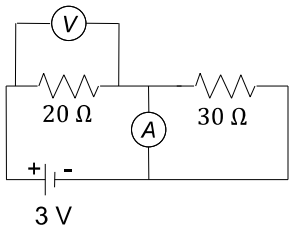
a) 2.5 Ω b) 1.5 Ω c) 0.5 Ω d) 1 Ω

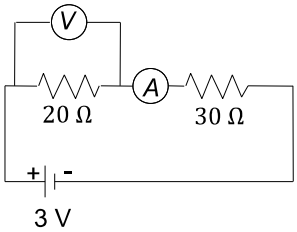
184. Two identical cells send the same current in 3 Ω resistance, whether connected in series or in parallel. The internal resistance on the cell should be

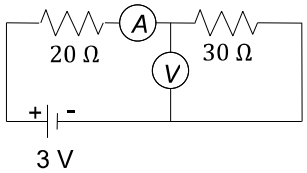
a) 1 Ω b) 3 Ω c) $\frac{1}{2}\Omega$ d) 3.5 Ω

185. Resistors of resistance 20Ω and 30Ω are joined in series with a battery of emf 3V. It is desired to measure current and voltage across the 20Ω resistor with the help of an ammeter and voltmeter. Identify the correct arrangement of ammeter (A) and voltmeter (V) out of four possible arrangements shown in figure. Given below

a)


b)


c)


d)


186. For a thermocouple, the inversion temperature is 600°C and the neutral temperature is 320°C. Find the temperature of the cold junction?

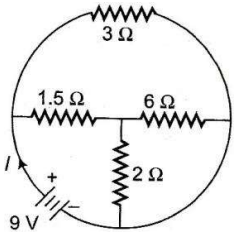
a) 40°C b) 20°C c) 80°C d) 60°C

187. Two bulbs, one of 50 *watt* and another of 25 *watt* are connected in series to the mains. The ratio of the currents through them is

a) 2 :1 b) 1 :2

c) 1 :1 d) Without voltage, cannot be calculated

188. The total current supplied to the given circuit by the battery is



a) 9 A b) 6 A c) 2 A d) 4 A

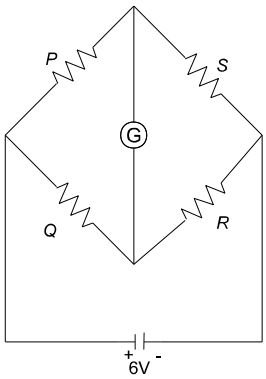
189. A resistance of 2 Ω is connected across one gap of a meter-bridge(the length of the wire is 100cm) and an unknown resistance, greater than 2 Ω is connected across the other gap. When these resistances are interchanged, the unknown resistance is

a) 3 Ω b) 2 Ω c) 4 Ω d) 6 Ω

190. A bulb rated at $(100W - 200V)$ is used on a $100V$ line. The current in the bulb is

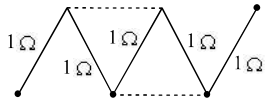
a) $\frac{1}{4} amp$ b) 4 amp c) $\frac{1}{2} amp$ d) 2 amp

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



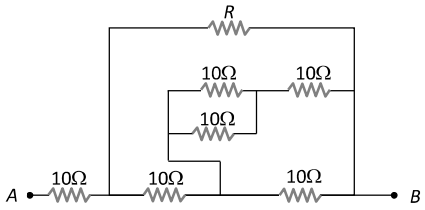
a) 0.36A b) Zero c) 0.18A d) 0.72A

192. 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

193. 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

194. The cold junction of a thermocouple is maintained at 10°C. No thermo *e*.m.f. is developed when the hot junction is maintained at 530°C. The neutral temperature is

a) 260°C b) 270°C c) 265°C d) 520°C

195. Two electric bulbs rated P_1 watt V volts and P_2 watt V volts are connected in parallel and V volts are applied to it. The total power will be

a) $P_1 + P_2 watt$ b) $\sqrt{P_1 P_2}\, watt$ c) $\frac{P_1 P_2}{P_1 + P_2} watt$ d) $\frac{P_1 + P_2}{P_1 P_2} watt$

196. A tap supplies water at 22°C. A man takes 1 L of water per min at 37°C from the geyser. The power of the geyser is

a) 525 W b) 1050 W c) 1575 W d) 2100 W

197. Kirchoff's second law for the analysis of circuit is based on

a) Conversion of charge b) Conversion of energy

c) Conversion of both charge and energy d) Conversion of momentum of electron

198. On passing the current in water voltmeter, hydrogen

a) Is liberated at anode b) Is liberated at cathode

c) Is not liberated d) Remains in the solution

199. 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

200. A certain current passing through a galvanometer produces a deflection of 100 divisions. When a shunt of one ohm is connected, the deflection reduces to 1 division. The galvanometer resistance is

a) 100 Ω b) 99 Ω c) 10 Ω d) 9.9 Ω

201. The amount of chlorine produced per-second through electrolysis in a plate which consumes 100 KW power at 200 V is (Given, electrochemical equivalent of chlorine $= 0.367 \times 10^{-3} gC^{-1}$)

a) 18.35 g b) 1.835 g c) 183.5 g d) 0.1835 g

202. The temperature of the cold junction of a thermocouple is 0°C and the temperature of the hot junction is T°C. The emf is $E = 16T - 0.04T^2\ \mu V$. The inversion temperature T_i is

a) 200°C b) 400°C c) 100°C d) 300°C

203. A resistance of 2Ω is to be made from a copper wire (specific resistance=1.7×10^{-8}Ω m) using a wire of length 50cm. The radius of the wire is

a) 0.0116 mm b) 0.367 mm c) 0.116 mm d) 0.267 mm

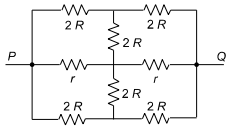
204. A 6V cell with 0.5 Ω internal resistance, a10V cell with 1 Ω internal resistance and a 12 Ω external resistance are connected in parallel. The current (in ampere) through the 10V cell is

a) 0.60 b) 2.27 c) 2.87 d) 5.14

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

a) 1 Ω b) 2 Ω c) $\frac{1}{2}$Ω d) 2.5 Ω

206. The effective resistance between points P and Q of the electrical circuit shown in the figure.



a) $\frac{2Rr}{R+r}$ b) $\frac{8R(R+r)}{(3R+r)}$ c) $2R + 4r$ d) $\frac{5R}{2} + 2R$

207. To get a maximum current through a resistance of 2.5Ω, one can use m rows of cells each row having n cells. The internal resistance of each cell is 0.5Ω. What are the values of m and n if the total number of cells are 20?

a) $m = 2, n = 10$ b) $m = 4, n = 5$ c) $m = 5, n = 4$ d) $n = 2, m = 10$

208. 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

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) $R = R_2 - R_1$

209. In charging a battery of motor-car, the following effect of electric current is used
a) Magnetic b) Heating c) Chemical d) Induction

210. According to Faraday's law of electrolysis, the amount of decomposition is proportional to
a) 1/time for which current passes b) Electrochemical equivalent of the substance
c) 1/current d) 1/electrochemical equivalent

211. A 100 ohm galvanometer gives full scale deflection at 10 mA. How much shunt is required to read 100 mA
a) 11.11 ohm b) 9.9 ohm c) 1.1 ohm d) 4.4 ohm

212. 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

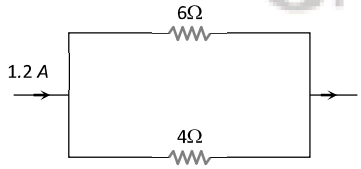
213. The steady current flows in a metallic conductor of non-uniform cross-section. The quantity/quantities constant along the length of the conductor is/are
a) Current, electric field and drift velocity b) Drift speed only
c) Current and drift speed d) Current only

214. There are 8 equal resistance R. Two are connected in parallel, such four groups are connected in series, the total resistance of the system will be
a) $R/2$ b) 2 R c) 4 R d) 8 R

215. Two electric bulbs whose resistances are in the ratio of 1 : 2 are connected in parallel to a constant voltage source. The powers dissipated in them have the ratio
a) 1 :2 b) 1 :1 c) 2 :1 d) 1 :4

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

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



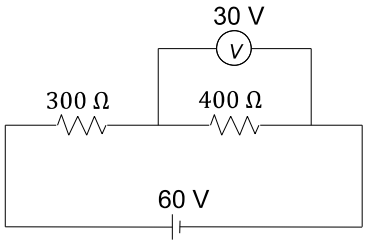
a) 0.40 $ampere$ b) 0.48 $ampere$ c) 0.72 $ampere$ d) 0.80 $ampere$

218. A wire is broken in four equal parts. A packet is formed by keeping the four wires together. The resistance of the packet in comparison to the resistance of the wire will be
a) Equal b) One fourth c) One eight d) $\frac{1}{16}th$

219. A wire is stretched so as to change its diameter by 0.25%. The percentage change in resistance is
a) 4.0% b) 2.0% c) 1.0% d) 0.5%

220. The junction of Ni-Cu thermo couple are maintained at 0°C and 100°C. The seeback emf developed in the temperature is
$a_{Ni-Cu} = 16.3 \times 10^{-6}V°C^{-1}$
$b_{Ni-Cu} = -0.021 \times 10^{-6}V°C^{-1}$
a) 2.73×10^{3}V b) 1.42×10^{-3}V c) 3.68×10^{-3}V d) 2.23×10^{3}V

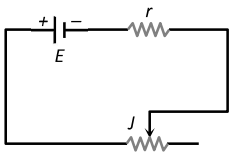
221. In the circuit figure, the voltmeter reads 30 V. what is the resistance of the voltmeter?

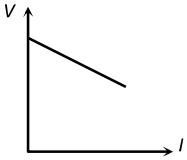


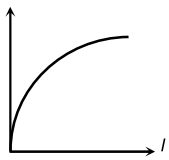
a) 1200 Ω b) 700 Ω c) 400 Ω d) 300 Ω

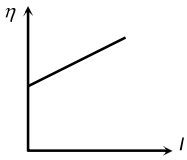
222. The lowest resistance which can be obtained by connecting 10 resistors each of 1/10 *ohm* is
a) 1/250 Ω b) 1/200 Ω c) 1/100 Ω d) 1/10 Ω

223. Battery shown in figure has *e*.m.f. E and internal resistance r. Current in the circuit can be varied by sliding the contact J. If at any instant current flowing through the circuit is I, potential difference between terminals of the cell is V, thermal power generated in the cell is equal to η fraction of total electrical power generated in it.; then which of the following graphs is correct



a) 

b) 

c) 

d) Both (a) and (b) are correct

224. 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
a) 200 J b) 400 J c) 25 J d) 50 J

225. Two bulbs are working in parallel order. Bulb A is brighter than bulb B. If R_A and R_B are their resistance respectively then
a) $R_A > R_B$ b) $R_A < R_B$ c) $R_A = R_B$ d) None of these

226. A 60 *watt* bulb carries a current of 0.5 *amp*. The total charge passing through it in 1 *hour* is
a) 3600 *coulomb* b) 3000 *coulomb* c) 2400 *coulomb* d) 1800 *coulomb*

227. 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
a) E and $-r$ b) $-r$ and E c) r and $-E$ d) $-E$ and r

228. The dimensions of $\frac{1}{2}\varepsilon_o E^2$ (ε_o:permittivity of free space; E: electric field) is
a) [MLT] b) $[ML^2T^{-2}]$ c) $[ML^{-1}T^{-2}]$ d) $[ML^2T^{-1}]$

229. A thermoelectric refrigerator works on
a) Joule effect b) Seeback effect c) Peltier effect d) Thermonic emission

230. A cell of internal resistance 3 *ohm* and *emf* 10 *volt* is connected to a uniform wire of length 500 *cm* and resistance 3 *ohm*. The potential gradient in the wire is
a) 30 mV/cm b) 10 mV/cm c) 20 mV/m d) 4 mV/cm

231. A given piece of wire of length l and radius r is having a resistance R. This wire is stretched uniformly to a wire of radius $\frac{r}{2}$. What is the new resistance?

a) $3R$ b) $8R$ c) $16R$ d) $2R$

232. A wire of resistance 18Ω is divided into three equal parts. These parts are connected in side of triangle, the equivalent resistance of any two corners of triangle will be
a) 18Ω b) 9Ω c) 6Ω d) 4Ω

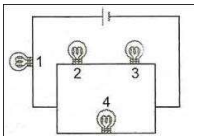
233. If an ammeter is connected in parallel to a circuit, it is likely to be damaged due to excess
a) Current b) Voltage c) Resistance d) All of these

234. When 1 kg of hydrogen forms water, 34×10^6 cal of heat is liberated. If ECE of hydrogen is $(1/96500{,}000)$kg C^{-1}, then the minimum voltage requird for decomposition of water is
a) 0.75 V b) 3.0 V c) 1.5 V d) 6.0 V

235. A source of a primary cell is 2V. what is the short circuited it provides 4A current, then the internal resistance of cell will be
a) 8 Ω b) 2.0 Ω c) 4 Ω d) 0.5 Ω

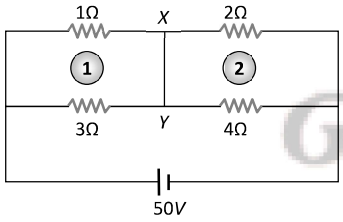
236. The current inside a copper voltameter
a) Is half the outside value
b) Is the same as the outside value
c) Is twice the outside value
d) Depends on the concentration of $CuSO_4$

237. All bulbs in figure, are identical. Which bulb lights brightly?



a) 1 b) 2 c) 3 d) 4

238. Current through wire XY of circuit shown is

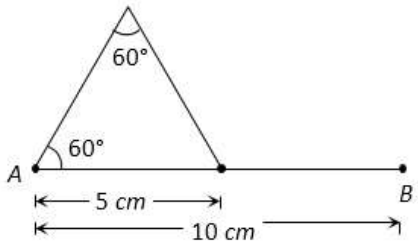


a) 1 A b) 4 A c) 2 A d) 3 A

239. A voltmeter of resistance 1000Ω gives full scale deflection when a current of 100 mA flows through it. The shunt resistance required across it to enable it to be used as an ammeter reading 1 A at full scale deflection is
a) 10000Ω b) 9000Ω c) 222Ω d) 111Ω

240. Two wires A and B of same material and same mass have radii $2r$ and r respectively. If resistance of wire A is 34Ω, then resistance of B will be
a) 544Ω b) 272Ω c) 68Ω d) 17Ω

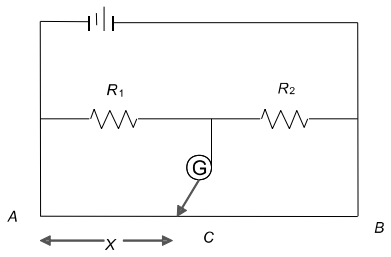
241. A wire has resistance of 24 Ω is bent in the following shape. The effective resistance between A and B is



a) 24 Ω b) 10 Ω c) $\frac{16}{3}\Omega$ d) None of these

242. In the shown arrangement of the experiment of the meter bridge if AC corresponding to null deflection of

galvanometer is x, what would be its value if the radius of the wire AB is doubled?



a) x b) $x/4$ c) $4x$ d) $2x$

243. A 2V battery, a 990 Ω resistor and a potentiometer of 2m length, all are connected in series of the residence of potentiometer wire is 10 Ω, then the potential gradient of the potentiometer wire is
a) $0.05Vm^{-1}$ b) $0.5Vm^{-1}$ c) $0.01Vm^{-1}$ d) $0.1\ Vm^{-1}$

244. 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)

245. A constant voltage is applied between the two ends of a uniform metallic wire. Some heat is developed in it. The heat developed is doubled if
a) Both the length and radius of wire are halved b) Both the length and radius of wire are doubled
c) The radius of wire is doubled d) The length of wire is doubled

246. Two identical cells weather connected in parallel or in series gives the same current when connected to an external resistance 1.5 Ω. Find the value of internal resistance of each cell.
a) 1 Ω b) 0.5 Ω c) Zero d) 1.5 Ω

247. A capacitor of 10 μF has a potential difference of 40 V across it. If it is discharged in 0.2 s, the average current during discharge is
a) 2 mA b) 4 mA c) 1 mA d) 0.5 mA

248. 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

249. Consider the following two statements A and B and identify the correct choice given in the answer
(A) Duddells thermo-galvanometer is suitable to measure direct current only
(B) Thermopile can measure temperature differences of the order of 10^{-3}°C
a) Both A and B are true b) Both A and B are false
c) A is true but B is false d) A is false but B is true

250. Two ends of a conductor are at different temperatures the electromotive force generated between two ends is
a) Seebeck electro motive force (e.m.f.) b) Peltier electro motive force (e.m.f.)
c) Thomson electro motive force (e.m.f.) d) None of these

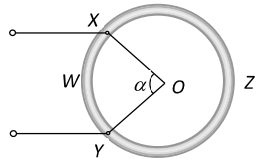
251. A voltmeter having resistance of $50 \times 10^3\ ohm$ is used to measure the voltage in a circuit. To increase the range of measurement 3 times the additional series resistance required is
a) $10^5\ ohm$ b) $150\ k.ohm$ c) $900\ k.ohm$ d) $9 \times 10^6 ohm$

252. We have a galvanometer of resistance 25Ω. It is shunted by a 2.5 Ω 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) $\frac{I}{I_0} = \frac{4}{11}$

253. 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, $\frac{\alpha_1}{\alpha_2}$ is

a) $\frac{t_1}{t_2}$ b) $\frac{t_2 - t_1}{t_2}$ c) $\frac{t_2 - t_1}{t_1}$ d) $\frac{t_2}{t_1}$

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

255. One junction of a certain thermo-couple is at a fixed temperature T_r and the other junction is at temperature T. The thermo electric force for this is expressed by

$E = K(T - T_r)[\, T_0 + \frac{1}{2}(T^2 + T_r^2)\,]$.

At temperature $T = T_0/2$ the thermoelectric power is

a) $\frac{1}{2}\, K\, T_0$ b) $\frac{3}{2} K\, T_0$ c) $\frac{1}{2}\, K\, T_0^2$ d) $\frac{1}{2} K\, (T_0 - T_r)^2$

256. A silver and a zinc voltmeter are connected in series and a current I is passed through them for a time t, liberating w gram of zinc. The weight of silver deposited is nearly

a) 1.7 w g b) 2.4 w g c) 3.5 w **g** d) 1.2 w g

257. When current is passed in antimony-bismuth couple, then

a) The junction becomes hot when the current is from bismuth to antimony

b) The junction becomes hot when current flows from antimony to bismuth

c) Both junctions becomes hot

d) Both junctions becomes cold

258. A galvanometer of resistance 50 Ω is connected to a battery of 3V along with a resistance of 2950 Ω 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

a) 5050 Ω b) 5550 Ω c) 6050 Ω d) 4450 Ω

259. A moving coil galvanometer has a resistance of 10Ω and full scale deflection of 0.01A. It can be converted into voltmeter of 10V full scale by connecting into resistance of

a) 9.90Ω is series b) 10Ω in series c) 990Ω in series d) 0.10Ω in series

260. When a current is passed through water, acidified with a dilute sulphuric acid, the gases formed at the platinum electrodes are

a) 1 vol. hydrogen (cathode) and 2 vol. oxygen (anode)

b) 2 vol. hydrogen (cathode) and 1 vol. oxygen (anode)

c) 1 vol. hydrogen (cathode) and 1 vol. oxygen (anode)

d) 1 vol. oxygen (cathode) and 2 vol. hydrogen (anode)

261. 12 cells each having same emf are connected in series with some cells wrongly connected. The arrangement is connected in series with an ammeter and two cells which are in series. Current is 3 A when cells and battery aid each other and is 2 A when cells and battery oppose each other. The number of cells wrongly connected is

a) 4 b) 1 c) 3 d) 2

262. Equal amounts of a metal are converted into cylindrical wire of different lengths L and cross-sectional area A.The wire with the maximum resistance is the one, which has

a) Length=L and area = A

b) lengths = $\frac{L}{2}$ and area = $2A$

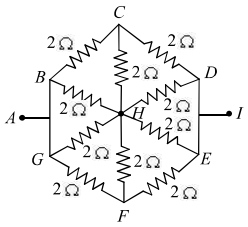
c) lengths = $2L$ and area = $\frac{A}{2}$

d) All have the same resistance, as the amount of the metal is the same

263. If θ_i is the inversion temperature, θ_n is the natural temperature, θ_c is the temperature of the cold junction then

a) $\theta_i + \theta_c = \theta_n$ b) $\theta_i - \theta_c = 2\theta_n$ c) $\frac{\theta_i + \theta_c}{2} = \theta_n$ d) $\theta_c - \theta_i = 2\theta_n$

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



a) 2 Ω b) 1 Ω c) 0.5 Ω d) 5 Ω

265. If 2 A of current is passed through $CuSO_4$ solution for 32 s, then the number of copper ions deposited at the cathode will be

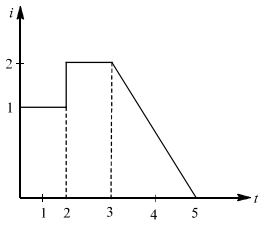
a) 4×10^{20} b) 2×10^{20} c) 4×10^{19} d) 2×10^{19}

266. 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}

267. The plot represents the flow of current through a wire at three different times.



The ratio of charges flowing through the wire at different times is

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

268. The internal resistance of a cell of emf 2 V is 0.1Ω. It is connected to a resistance of 3.9Ω . The potential difference across is

a) 0.5 V b) 1.9 V c) 1.95 V d) 2 V

269. 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

270. An AC generator of 220 V have internal resistance $r = 10$ Ω and external resistance $R = 100$ Ω. What is the power developed in the external circuit?

a) 227 W b) 325 W c) 400 W d) 500 W

271. Two resistances when connected in parallel across a cell of negligible internal resistance consume 4 times the power they would consume when connected in series. If one resistance is 5 Ω , the other is

a) 1 Ω b) 2.5 Ω c) 5 Ω d) 10 Ω

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

a) 8% b) 9% c) 10% d) 91%

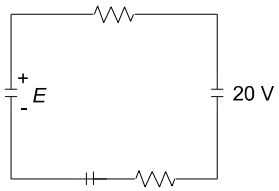
273. What will happen when a 40 $watt$, 220 $volt$ lamp and 100 $watt$, 220 $volt$ lamp are connected in series across 40 $volt$ supply

a) 100 $watt$ lamp will fuse b) 40 $watt$ lamp will fuse

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

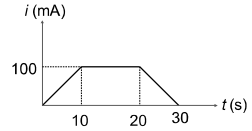
274. Calculate the value E, for given circuit, when value of 2A current is either flowing in clockwise or

anticlockwise direction



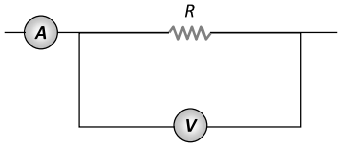
a) 32 V, 8V b) 38V, 2V c) 32V, 2V d) 30V, 8V

275. In a copper voltmeter, the mass deposited in 30 s is m gram. If the current-time graph is as shown in figure, the electrochemical equivalent of copper, in gC^{-1} is



a) 0.1 m b) 0.6 m c) $\frac{m}{2}$ d) m

276. 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)

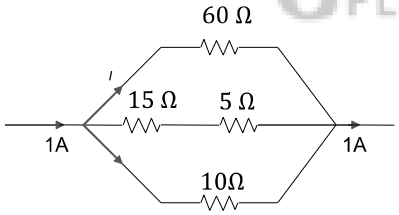


a) Exactly 10 ohm b) Less than 10 ohm
c) More than 10 ohm d) We cannot definitely say

277. An electric kettle takes 4 A current at 220 V. How much time will it take to boil 1 kg of water from room temperature 20°C? The temperature of boiling water is 100°C

a) 0.63 $minutes$ b) 6.3 $minutes$ c) 12.6 $minutes$ d) 12.8 $minutes$

278. The magnitude of I in ampere is



a) 0.1 b) 0.3 c) 0.6 d) None of the above

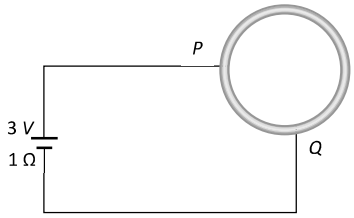
279. Two electric bulbs marked 40 W, 220 V and 60 W, 220 V when connected in series, across same voltage supply of 220 V, the effective power is P_1 and when connected in parallel the effective power is P_2. Then $\frac{P_1}{P_2}$ is

a) 0.5 b) 0.48 c) 0.24 d) 0.16

280. 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

a) 10 Ω b) 20 Ω c) 30 Ω d) 40 Ω

281. A wire of resistance 10 Ω 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 Ω 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 $\frac{9}{25}A$

282. The temperature at which thermo emf is zero, is
a) Temperature of inversion b) Temperature of cold junction
c) Neutral temperature d) None of the above

283. n identical bulbs, each designed to draw a power p from a certain voltage supply, are joined in series across that supply. The total power which they will draw is
a) p/n^2 b) p/n c) p d) np

284. The thermistors are usually made of
a) Metals with low temperature coefficient of resistivity
b) Metals with high temperature coefficient of resistivity
c) Metal oxides with high temperature coefficient of resistivity
d) Semiconducting materials having low temperature coefficient of resistivity

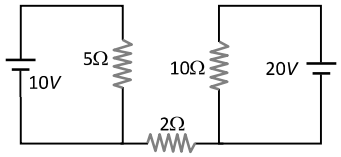
285. In above question, if length is doubled, the drift velocity
a) Is doubled b) Is halved c) Remains same d) Becomes zero

286. 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

287. When a copper voltmeter is connected with a battery of emf 12V, 2 g of copper is deposited in 30 min. If the same voltmeter is connected across 6 V battery, the mass of copper deposited in 45 min would be
a) 1 g b) 1.5 g c) 2 g d) 2.5 g

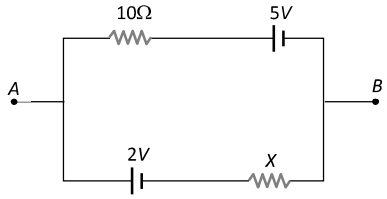
288. Which of the following is not reversible
a) Joule effect b) Peltier effect c) Seebeck effect d) Thomson effect

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



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

290. If $V_{AB} = 4V$ in the given figure, then resistance X will be



a) 5 Ω b) 10 Ω c) 15 Ω d) 20 Ω

291. As the temperature rises the resistance offered by metal
a) Increase b) Decrease c) Remains same d) None of these

292. A uniform wire has resistance 24 Ω. It is bent in the form of a circle. The effective resistance between the two end points on any diameter of the circle is
a) 6 Ω b) 12 Ω c) 3 Ω d) 24 Ω

293. When the length and area of cross-section both are doubled, then its resistance
a) Will become half b) Will be doubled

c) Will remain the same d) Will become four times

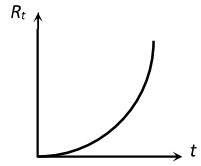
294. When a current passes through a wire whose different parts are maintained at different temperatures, evolution or absorption of heat all along the length of wire is known as

a) Joule effect b) Seebeck effect c) Peltier effect d) Thomson effect

295. The drift velocity of free electrons in a conductor is $'v'$ when a current $'i'$ is flowing in it. If both the radius and current are doubled, then drift velocity will be

a) v b) $\frac{v}{2}$ c) $\frac{v}{4}$ d) $\frac{v}{8}$

296. The resistance R_t of a conductor varies with temperature t as shown in the figure. If the variation is represented by $R_t = R_0[1 + \alpha t + \beta t^2]$, then



a) α and β are both negative b) α and β are both positive

c) α is positive and β is negative d) α is negative and β are positive

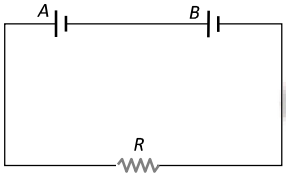
297. A 50 ohm galvanometer gets full scale deflection when a current of 0.01 A passes through the coil. When it is converted to a 10 A ammeter, the shunt resistance is

a) 0.01 Ω b) 0.05 Ω c) 2000 Ω d) 5000 Ω

298. An expression for rate of heat generated, if a current of I ampere flows through a resistance of R Ω, is

a) I^2Rt b) I^2R c) V^2R d) $I\,R$

299. 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

300. 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) $\frac{R}{25}$

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

a) 3 b) 4 c) 6 d) 5

302. The resistance of a conductor increases with

a) Increase in length b) Increase in temperature

c) Decrease in cross-sectional area d) All of these

303. A 50V battery is connected across a 10 Ω resistor and a current of 4.5 A flows. The internal resistance of the battery is

a) 10 Ω b) 0.5 Ω c) 1.1 Ω d) 5 Ω

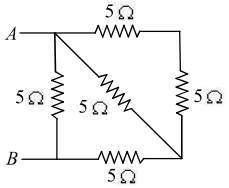
304. A galvanometer of resistance 22.8 Ω measures 1A. How much shunt should be used, so that it can be used to measure 20A?

a) 1Ω b) 2Ω c) 1.2Ω d) 2.2Ω

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

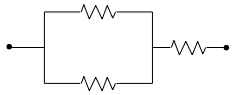
a) $R \gg r$ b) $R \ll r$ c) $R = r$ d) None of these

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



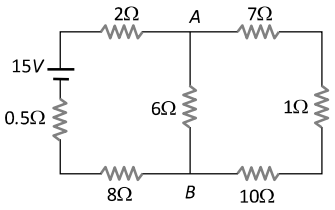
a) 3.12 Ω b) 1.56 Ω c) 6.24 Ω d) 12.48 Ω

307. Three equal resistors are connected as shown in figure. The maximum power consumed by each resistor is 18 W. Then maximum power consumed by the combination is



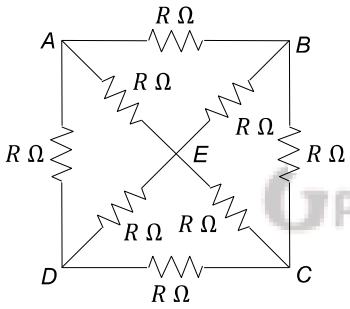
a) 18 W b) 27 W c) 36 W d) 54 W

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



a) 1 A b) 2 A c) 1.5 A d) 3 A

309. The resistance between the points A and C in the figure below is



a) $R\ \Omega$ b) $\frac{4}{3}\ \Omega$ c) $\frac{2}{3}\ R\Omega$ d) $\frac{8R}{3}$

310. In an electroplating experiment, $m\ gm$ of silver is deposited when 4 $ampere$ of current flows for 2 $minute$. The amount (in gm) of silver deposited by 6 $ampere$ of current for 40 $second$ will be

a) $4\ m$ b) $m/2$ c) $m/4$ d) $2\ m$

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

a) Copper b) Tungsten c) Germanium d) Aluminium

312. 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) 24 Ω b) 36 Ω c) 48 Ω d) 60 Ω

313. Current flows through a metabolic conductor whose area of cross-section increases in the direction of the current. If we move in this direction,

a) The carrier density will change b) The current will change

c) The drift velocity will decrease d) The drift velocity will increase

314. 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 increases

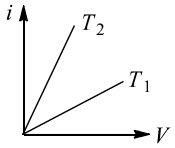
c) The number of conduction electrons decrease

d) The number of conduction electrons increase

315. A 4_{μ} F conductor is charged to 400 V and then its plates are joined through a resistance of 1 kΩ. The heat produced in the resistance is

a) 0.18 J b) 0.21 J c) 0.25 J d) 0.32 J

316. The current i and voltage V graphs for a given metallic wire at two different temperatures T_1 and T_2 are shown in the figure. It is concluded that



a) $T_1 > T_2$ b) $T_1 < T_2$ c) $T_1 = T_2$ d) $T_1 = 2T_1$

317. 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

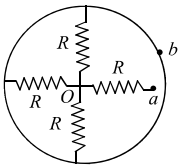
318. The electric intensity E, current density j and specific resistance k are related to each other by the relation

a) $E = j/k$ b) $E = jk$ c) $E = k/j$ d) $k = jE$

319. The same mass of copper is drawn into two wires 1 mm and 2 mm thick. Two wires are connected in series and current is passed through them. Heat produced in the wire is in the ratio

a) 2 :1 b) 1 :16 c) 4 :1 d) 16 :1

320. The equivalent resistance between points a and b of a network shown in the figure is given by

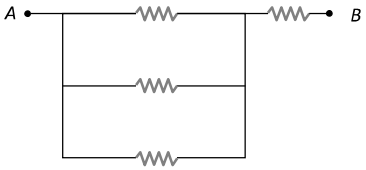


a) $\frac{3}{4}R$ b) $\frac{4}{3}R$ c) $\frac{5}{4}R$ d) $\frac{4}{5}R$

321. 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

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



a) 2 ohm b) 4 ohm c) $1\frac{2}{3}$ ohm d) $2\frac{2}{3}$ ohm

323. 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

324. Potentiometer wire of length 1m is connected in series with 490Ωresistance and 2V battery. If 0.2m $Vcm^{-1}$is the potential gradient, then resistance of the potentiometer wire is

a) 4.9Ω b) 7.9Ω c) 5.9Ω d) 6.9Ω

325. A conductor wire having 10^{29} free electrons/m^3 carries a current of 20A. If the cross-section of the wire is $1mm^2$, then the drift velocity of electrons will be

a) $6.25 \times 10^{-3} ms^{-1}$ b) $1.25 \times 10^{-5} ms^{-1}$ c) $1.25 \times 10^{-3} ms^{-1}$ d) $1.25 \times 10^{-4} ms^{-1}$

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

a) 12 Ω b) 24 Ω c) 6 Ω d) 3 Ω

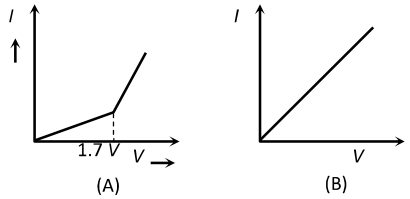
327. The material of fuse wire should have

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

328. An electric lamp is marked 60 W, 230 V. The cost of a 1 kWh of energy is $Rs.$ 1.25. The cost of using this lamp 8 hrs a day for 30 days is

a) $Rs.10$ b) $Rs.16$ c) $Rs.18$ d) $Rs.20$

329. The V-i graphs A and B are drawn for two voltameters. Identify each graph



a) A for water voltameter and B for Cu voltameter
b) A for Cu voltmeter and B for water voltameter
c) Both A and B represents Cu voltameter
d) None of these

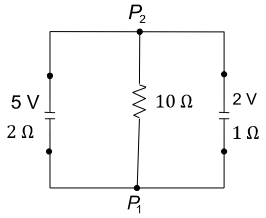
330. The resistance of a wire is 10Ω. Its length is increased by 10% by stretching. The new resistance will now be

a) 12Ω b) 1.2Ω c) 13Ω d) 11Ω

331. If t_1 and t_2 are the times taken by two different coils for producing same heat with same supply, then the time taken by them to produce the same heat when connected in parallel will be

a) $t_1 + t_2$ b) $\frac{t_1 t_2}{t_1 + t_2}$ c) $\frac{2t_1 t_2}{t_1 + t_2}$ d) $t_1 t_2$

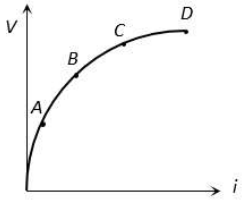
332. A 5V battery with internal resistance 2 Ω and a 2V battery with internal resistance 1 Ω are connected to a 10 Ω resistor as shown in the figure



The current in the 10 Ω resistor is

a) 0.27A, $P_2 to\ P_1$ b) 0.03A, $P_1\ to\ P_2$ c) 0.03A, $P_2\ tp\ P_1$ d) 0.27A, $P_1 to\ P_2$

333. Variation of current passing through a conductor as the voltage applied across its ends is varied as shown in the adjoining diagram. If the resistance (R) is determined at the points A, B, C and D, we will find that



a) $R_C = R_D$ b) $R_B > R_A$ c) $R_C > R_B$ d) None of these

334. Two resistances R and $2R$ are connected in parallel in an electric circuit. The thermal energy developed in R and $2R$ are in the ratio

a) 1 : 2 b) 2 : 1 c) 1 : 4 d) 4 : 1

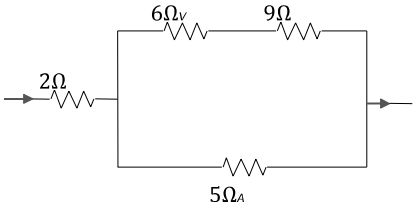
335. An electric bulb is rated 220 V – 100 W. The power consumed by it when operated on 110 V will be
a) 75 W b) 40 W c) 25 W d) 50 W

336. Dimensions of a block are $1\ cm \times 1\ cm \times 100 cm$. If specific resistance of its material is $3 \times 10^{-7} ohm - m$, then the resistance between the opposite rectangular faces is
a) $3 \times 10^{-9} ohm$ b) $3 \times 10^{-7} ohm$ c) $3 \times 10^{-5} ohm$ d) $3 \times 10^{-3} ohm$

337. A copper and silver voltmeter are connected in parallel. If 2000 C of charge liberates the same mass of copper and silver, then charge flowing in copper voltmeter is
$[Z(Cu = 3.36 \times 10^{-7}\ kg\ C^{-1}, Z(Ag) = 1.008 \times 10^{-6} kgC^{-1}]$
a) 1250 C b) 1500 C c) 1750 C d) 1000 C

338. Two wires of the same material but of different diameters carry the same current i. If ratio of their diameters is 1:2, then the corresponding ratio of their mean drift velocities will be
a) 4: 1 b) 1: 1 c) 1: 2 d) 1: 4

339. In the circuit shown, if the resistance 5 Ω develops a heat of 42 J per second, heat developed in 2 Ω must be about (in Js^{-1})



a) 25 b) 20 c) 30 d) 35

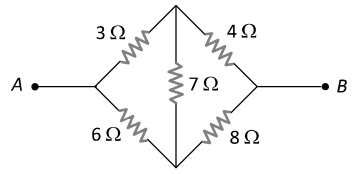
340. The net resistance of a voltmeter should be large to ensure that
a) It does not get overheated
b) It does not draw excessive current
c) It can measure large potential difference
d) It does not appreciably change the potential difference to be measured

341. Five cells each of internal resistances 0.2Ω and emf 2 V are connected in series with a resistance of 4Ω. The current through the external resistance is
a) 4 A b) 2 A c) 1 A d) 0.5 A

342. 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) $r^{1/2}$

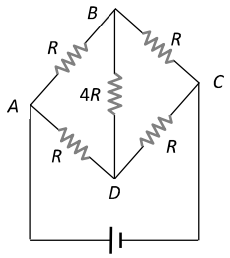
343. If the cold junction is held at 0°C, the same thermo-emf V of a thermocouple varies as $V = 10 \times 10^{-6}\ t - \frac{1}{40} \times 10^{-6}\ t^2$, where t is the temperature of the hot junction in °C. The neutral temperature and the maximum value of thermo-emf are respectively
a) 200°C; 2 mV b) 400°C; 2 mV c) 100°C; 1 mV d) 200°C; 1 mV

344. In the given figure, equivalent resistance between A and B will be



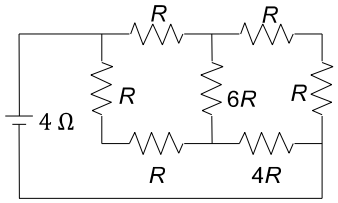
a) $\frac{14}{3}\Omega$ b) $\frac{3}{14}\Omega$ c) $\frac{9}{14}\Omega$ d) $\frac{14}{9}\Omega$

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



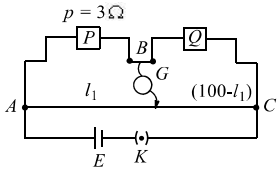
a) Half the current in the arm ABC b) Zero
c) Twice the current in the arm ABC d) Four times the current in the arm ABC

346. A battery of internal resistance 4 Ω is connected to the network of resistance as shown. In order to given the maximum power to the network, the value of R (in Ω) should be



a) 4/9 b) 8/9 c) 2 d) 18

347. 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) $\frac{11}{48}\Omega$

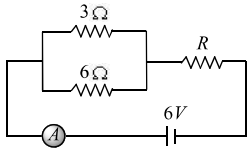
348. To deposit one litre of hydrogen at 22.4 atmosphere from acidulated water, the quantity of electricity that must pass through is

a) 1 $coulomb$ b) 22.4 $coulomb$ c) 96500 $coulomb$ d) 193000 $coulomb$

349. Out of five resistances of resistance R Ω each 3 are connected in parallel and are joined to the rest 2 in series. Find the resultant resistance

a) $\left(\frac{3}{7}\right)R\ \Omega$ b) $\left(\frac{7}{3}\right)R\ \Omega$ c) $\left(\frac{7}{8}\right)R\ \Omega$ d) $\left(\frac{8}{7}\right)R\ \Omega$

350. If the ammeter in the given circuit reads 2 A, the resistance R is



a) 1 ohm b) 2 ohm c) 3 ohm d) 4 ohm

351. An electric bulb of 100 $watt$ is connected to a supply of electricity of 220 V. Resistance of the filament is

a) 484 Ω b) 100 Ω c) 22000 Ω d) 242 Ω

352. The emf of a thermocouple, cold junction of which is kept at −300°C is given by $E = 40t + \frac{1}{10}t^2$. The temperature of inversion of thermocouple will be

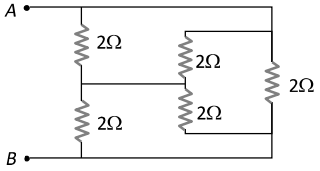
a) 200°C b) 400°C c) −200°C d) −100°C

353. An aluminium (Al) rod with area of cross-section $4 \times 10^{-6}\text{m}^2$ has a current of 5 A flowing through it. Find the drift velocity of electron in the rod. Density of Al= 2.7×10^3 kgm^{-3} and atomic wt.=27u. Assume that each Al atom provides one electron.

a) $8.6 \times 10^{-4} ms^{-1}$ b) $1.3 \times 10^{-4} ms^{-1}$ c) $2.8 \times 10^{-2} ms^{-1}$ d) $3.8 \times 10^{-3} ms^{-1}$

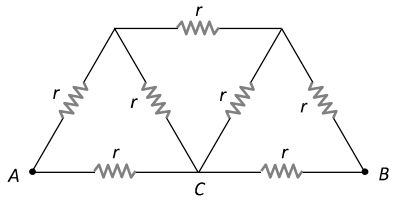
354. Which of the following is not a correct statement
   a) Resistivity of electrolytes decreases on increasing temperature
   b) Resistance of mercury falls on decreasing its temperature
   c) When joined in series a 40 W bulb glows more than a 60 W bulb
   d) Resistance of 40 W bulb is less than the resistance of 60 W bulb

355. Find the equivalent resistance across AB



a) 1 Ω b) 2 Ω c) 3 Ω d) 4 Ω

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



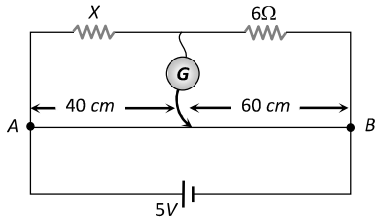
a) $(4/3)r$ b) $3r/2$ c) $r/3$ d) $8r/7$

357. Some electric bulbs are connected in series across a 220V supply in a room. If one bulb is fused, then remaining bulbs are connected again in series across the same supply. The illumination in the room will be
   a) Increase b) Decrease c) Remain the same d) Not continuous

358. A galvanometer coil has a resistance of 15 Ω and gives full scale deflection for a current of 4mA. To convert it to an ammeter of range 0 to 6A
   a) 10 m Ω resistance is to be connected in parallel to the galvanometer
   b) 10 m Ω resistance is to be connected in series with the galvanometer
   c) 0.1 Ω resistance is to be connected in parallel to the galvanometer
   d) 0.1 Ω resistance is to be connected in series with the galvanometer

359. Sensitivity of potentiometer can be increased by
   a) Increasing the e.m.f. of the cell
   b) Increasing the length of the potentiometer wire
   c) Decreasing the length of the potentiometer wire
   d) None of the above

360. 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

361. A metallic resistor is connected across a battery. If the number of collisions of the free electrons with the lattice is some how decreased in the resistor (for example by cooling it), the current will

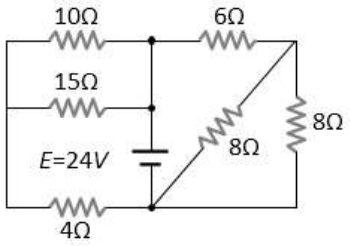
a) Remains constant b) Increase c) Decrease d) Become zero

362. A 10 m long wire of 20Ω resistance is connected with a battery of 3 $volt$ e.m.f. (negligible internal resistance) and a 10 Ω resistance is joined to it is series. Potential gradient along wire in volt per meter is
a) 0.02 b) 0.3 c) 0.2 d) 1.3

363. Resistances R_1 and R_2 are joined in parallel and a current is passed so that the amount of heat liberated is H_1 and H_2 respectively. The ratio $\frac{H_1}{H_2}$ has the value
a) $\frac{R_2}{R_1}$ b) $\frac{R_1}{R_2}$ c) $\frac{R_1^2}{R_2^2}$ d) $\frac{R_2^2}{R_1^2}$

364. The $V-i$ graph for a good conductor makes angle 40° with V −axis. Here V denotes voltage and i denotes current. The resistance of the conductor will be
a) $\sin 40°$ b) $\cos 40°$ c) $\tan 40°$ d) $\cot 40°$

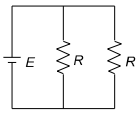
365. Find the equivalent resistance across the terminals of source of e.m.f. 24 V for the circuit shown in figure

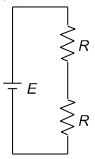


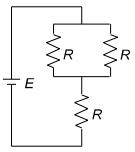
a) 15 Ω b) 10 Ω c) 5 Ω d) 4 Ω

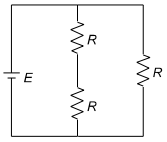
366. Three resistances of 4Ω, 6Ω and 12Ω are connected in parallel and the combination is connected in series with 4 V battery with internal resistance of 2 Ω. The battery current is
a) 1 A b) 10 A c) 2 A d) 0.5 A

367. The negative Zn pole of Daniell cell, sending a constant current through a circuit, decreases in mass by 0.13 g in 30 min. If the electrochemical equivalent of Zn and Cu are 32.5 and 31.5 respectively, the increase in the mass of the positive Cu pole in this time is
a) 0.180 g b) 0.141 g c) 0.126 g d) 0.242 g

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

b) 

c) 

d) 

369. For a certain thermocouple the emf is $E = aT + bT^2$, where t (in°C) is the temperature of hot junction, the cold junction is at 0°C. The value of contants a and b are 10×10^{-6} and 0.02×10^{-6} respectively, then the temperature of inversion (in°C) will be
a) 150 b) 250 c) 500 d) 750

370. The temperature coefficient of resistance for a wire is $0.00125°\ C^{-1}$.At 300 K its resistance is 1 Ω.The temperature at which the resistance becomes 1.5 Ω is?
a) 450 K b) 727 K c) 454 K d) 900 K

371. A source of emf E=15V and having negligible internal resistance, is connected to a variable resistance, so that the current in the circuit increases with time as I=1.2t+3. Then, the total charge that will flow in first 5s will be
a) 10C b) 20C c) 30C d) 40C

372. A current of 0.01mA passes through the potentiometer wire of a resistivity of 10^9 Ω-cm and area of cross-section $10^{-2}cm^2$. The potential gradient is
a) $10^9 Vm^{-1}$ b) $10^{11} Vm^{-1}$ c) $10^{10} Vm^{-1}$ d) $10^8 Vm^{-1}$

373. A wire of a certain material is stretched slowly by ten percent. Its new resistance and specific resistance

become respectively

a) Both remain the same b) 1.1 times, 1.1 times c) 1.2 times , 1.1 times d) 1.21 times, same

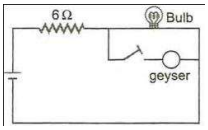
374. An ammeter reads upto 1A. Its internal resistance is 0.81Ω. To increase the range to 10A the value of the required shunt is

a) 0.03Ω b) 0.3Ω c) 0.9Ω d) 0.09Ω

375. The electron in a hydrogen atom circles around the proton in 1.5941×10^{-18}s. The equivalent current due to motion of the electrons is

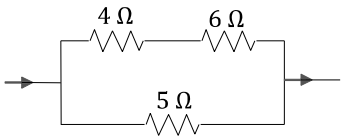
a) 127.37 mA b) 122.49 mA c) 100.37 mA d) 94.037 mA

376. The wiring of a house has resistance 6 Ω. A 100 W bulb is glowing as shown in figure. If a geyser of 1000 W is switched on, the change in potential drop across the bulb is nearly



a) Nil b) 12 V c) 24 V d) 32 V

377. In the circuit shown, the heat produced in the 5Ω resistor due to current flowing in it is 10 cal $-$ s^{-1}. The heat generated in Ω resistor is



a) 1 cal $-$ s^{-1} b) 2 cal $-$ s^{-1} c) 3 cal $-$ s^{-1} d) 4 cal $-$ s^{-1}

378. The relation between Faraday constant (F), chemical equivalent (E) and electrochemical equivalent (Z) is

a) $F = EZ$ b) $F = \frac{Z}{E}$ c) $F = \frac{E}{Z}$ d) $F = \frac{E}{Z^2}$

379. 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

a) 4 b) 10 c) 8 d) 20

380. 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

a) 180 W b) 60 W c) 20 W d) $\frac{20}{3}W$

381. 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

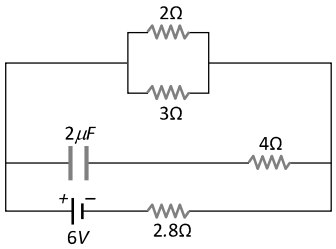
382. In a meter bridge experiment, the ratio of the left gap resistance to right gap resistance is 2:3, the balance point from left is

a) 60 cm b) 50 cm c) 40 cm d) 20 cm

383. 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

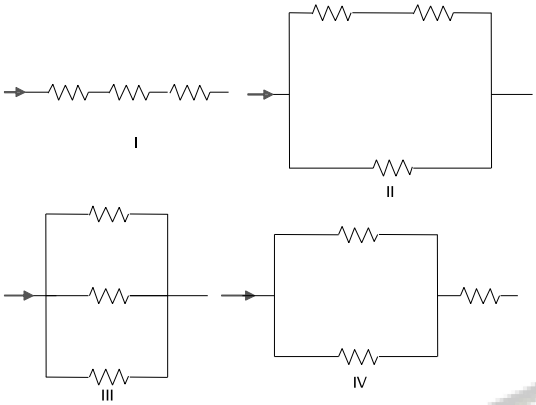
a) 80% b) 90% c) 87.5% d) 82.5%

384. In the figure shown, the capacity of the condenser C is 2 μF. The current in 2Ω resistor is



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

385. The three resistances of equal value are arranged in the different combinations shown below. Arrange them in increasing order of power dissipation



a) III < II < IV <I b) II < III < IV < I c) I < IV < III < II d) I < III < II < IV

386. 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

387. If nearly 10^5C liberate 1 g equivalent of aluminium, then the amount of aluminium (equivalent weight g) deposited through electrolysis in 20 min by a current of 50 A will be

a) 0.09 g b) 0.6 g c) 5.4 g d) 10.8 g

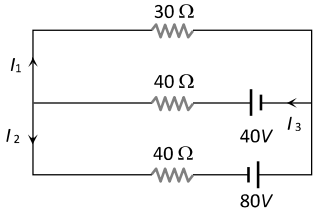
388. The drift velocity of the electrons in a copper wire of length 2 m under the application of a potential difference of 220 V is $0.5 ms^{-1}$. Their mobility (in $m^2V^{-1}s^{-1}$)

a) 2.5×10^{-3} b) 2.5×10^{-2} c) 5×10^{2} d) 5×10^{-3}

389. When a current passes through the junction of two different metals, evolution or absorption of heat at the junction is known as

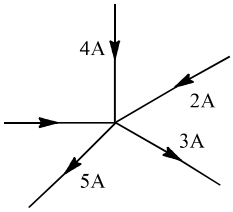
a) Joule effect b) Seebeck effect c) Peltier effect d) Thomson effect

390. In the given circuit the current I_1 is



a) $0.4\ A$ b) $-0.4\ A$ c) $0.8\ A$ d) $-0.8\ A$

391. In the given current distribution, what is the value of I?

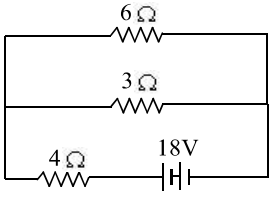


a) 3A b) 8A c) 2A d) 5A

392. A galvanometer of resistance G can measure 1 A current. If a shunt S is used to convert it into an ammeter to measure $10A$ current. The ratio of $\frac{G}{S}$ is

a) $\frac{1}{9}$ b) $\frac{9}{1}$ c) 10 d) $\frac{1}{10}$

393. The total power dissipated in Watts in the circuit shown here is



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

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

a) 60 Ω b) 47 Ω c) 57 Ω d) 35 Ω

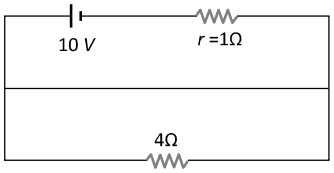
395. For a metallic wire, the ratio $\frac{V}{i}$ (V =applied potential difference and i=current flowing) is

a) Independent of temperature
b) Increases as the temperature rises
c) Decreases as the temperature rises
d) Increases or decreases as temperature rises depending upon the metal

396. For measurement of potential difference, potentiometer is preferred in comparison to voltmeter because

a) Potentiometer is more sensitive than voltmeter
b) The resistance of potentiometer is less than voltmeter
c) Potentiometer is cheaper than voltmeter
d) Potentiometer does not take current from the circuit

397. Potential difference across the terminals of the battery shown in figure is (r = internal resistance of battery)

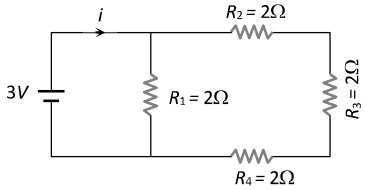


a) 8 V b) 10 V c) 6 V d) Zero

398. If R_1 and R_2 be the resistances of the filaments of 200 W and 100 W electric bulbs operation at 220 V, then $\left(\frac{R_1}{R_2}\right)$ is

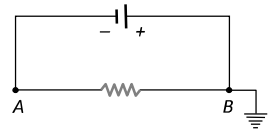
a) 1 b) 2 c) 0.5 d) 4

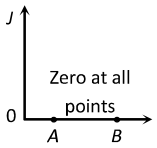
399. What is the current (i) in the circuit as shown in figure

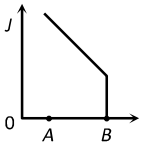


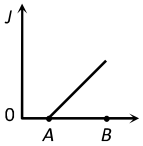
a) 2 A b) 1.2 A c) 1 A d) 0.5 A

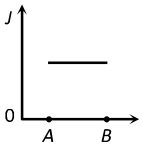
400. A battery is connected to a uniform resistance wire AB and B is earthed. Which one of the graphs below shows how the current density J varies along AB



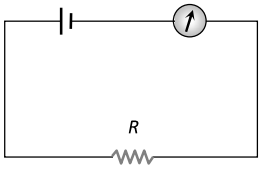
a) 

b) 

c) 

d) 

401. 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

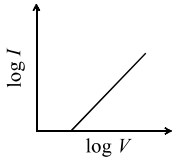


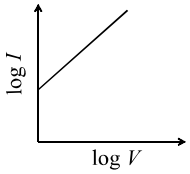
a) 19 Ω b) 17 Ω c) 10 Ω d) 12 Ω

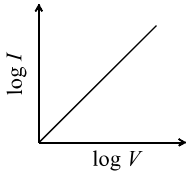
402. Two identical conductors maintained at same temperatures are given potential differences in the ratio 1 : 2. Then the ratio of their drift velocities is

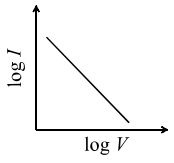
a) 1 : 2 b) 3 : 2 c) 1 : 1 d) $1 : 2^{1/2}$

403. 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) 

404. The emf of a thermocouple, one junction of which is kept at 0°C, is given by $e = at + bt^2$. The Peltier co-efficient will be

a) $(t + 273)(a + 2bt)$ b) $(t + 273)(a - 2bt)$ c) $(t - 273)(a - 2bt)$ d) $(t - 273)(a + 2bt)$

405. A potentiometer wire, 10 m long, has a resistance of 40Ω. It is connected in series with a resistance box and a 2V storage cell. If the potential gradient along the wire is $(0.1\ \text{mVcm}^{-1})$, the resistance unplugged in the box is

a) 260 Ω b) 760 Ω c) 960 Ω d) 1060 Ω

406. The resistance of a wire of iron is 10 ohm and temp. coefficient of resistance is 5×10^{-3}/°C. At 20°C it carries 30 $milliampere$ of current. Keeping constant potential difference between its ends, the

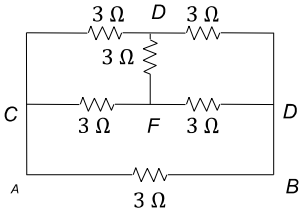
temperature of the wire is raised to 120°C. The current in *milliampere* that flows in the wire is

a) 20 b) 15 c) 10 d) 40

407. The resistance of a galvanometer coil is R, then the shunt resistance required to convert it into a ammeter of range 4times, will be

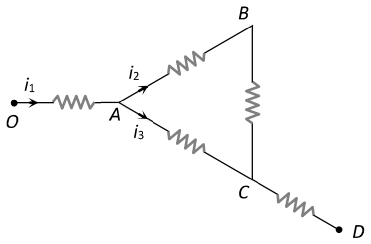
a) $4R$ b) $R/3$ c) $R/4$ d) $R/5$

408. Six resistors, each of value 3 Ω are connected as shown in the figure. A cell of emf 3V is connected across AB. The effective resistance across AB and the current through the arm AB will be



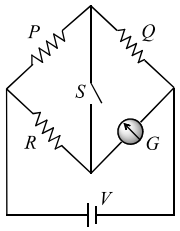
a) 0.6 Ω, 1 A b) 1.5 Ω , 2 A c) 0.6Ω,2 A d) 1.5 Ω, 1 A

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



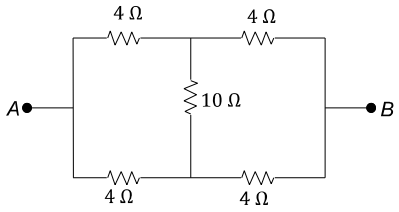
a) $i_1 + i_2$ b) $i_2 + i_3$ c) $i_1 + i_3$ d) $i_1 - i_2 + i_3$

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



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

411. The equivalent resistance across A and B is



a) 2Ω b) 3Ω c) 4Ω d) 5Ω

412. 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

413. The amount of charge Q passed in time t through a cross-section of a wire is $Q = 5t^2 + 3t + 1$.The value of current at time $t = 5\ s$ is

a) 9A b) 49A c) 53A d) None of these

414. The mass of ions deposited during a given interval of time in the process of electrolysis depends on
a) The current b) The resistance c) The temperature d) The electric power

415. A cell of emf $6\ V$ and resistance 0.5 ohm is short circuited. The current in the cell is
a) 3 amp b) 12 amp c) 24 amp d) 6 amp

416. 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

417. Electric field (E) and current density (J) have relation
a) $E \propto J^{-1}$ b) $E \propto J$ c) $E \propto \frac{1}{J^2}$ d) $E^2 \propto \frac{1}{J}$

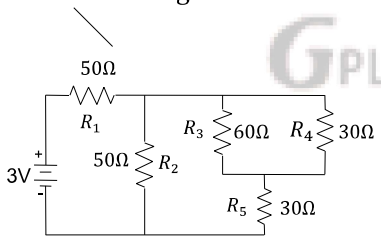
418. The chemical equivalent of copper and zinc are 32 and 108 respectively. When copper and silver voltmeters are connected in series and electric current is passed through for sometime, 1.6 g of copper is deposited. Then, the mass of silver deposited will be
a) 3.5 g b) 2.8 g c) 5.4 g d) None of these

419. 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

420. A Copper wire of length 1 m and radius 1 mm is joined in series with an iron wire of length 2 m and radius 3 mm and a current is passed through the wires. The ratio of the current density in the wires. The ratio of the current density in the copper and iron wires is
a) 2: 3 b) 6: 1 c) 9: 1 d) 18: 1

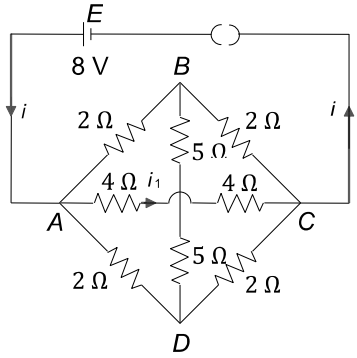
421. To draw maximum current from a combination of cells, how should the cells be grouped?
a) Parallel b) Series
c) Mixed grouped d) Depends upon the relative values of internal and external resistances

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



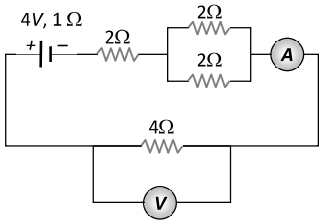
a) 0.4V b) 0.6V c) 1.2V d) 1.5V

423. The value of i_1 in the circuit diagram will be



a) 1A b) $\frac{1}{2}$A c) $\frac{3}{4}$A d) $\frac{3}{2}$A

424. What is the equivalent resistance of the circuit

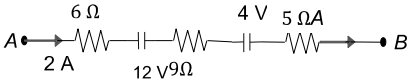


a) 6 Ω b) 7 Ω c) 8 Ω d) 9 Ω

425. 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

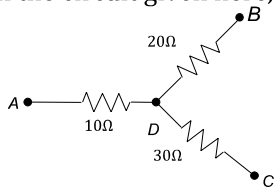
a) 2500 Ω as a shunt b) 2450 Ω as a shunt c) 2550 Ω in series d) 2450 Ω in series

426. The potential difference between A and B in the following figure is



a) 32 V b) 48 V c) 24 V d) 14 V

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



a) The point *D* will be at a potential of 60V
b) The point *D* will be at a potential of 20V
c) Currents in the path *AD, DB* and *DC* are in the ratio of 1:2:3
d) Currents in the path *AD, DB* and *DC* are in the ratio of 3 : 2 : 1

428. A house, served by 220 V supply line, is protected by a 9 A fuse. The maximum number of 60 W bulbs in parallel that can be turned on is

a) 11 b) 22 c) 33 d) 44

429. The thermo emf of copper-constantan couple is 40μV per degree. The smallest temperature difference that can be detected with this couple and a galvanometer of 100Ω resistance capable of measuring the maximum current of 1μA is

a) 10°C b) 7.5°C c) 5.0°C d) 2.5°C

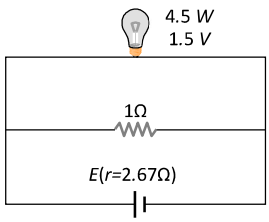
430. When a Daniel cell is connected in the secondary circuit of a potentiometer, the balancing length is found to be 540 cm. If the balancing length becomes 500 cm when the cell is short circuited with 1 Ω, the internal of the cell is

a) 0.08 Ω b) 0.04 Ω c) 1.0 Ω d) 1.08 Ω

431. If in a voltaic cell, 5 g of zinc is consumed, we will get how many ampere hour (given that ECE of zinc is $3.38 \times 10^{-7} \text{kgC}^{-1}$)

a) 2.05 b) 8.2 c) 4.1 d) $5 \times 3.338 \times 10^{-7}$

432. A torch bulb rated as 4.5 *W*, 1.5 *V* is connected as shown in the figure. The *e. m. f*. of the cell needed to make the bulb glow at full intensity is



a) 4.5 V b) 1.5 V c) 2.67 V d) 13.5 V

433. Same current is being passed through a copper voltmeter and a silver voltmeter. The rate of increase in weights of the cathode of the two voltmeters will be proportional to

a) Atomic masses b) Atomic number c) Relative densities d) None of the above

434. Two resistances R and $2R$ are connected in parallel in an electric circuit. The thermal energy developed in in R and $2R$ is in the ratio

a) 1 : 2 b) 1 : 4 c) 4 : 1 d) 2 : 1

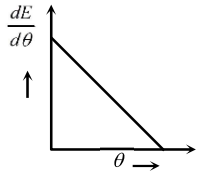
435. Drift velocity v_d varies with the intensity of electric field as per the relation

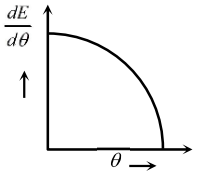
a) $v_d \propto E$ b) $v_d \propto \frac{1}{E}$ c) $v_d =$ constant d) $v_d \propto E^2$

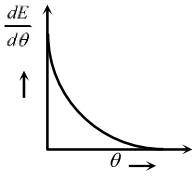
436. A potentiometer wire of length 10 m and resistance 20 Ω is connected is series with a 15V battery and an external resistance 40 Ω. A secondary cell of emf E in the secondary circuit is balanced by 240 cm long the potentiometer wire. The emf E of the cell is

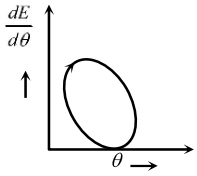
a) 2.4V b) 1.2V c) 2.0V d) 3V

437. Which of the following graphs shows the variation of thermoelectric power with temperature difference between hot and cold junction in thermocouples

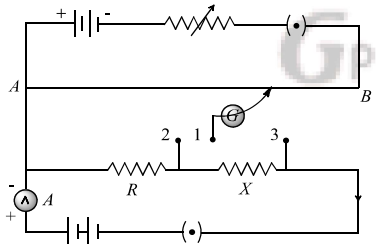
a) 

b) 

c) 

d) 

438. 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 cicuit, 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



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

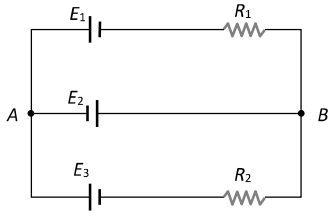
439. An immersion heater is rated 836 $watt$. It should heat 1 $litre$ of water from 10°C to 40°C in about

a) 200 sec b) 150 sec c) 836 sec d) 418 sec

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

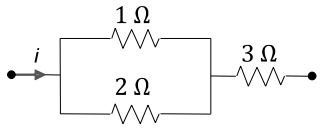
a) $\frac{1}{500} V/cm$ b) $\frac{3}{2000} V/cm$ c) $\frac{3}{5000} V/cm$ d) $\frac{1}{1000} V/cm$

441. In the circuit shown here, $E_1 = E_2 = E_3 = 2V$ and $R_1 = R_2 = 4\ ohm$. The current flowing between points A and B through battery E_2 is



a) Zero b) 2 amp from A to B c) 2 amp from B to A d) None of the above

442. In the circuit shown in figure, power developed across 1Ω , 2Ω , 3 Ω resistance are in ratio of



a) 1 : 2 : 3 b) 4 : 2 : 27 c) 6 : 4 : 9 d) 2 : 1 : 27

443. Two uniform wires A and B are of the same metal and have equal masses. The radius of wire A is twice that of wire B. The total resistance of A and B when connected in parallel is
a) 4 Ω when the resistance of wire A is 4.25 Ω
b) 5 Ω when the resistance of wire A is 4.25 Ω
c) 4 Ω when the resistance of wire B is 4.25 Ω
d) 5 Ω when the resistance of wire B is 4.25 Ω

444. A thermocouple develops 40 $\mu V/kelvin$. If hot and cold junctions are at 40°C and 20°C respectively, then then emf developed by a thermopile using such 150 thermocouples in series shall be
a) $150mV$ b) $80mV$ c) $144mV$ d) $120mV$

445. A fuse wire with a radius of 1 mm blows at 1.5 A. If the fuse wire of the same material should blow at 3.0 A, the radius of the fuse wire must be
a) $4^{1/3}$ mm b) $\sqrt{2}$ mm c) 0.5 mm d) 8.0 mm

446. The power dissipated across resistance R which is connected across a battery of potential V is P. If resistance is doubled, then the power becomes
a) $1/2$ b) 2 c) $1/4$ d) 4

447. The colour sequence in a carbon resistor is red, brown, orange and silver. The resistance of the resistor is
a) $21 \times 10^3 \pm 10\%$ b) $23 \times 10^1 \pm 10\%$ c) $21 \times 10^3 \pm 5\%$ d) $12 \times 10^3 \pm 5\%$

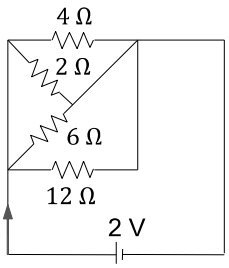
448. Two resistors of resistance R_1 and R_2 having $R_1 > R_2$ are connected in parallel. For equivalent resistance R, the correct statement is
a) $R > R_1 + R_2$ b) $R_1 < R < R_2$ c) $R_2 < R < (R_1 + R_2)$ d) $R < R_1$

449. In the absence of applied potential, the electric current flowing through a metallic wire is zero because
a) The electrons remain stationary
b) The electrons are drifted in random direction with a speed of the order of 10^{-2} cm s^{-1}
c) The electrons move in random direction with a speed of the order close to that of velocity of light
d) Electrons and ions move in opposite direction

450. 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 v_P and v_Q respectively, then
a) $v_P = v_Q$ b) $v_P = \frac{1}{2}v_Q$ c) $v_P = \frac{1}{4}v_Q$ d) $v_P = 2v_Q$

451. A bulb of 220 V and 300 W is connected across 110 V circuit. The percentage reduction in power is
a) 100% b) 25% c) 70% d) 75%

452. The resistance in which the maximum heat is produced is given by



a) 2Ω b) 6Ω c) 4Ω d) 12Ω

453. Calculate the amount of charge flowing in 2 $minutes$ in a wire of resistance 10Ω when a potential difference of 20 V is applied between its ends
a) 120 C b) 240 C c) 20 C d) 4 C

454. If current in an electric bulb changes by 1%, then the power will change by
a) 1% b) 2% c) 4% d) $\frac{1}{2}\%$

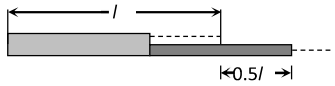
455. Which of the following is not equal to $watt$
a) $(Amp)^2 \times ohm$ b) $Amp/Volt$ c) $Amp \times Volt$ d) $Joule/sec$

456. 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

457. Tap supplies water at 20°C. A man takes 1 L of water per minute at 35°C from a geyser connected to the tap. The power of geyser is
a) 1050 W b) 2100 W c) 1500 W d) 3000 W

458. By a cell a current of 0.9 A flows through 2 ohm resistor and 0.3 A through 7 ohm resistor. The internal resistance of the cell is
a) 0.5 Ω b) 1.0 Ω c) 1.2 Ω d) 2.0 Ω

459. In order to quadruple the resistance of a uniform wire, a part of its length was uniformly stretched till the final length of the entire wire was 1.5 times the original length, the part of the wire was fraction equal to

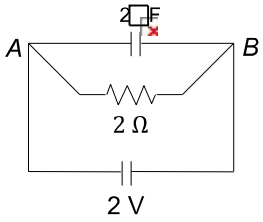


a) 1/8 b) 1/6 c) 1/10 d) 1/4

460. The Petlier coefficient of a thermo-couple of metls A and B at junction temperature T is given by
a) $T^2\frac{dE}{dT^2}$ b) $T\frac{dE}{dT}$ c) $T^3\frac{dE^2}{dT}$ d) $T^4\frac{d^2E}{dT^2}$

461. 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

462. At steady state, energy stored in capacitor is

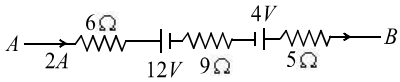


a) 4×10^{-6} J b) 2 J c) 4 J d) Zero

463. A battery of emf E produces currents I_1 and I_2 when connected to external resistances R_1 and R_2 respectively. The internal resistance of the battery is
a) $\frac{I_1R_2 - I_2R_1}{I_2 - I_1}$ b) $\frac{I_1R_2 + I_2R_1}{I_1 - I_2}$ c) $\frac{I_1R_1 + I_2R_2}{I_1 - I_2}$ d) $\frac{I_1R_1 - I_2R_2}{I_2 - I_1}$

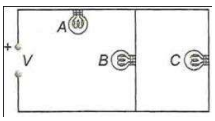
464. A cell of emf E is connected across a resistance R. the potential difference between the terminals of the cell is found to be V volt. Then the internal resistance of the cell must be
a) (E-V) b) $\frac{(E-V)}{V}R$ c) $\frac{2(E-V)R}{E}$ d) $\frac{2(E-V)V}{R}$

465. The potential difference between A and B in the following figure is



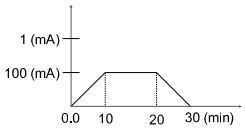
a) 24 V b) 14 V c) 32 V d) 48 V

466. Figure shown three similar lamps A, B and C connected across a power supply. If the lamp C fuses, how will the light emitted by A and B change?



a) No change

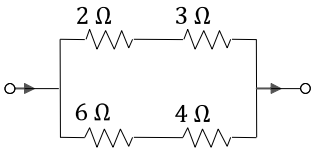
Brilliance of A decreases and that of B increases

b) 

c) Brilliance of both A and B increases

d) Brilliance of both A and B decreases

467. In the circuit shown in figure, the heat produced by the 6 Ω resistance is 60Ω cal s^{-1}. What heat per second is produced across 3Ω resistance?



a) 30 cal b) 60 cal c) 100 cal d) 120 cal

468. 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

a) 10 $watt$ b) 30 $watt$ c) 10/3 $watt$ d) 90 $watt$

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

a) 2 R b) 0.25 R c) 4 R d) 0.5 R

470. Two bulbs of 100 W and 200 W working at 220 V are joined in series with 220 V supply. Total power consumed will be

a) 65 W b) 33 W c) 300 W d) 100 W

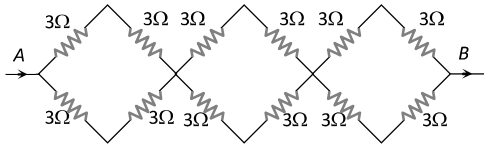
471. A cell in secondary circuit gives null deflection for 2.5m length of potentiometer having 10m length of wire. If the length of the potentiometer wire is increased by 1 m without changing the cell in the primary, the position of the null point now is

a) 3.5 m b) 3 m c) 2.75 m d) 2.0 m

472. A 10 μF capacitor is charged to 500 V and then its plates are joined together through a resistance of 10 Ω. The heat produced in the resistance is

a) 500 J b) 250 J c) 125 J d) 1.25 J

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



a) 54 ohm b) 18 ohm c) 36 ohm d) 9 ohm

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

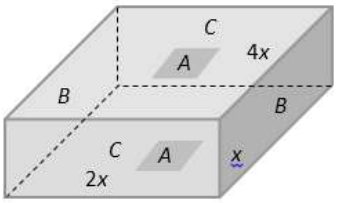
a) Network is not balanced
b) Network is still balanced
c) Galvanometer shows zero deflection
d) Galvanometer and the cell must be interchanged to balance

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

a) 32Ω b) 20Ω c) 8Ω d) 4Ω

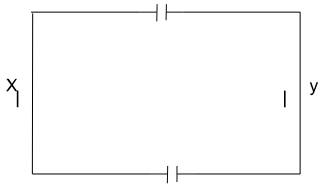
476. Given figure shows a rectangular block with dimensions x, $2x$ and $4x$. Electrical contacts can be made to the block between opposite pairs of faces (for example, between the faces labelled $A-A$, $B-B$ and $C-$

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)



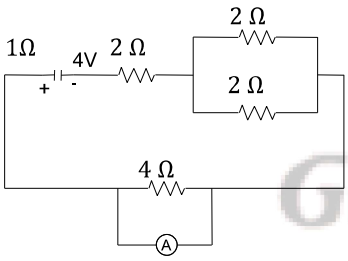
a) $A-A$
b) $B-B$
c) $C-C$
d) Same for all three pairs

477. Two similar accumulators each of emf E and internal resistance r are connected as shown in the following figure. Then, the potential difference between x and y is



a) 2E b) E c) Zero d) None of these

478. The current passing through the ideal ammeter in the circuit given below is



a) 1.25A b) 1A c) 0.75A d) 0.5A

479. 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) $8\,l$ d) $16\,l$

480. An immersion heater with electrical resistance 7 Ω is immersed in 0.1 kg of water at 20°C for 3 min. If the flow of current is 4 A, what is the final temperature of the water in ideal conditions?
(Specific heat capacity of water $= 4.2 \times 10^3$ Jkg)$^{-1}$K^{-1}
a) 28°C b) 48°C c) 52°C d) 68°C

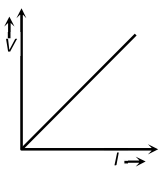
481. The resistance of hot tungsten filament is about 10 times the cold resistance. What will be the resistance of 100 W and 200 V lamp, when not in use?
a) 40Ω b) 20Ω c) 400Ω d) 20Ω

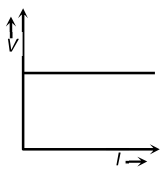
482. How many coulombs of electric charge must pass through acidulated water in order to release 22.4 L Of hydrogen at NTP?
a) 96500 Faraday b) 193000 coulomb c) 196500 Faraday d) 96500 coulomb

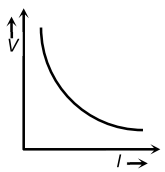
483. If an ammeter is to be used in place of a voltmeter, then we must connect with the ammeter a
a) Low resistance in parallel b) High resistance in parallel
c) High resistance in series d) Low resistance in series

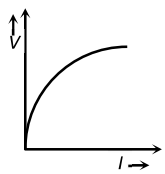
484. Emf is most closely related to
a) Mechanical force b) Potential difference c) Electric field d) Magnetic field

485. The electrolyte used in Lechlanche cell is
   a) Copper sulphate solution
   b) Ammonium chloride solution
   c) Dilute sulphuric acid
   d) Zinc sulphate

486. Which of the adjoining graphs represents *ohmic* resistance
   a) 

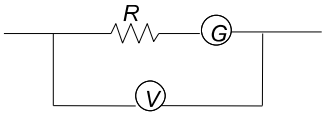
   b) 

   c) 

   d) 

487. 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 $4\ L$ will be
   a) $2R$
   b) R
   c) $R/2$
   d) $R/4$

488. If resistance of voltmeter is 10000Ω and resistance of galvanometer is 2Ω, then find R when voltmeter reads 12V and galvanometer reads 0.1A.



   a) 118Ω
   b) 120Ω
   c) 124Ω
   d) 114Ω

489. Ampere hour is the unit of
   a) Quantity of charges
   b) Potential
   c) Energy
   d) Current

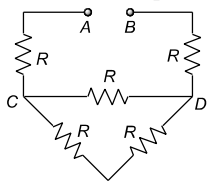
490. The equivalent resistance of resistor connected in series is always
   a) Equal to the mean of component resistors
   b) Less than the lowest of component resistors
   c) In between the lowest and the highest of component resistors
   d) Equal to sum of component resistors

491. A cell having emf of 1.5V, when connected across a resistance of 14 Ω, produces a voltage of only 1.4V across this resistance. The internal resistance of the cell must be
   a) 1 Ω
   b) 14 Ω
   c) 15 Ω
   d) 21 Ω

492. A resistor R and 2μF capacitor in series is connected through a switch to 200 V direct supplies. Across the capacitor is a neon bulb that lights up at 120 V. Calculate the value of R to make the bulk light up 5 s alter the switch has been closed ($\log_{10} 2.5 = 0.4$)
   a) $1.7 \times 10^5\ \Omega$
   b) $2.7 \times 10^6\ \Omega$
   c) $3.3 \times 10^7\ \Omega$
   d) $1.3 \times 10^4\ \Omega$

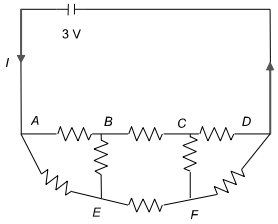
493. The drift velocity does not depend upon
   a) Cross-section of the wire
   b) Length of the wire
   c) Number of free electrons
   d) Magnitude of the current

494. What is the equivalent resistance between points A and B in the circuit if figure, if $R = 3\ \Omega$?



   a) 8 Ω
   b) 9 Ω
   c) 12 Ω
   d) 15 Ω

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



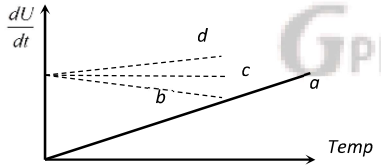
a) 0.25A b) 0.50A c) 0.75A d) 1.0A

496. A cell of emf E and internal resistance r supplies currents for the same time t through external resistance R_1 =100 Ω and R_2 = 40 Ω separately. If the heat developed in both the cases in the same, then the internal resistance of the cell is given by
a) 28.6 Ω b) 70 Ω c) 63.3 Ω d) 140 Ω

497. The electric bulbs have tungsten filaments of same length. If one of then gives 60 *watt* and other 100 *watt*, then
a) 100 *watt* bulb has thicker filament
b) 60 *watt* bulb has thicker filament
c) Both filaments are of same thickness
d) It is possible to get different wattage unless the lengths are different

498. 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

499. A constant current i is passed through a resistor. Taking the temperature coefficient of resistance into account, indicate which of the plots shown in figure best represents the rate of production of thermal energy in the resistor



a) a b) b c) c d) d

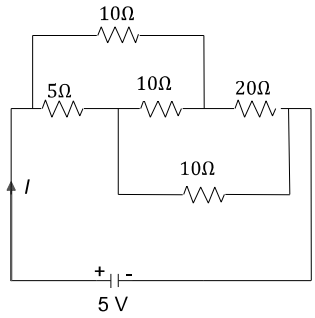
500. If voltage across a bulb rated 220 Volt-100 Watt drops by 2.5% of its rated value, the percentage of the rated value by which the power would decrease is
a) 20% b) 2.5% c) 5% d) 10%

501. Current is flowing with a current density $J = 480\text{Acm}^{-2}$ in a copper wire. Assuming that each copper atom contributes one free electron and given that
Avogadro number=6.0×10^{23}atoms mol^{-1}
Density of copper=9.0g cm^{-3}
Atomic weight of copper =64 g mol^{-1}
The drift velocity of electrons is
a) 1 mm s^{-1} b) 2 mm s^{-1} c) 0.5 mm s^{-1} d) 0.36 mm s^{-1}

502. An electric wire of length $'L'$ and area of cross-section a has resistance R *ohm*. Another wire of the same material having same length and area of cross-section $4a$ has a resistance of
a) $4R$ b) $R/4$ c) $R/16$ d) $16R$

503. When a current flows through a conductor its temperature
a) May increase or decrease b) Remains same
c) Decrease d) Increase

504. The current I drawn from the 5 V source will be

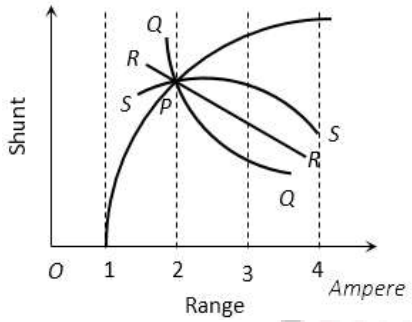


a) 0.33A b) 0.5A c) 0.67A d) 0.17A

505. The voltage of clouds is 4×10^6 V with respect to ground. In a light ning strike lasting 100 ms, a charge of 4 C is delivered to the ground. The power of lightning strike is
a) 160 MW b) 80 MW c) 20 MW d) 500 Kw

506. An electric bulb is rated 220 V-100 W. The power consumed by it when operated on 110 V will be
a) 75 W b) 40 W c) 25 W d) 50 W

507. The ammeter has range 1 *ampere* without shunt. The range can be varied by using different shunt resistances. The graph between shunt resistance and range will have the nature

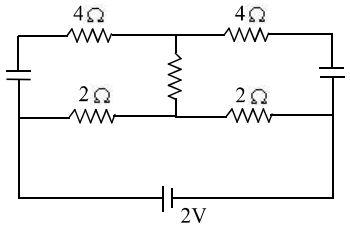


a) P b) Q c) R d) S

508. 1kg piece of copper is drawn into a wire 1 mm thick, and another piece into a wire 2 mm thick. Compare the resistance of these wires
a) 2: 1 b) 4: 1 c) 8: 1 d) 16: 1

509. Faraday's 2nd law states that mass deposited on the electrode is directly proportional to
a) Atomic mass b) Atomic mass × Velocity
c) Atomic mass/Valency d) Valency

510. Find the power of the circuit



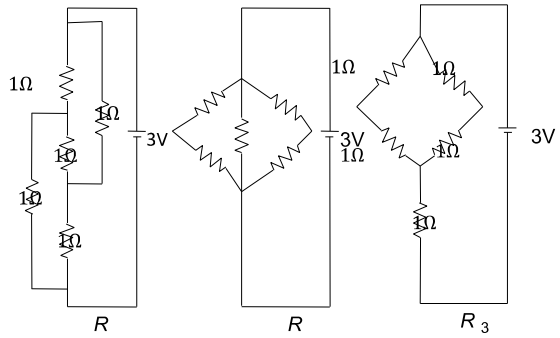
a) 1.5 W b) 2 W c) 1 W d) None of these

511. When two resistances R_1 and R_2 are connected in series, they consume 12 W powers. When they are connected in parallel, they consume 50 W powers. What the ratio of the powers of R_1 and R_2?
a) 1/4 b) 4 c) 3/2 d) 3

512. A milliammeter of range 10 mA has a coil of resistance 1 Ω. To use it as voltmeter of range 10 $volt$, the resistance that must be connected in series with it, will be
a) 999 Ω b) 99 Ω c) 1000 Ω d) None of these

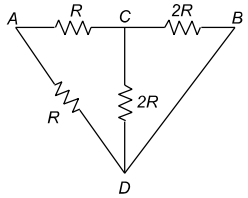
513. Figure shows three resistor configurations R_1, R_2 and R_3 connected to 3 V batteries. If the power

dissipated by the configuration R_1, R_2 and R_3 IS P_1, P_2 and P_3, respectively, then



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

514. The effective resistance between points A and B is

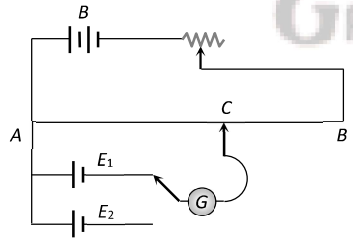


a) R b) $\frac{R}{3}$ c) $\frac{2R}{3}$ d) $\frac{3R}{5}$

515. The emf is thermocouple changes sign at 600 K. If the neutral temperature is 210°C, the temperature of cold junction is

a) 180 K b) 117 K c) 93°C d) 90°C

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



a) To the left of C b) To the right of C c) At C itself d) No where on AB

517. What is the volume of hydrogen liberated at NTP by the amount of charge which liberates 0.3175 g of copper?

a) 224 cc b) 112 cc c) 56 cc d) 1120 cc

518. In a closed circuit, the current I(in ampere) at an instant of time t(in second) is given by $I = 4 - 0.08t$. The number of electrons flowing in 50s through the cross-section of the conductor is

a) 1.25×10^{19} b) 6.25×10^{20} c) 5.25×10^{19} d) 2.55×10^{20}

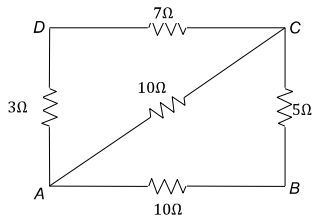
519. A 60 $watt$ bulb operates on $220V$ supply. The current flowing through the bulb is

a) $11/3$ amp b) $3/11$ amp c) 3 amp d) 6 amp

520. The number of free electrons per 100 mm of ordinary copper wire is 2×10^{21}. Average drift speed of electrons is 0.25mms^{-1}. The current flowing is

a) 8 A b) 0.8 A c) 80 A d) 5 A

521. The resistance is connected as shown in the figure below. Find the equivalent resistance between the points A and B.



a) 205Ω b) 10 Ω c) 3.5 Ω d) 5 Ω

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

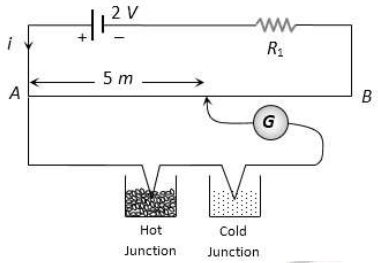
a) L and A b) $2L$ and $A/2$

c) $L/2$ and $2\ A$ d) Any of the above, because volume of silver remains same

523. A galvanometer whose resistance is 120Ω gives full scale deflection with a current of 0.005 A so that it can read a maximum current of 10 A. A shunt resistance is added in parallel with it. The resistance of the ammeter so formed is

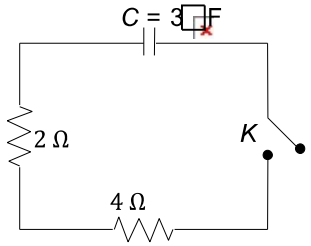
a) 0.06 Ω b) 0.006 Ω c) 0.6 Ω d) 6 Ω

524. In the following circuit a 10 m long potentiometer wire with resistance 1.2 ohm/m, a resistance R_1 and an accumulator of emf 2 V are connected in series. When the emf of thermocouple is 2.4 mV then the deflection in galvanometer is zero. The current supplied by the accumulator will be



a) $4 \times 10^{-4} A$ b) $8 \times 10^{-4} A$ c) $4 \times 10^{-3} A$ d) $8 \times 10^{-3} A$

525. A capacitor of capacitance 3μF is first charged by connecting across 10 V battery, then it is allowed to get discharged through 2 Ω and 4Ω resistor by closing the key Kas shown in figure. The total energy dissipated in 2Ω resistor is equal to



a) 0.15 m J b) 0.5 m J c) 0.05 m J d) 1.0 m J

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

a) 2 ohm and 7 ohm b) 3 ohm and 6 ohm c) 3 ohm and 9 ohm d) 5 ohm and 4 ohm

527. 10 wires (same length, same area, same material) are connected in parallel and each has 1Ω resistance, then the equivalent resistance will be

a) 10 Ω b) 1 Ω c) 0.1 Ω d) 0.001 Ω

528. A cell of constant emf first connected to a resistance $R_1$and then connected to a resistanceR_2.

a) $\sqrt{R_1 R_2}$ b) $\sqrt{\frac{R_1}{R_2}}$ c) $\frac{R_1 - R_2}{2}$ d) $\frac{R_1 + R_2}{2}$

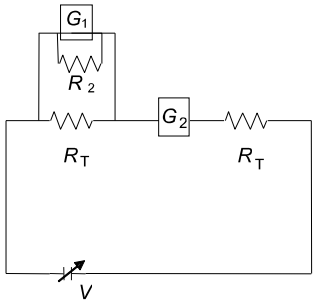
529. When a current of 1 ampere is passed through a conductor whose ends are maintained at temperature

difference of 1°C, the amount of heat evolved or absorbed is called

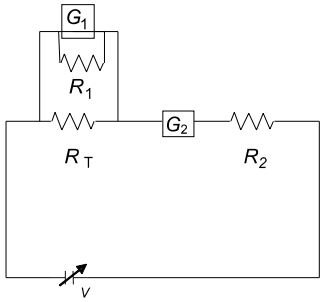
a) Peltier coefficient
b) Thomson coefficient
c) Thermoelectric power
d) Thermo *e*.m.f.

530. 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

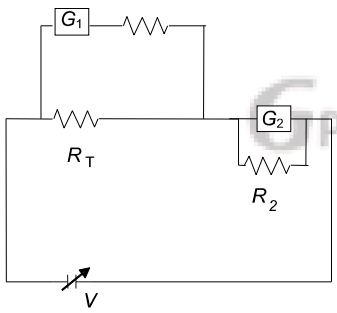
a)



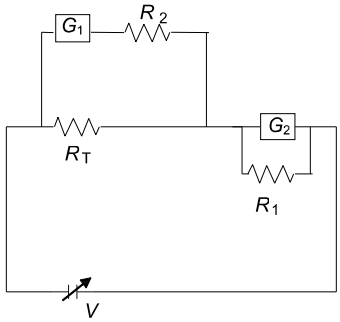
b)



c)



d)



531. To liberate two litres of hydrogen at 222.4 atmosphere from acidulated water the quantity of electricity that must pass through is

a) 44.8 C
b) 96500 C
c) 193000 C
d) 386000 C

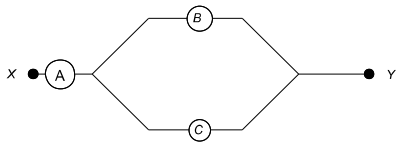
532. A galvanometer having a resistance of 8 *ohm* is shunted by a wire of resistance 2 *ohm*. If the total current is 1 *amp*, the part of it passing through the shunt will be

a) 0.25 *amp*
b) 0.8 *amp*
c) 0.2 *amp*
d) 0.5 *amp*

533. The resistance of a conductor is 5 *ohm* at 50°C and 6 *ohm* at 100°C. Its resistance at 0°C is

a) 1 ohm b) 2 ohm c) 3 ohm d) 4 ohm

534. Three voltmeters A, B and C having resistances R, 1.5R and 3R respectively are used in a circuit as shown. When a potential difference is applied between X and Y, the readings of the voltmeters are $V_1, V_2 and\ V_3$ respectively. Then

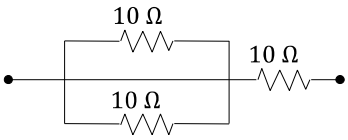


a) $V_1 = V_2 = V_3$ b) $V_1 < V_2 = V_2$ c) $V_1 > V_2 > V_3$ d) $V_1 > V_2 > V_3$

535. The heat generated through 2 ohm and 8 ohm resistances separately, when a condenser of 200 μF capacity charged to 200 V is discharged one by one, will be

a) 4 J and 16 J respectively b) 16 J and 4 J respectively
c) 4 J and 8 J respectively d) 4 J and 4 J respectively

536. Three equal resistances, each of 10 Ω are connected as shown in figure. The maximum power consumed by each resistance is 20 W. What is maximum power that can be consumed by the combination?



a) 5 W b) 15 W c) 30 W d) 60 W

537. 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

a) 2 :1 b) 1 :2 c) 1 :4 d) 4 :1

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

a) 1025 Ω in series b) 1025 Ω in parallel c) 975 Ω in series d) 975 Ω in parallel

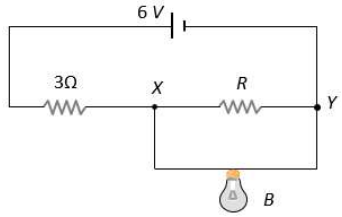
539. If two wires having resistances R and $2R$ both are joined in series and in parallel, then ratio of heat generated in this situation, applying the same voltage is

a) 2 :1 b) 1 :2 c) 2 :9 d) 9 :2

540. What determines the emf between the two metals placed in an electrolyte?

a) Relative position of metals in the electro chemical series b) Distance between them
c) Strength of electrolyte d) Nature of electrolyte

541. In the following circuit, bulb rated as 1.5 V, 0.45 W. If bulbs glows with full intensity then what will be the equivalent resistance between X and Y



a) 0.45 Ω b) 1 Ω c) 3 Ω d) 5 Ω

542. The electron drift speed is small and the charge of the electron is also small but still, we obtain large current in a conductor. This is due to

a) The conducting property of the conductor
b) The resistance of the conductor is small
c) The electron number density of the conductor is small
d) The electron number density of the conductor is enormous

543. A small power station supplies electricity to 5000 lamps connected in parallel. Each lamp has a resistance of 220 and is operated at 220 V. The total current supplied by the station is
a) 2500 A b) 3500 A c) 5000 A d) 10000 A

544. An emf of 0.9 V is generated when the temperature difference hot and cold junction of thermocouple is 75 K. Assuming that the thermo emf is directly proportional to the temperature difference, the extent to which the thermo emf will change when the cold junction is heated up by 15 K is
a) 10% b) 20% c) 40% d) 60%

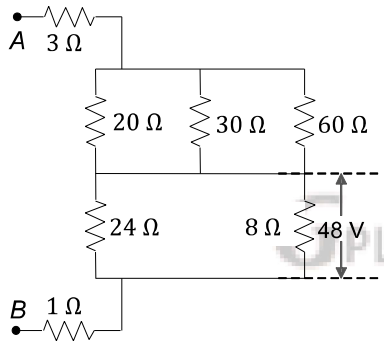
545. Which of the following is vector quantity
a) Current density b) Current c) Wattless current d) Power

546. If the balance point is obtained at the 35^{th} cm in a meter bridge, the resistances in the left and right gaps are in the ratio of
a) 7 : 13 b) 13 : 7 c) 9 : 11 d) 11 : 9

547. A lead acid accumulatory (storage battery) is connected to a battery charge for over night charging. Which of the following observations will indicate that the battery was partly charged during the next morning
a) The density of acid has decreased b) The density of acid has increased
c) The acid has changed colour d) The acid level has dropped

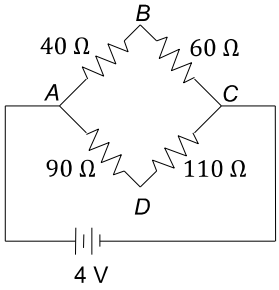
548. The temperature of cold junction of thermo-couple is 0°C. If the neutral temperature is 270°C, then the inversion temperature is
a) 540°C b) 520°C c) 640°C d) 580°C

549. The potential difference across 8Ω resistance is 48V as shown in figure. The value of potential difference across points A and B will be



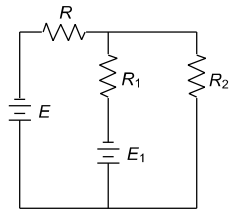
a) 62 V b) 80 V c) 128 V d) 160 V

550. Four resistances 40Ω, 60Ω, 90Ω and 110Ω make the arms of a quadrilateral $ABCD$. Across AC is the battery circuit, the emf of the battery being 4V and internal resistance negligible. The potential difference across BD is



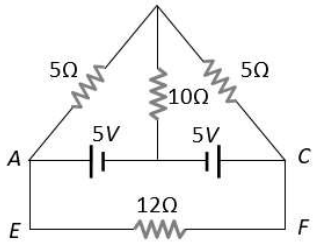
a) 1V b) −1V c) −0.2V d) 0.2V

551. Figure shows a circuit with known resistances R_1 .Neglect the internal resistance of the sources of current and resistance of the connecting wire. The magnitude of electromotive force E_1 such that the resistances R is zero will be



a) ER_1/R_2 b) ER_2/R_1 c) $E(R_1+R_2)/R_2$ d) $ER_1/(R_1+R_2)$

552. In the circuit of adjoining figure the current though 12 Ω resistor will be



a) 1 A b) $\frac{1}{5}A$ c) $\frac{2}{5}A$ d) 0 A

553. The thermo emf of a thermo-couple is found to depend on temperature T (in degree Celsius) as $E = 4T - \frac{T^2}{200}$, where T°C is the temperature of the hot junction. The neutral and inversion temperature of the thermocouple are (in degree celsius)

a) 100, 200 b) 200, 400 c) 300, 600 d) 400, 800

554. In a thermocouple, the temperature that does not depend on the temperature of the cold junction is called

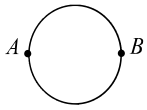
a) Neutral temperature b) Temperature of inversion

c) Both the above d) None of the above

555. A current I is passed for a time t through a number of voltmeters. If m is the mass of a substance deposited on an electrode and z is its electrochemical equivalent, then

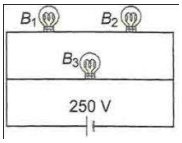
a) $\frac{zIt}{m}$ = constant b) $\frac{z}{mIt}$ = constant c) $\frac{I}{zmt}$ = constant d) $\frac{It}{zm}$ = constant

556. 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



a) 0.6 π Ω b) 3 Ω c) 6 π Ω d) 6 Ω

557. A 100 W bulb B_1 and two 60 W bulb B_2 and B_3 are connected to a 250 V source as shown in the figure.



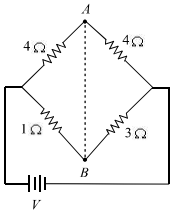
Now W_1, W_2 and W_3 are the out-put powers of the bulbs B_1, B_2 and B_3 respectively. Then

a) $W_1 > W_2 = W_3$ b) $W_1 > W_2 > W_3$ c) $W_1 < W_2 = W_3$ d) $W_1 < W_2 < W_3$

558. When the number of turns of the coil is doubled, the current sensitivity of a moving coil galvanometer is doubled whereas the voltage sensitivity of the galvanometer

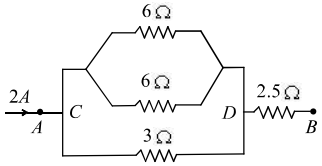
a) Remains the same b) Is halved c) Is doubled d) Is quadrupled

559. In the circuit shown, if a conducting wire is connected between points A and B, the current in this wire will



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

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

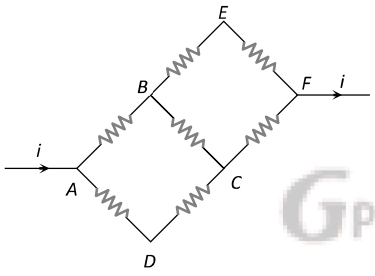


a) $4\ \Omega, 8\ V$
b) $8\ \Omega, 4\ V$
c) $2\ \Omega, 2\ V$
d) $16\ \Omega, 8\ V$

561. A thermocouple is made from two metals, Antimony and Bismuth. If one junction of the couple is kept hot and the other is kept cold, then, an electric current will
a) Flow from Antimony to Bismuth at the hot junction
b) Flow from Bismuth to Antimony at the cold junction
c) Not flow through the thermocouple
d) Flow from Antimony to Bismuth at the cold junction

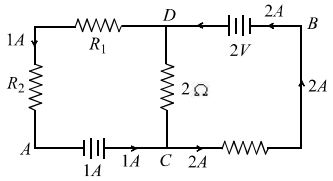
562. Incandescent bulbs are designed by keeping in mind that the resistance of their filament increases with the increase in temperature. If at room temperature, 100 W, 60 W and 40 W bulbs have filament resistances R_{100}, R_{60} and R_{40}, respectively, the relation between these resistances is
a) $\frac{1}{R_{100}} = \frac{1}{R_{40}} + \frac{1}{R_{60}}$
b) $R_{100} = R_{40} + R_{60}$
c) $R_{100} > R_{60} > R_{40}$
d) $\frac{1}{R_{100}} > \frac{1}{R_{60}} > \frac{1}{R_{40}}$

563. In the adjoining circuit diagram each resistance is of 10 Ω. The current in the arm AD will be



a) $\frac{2i}{5}$
b) $\frac{3i}{5}$
c) $\frac{4i}{5}$
d) $\frac{i}{5}$

564. In the circuit shown in the figure, if the potential at point A is taken to be zero, the potential at point B is



a) $-2V$
b) $+1V$
c) $-1V$
d) $+2V$

565. Electroplating does not help in
a) Fine finish to the surface
b) Shining appearance
c) Metals to become hard
d) Protecting metal against conosion

566. For a certain thermocouple, if the temperature of the cold junction is 0°C, the neutral temperature and inversion temperature are 285°C and 570°C respectively. If the cold junction is brought to 10°C, then the new neutral and inversion temperatures are respectively
a) 285°C and 560°C
b) 285°C and 570°C
c) 295°C and 560°C
d) 275°C and 560°C

567. A wire of diameter 0.02 $metre$ contains 10^{28} free electrons per cubic metre. For an electrical current of 100 A, the drift velocity of the free electrons in the wire is nearly
a) $1 \times 10^{-19} m/s$
b) $5 \times 10^{-10} m/s$
c) $2 \times 10^{-4} m/s$
d) $8 \times 10^{3} m/s$

568. In a circuit 5 percent of total current passes through a galvanometer. If resistance of the galvanometer is G

then value of the shunt is

a) 19 G b) 20 G c) $\frac{G}{20}$ d) $\frac{G}{19}$

569. In a potentiometer experiment, the galvanometer shows no deflection when a cell is connected across 60 cm of the potentiometer wire. If the cell is shunted by a resistance of 6Ω, the balance is obtained across 50 cm of the wire. The internal resistance of the cell is

a) 0.5 Ω b) 0.6 Ω c) 1.2 Ω d) 1.5 Ω

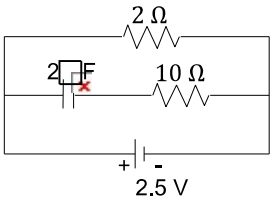
570. An electric cable of copper has just one wire of radius 9 mm. Its resistance is 5Ω. This single copper wire of cable is replaced by 6 different well insulated copper wires each of radius 3 mm. The total resistance of the cable will now be equal to

a) 7.5 Ω b) 45 Ω c) 90 Ω d) 270 Ω

571. When 1 g hydrogen (ECE = 1.044×10^{-8} kg C^{-1}) forms water, 34 kcal heat is liberated. The minimum voltage required to decompose water is

a) 0.75 V b) 3 V c) 1.5 V d) 4.5 V

572. A capacitor of capacitance 2μF is connected as shown in figure. The internal resistance of the cell is 0.5Ω. The amount of charge on the capacitor plates is



a) Zero b) 2μ C c) 4μC d) 6μC

573. A moving coil galvanometer is converted into an ammeter reading upto 0.03 A by connecting a shunt of resistance $4r$ across it and into an ammeter reading upto 0.06 A when a shunt of resistance r is connected across it. What is the maximum current which can be sent through this galvanometer if no shunt is used

a) 0.01 A b) 0.02 A c) 0.03 A d) 0.04 A

574. A 25 $watt$, 220 $volt$ bulb and a 100 $watt$, 220 $volt$ bulb are connected in series across a 220 $volt$ lines. Which electric bulb will glow more brightly

a) 25 $watt$ bulb b) 100 $watt$ bulb

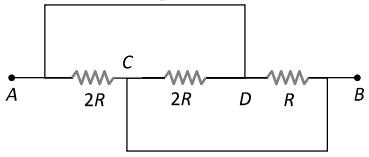
c) First 25 watt and then 100 $watt$ d) Both with same brightness

575. The colour code for a resistor of resistance 3.5$k\Omega$ 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

576. What is the equivalent resistance between A and B



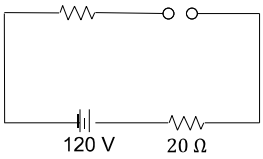
a) $\frac{2}{3}R$ b) $\frac{3}{2}R$ c) $\frac{R}{2}$ d) $2R$

577. Thomson coefficient of a conductor is $10\mu V/K$. The two ends of it are kept at 50°C and 60°C respectively. Amount of heat absorbed by the conductor when a charge of $10C$ flows through it is

a) 1000 J b) 100 J c) 100 mJ d) 1 mJ

578. In the circuit shown in the figure the potential difference between X and Y will be

40 Ω X Y



a) Zero b) 20 V c) 60 V d) 120 V

579. Who among the following scientists made the statement –"Chemical change can produce electricity"
a) Galvani b) Faraday c) Coulomb d) Thomson

580. The electric resistance of a certain wire of iron is R. If its length and radius are both doubled, then
a) The resistance will be doubled and the specific resistance will be halved
b) The resistance will be halved and the specific resistance will remain unchanged
c) The resistance will be halved and the specific resistance will be doubled
d) The resistance and the specific resistance, will both remain unchanged

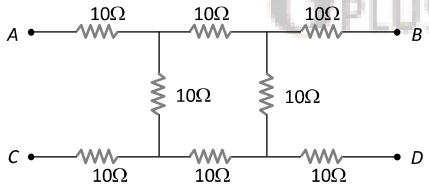
581. A coil develops heat of 800 cal/sec. When 20 $volts$ is applied across its ends. The resistance of the coil is $(1\ cal = 4.2\ joule)$
a) 1.2 Ω b) 1.4 Ω c) 0.12 Ω d) 0.14 Ω

582. A moving coil galvanometer has a resistance of 50Ω and gives full scale deflection for 10 mA. How could it be converted into an ammeter with a full scale deflection for $1A$
a) 50/99 Ω in series b) 50/99 Ω in parallel c) 0.01 Ω in series d) 0.01 Ω in parallel

583. When the temperature difference between hot and cold junctions of a thermo-couple is 100 K an emf of 1 V is generated. Assume the cold junction is heated by 20 K, the percentage change in thermo emf is
a) 20% b) 30% c) 40% d) 25%

584. 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
a) Putting in parallel a resistance of 240 Ω 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

585. What will be the equivalent resistance between the two points A and D



a) 10 Ω b) 20 Ω c) 30 Ω d) 40 Ω

586. The neutral temperature of a thermocouple is 350°C when the cold junction is at 0°C. When the cold junction is immersed in a bath of 30°C, the inversion temperature is
a) 700°C b) 600°C c) 350°C d) 670°C

587. A galvanometer has a resistance 50Ω. A resistance of 5Ω is connected parallel to it. Fraction of the total current flowing through galvanometer is
a) $\frac{1}{10}$ b) $\frac{1}{11}$ c) $\frac{1}{50}$ d) $\frac{2}{15}$

588. The neutral temperature $t_n = 285°C$ is constant for a Cu-Fe thermocouple. When the cold junction is at 0°C, the value of inversion temperature is $t_i = 570°C$ but if the cold junction is at 10°C, the inversion temperature (t_i) will be
a) 550°C b) 560°C c) 570°C d) 580°C

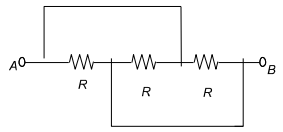
589. In a copper voltmeter experiment, current is decreased to one-fourth of the initial value but is passed for four times the earlier duration. Amount of copper deposited will be
a) Same b) One-fourth the previous value
c) Four times the previous value d) $\frac{1}{16}th$ the previous value

590. A 500 W heating unit is designed to operate from a 115 $volt$ line. If the line voltage drops to 110 volt, the percentage drop in heat output will be
a) 10.20% b) 8.1% c) 8.6% d) 7.6%

591. When the current i is flowing a conductor, the drift velocity is v. If $2i$ current is flowed through the same metal but having double the area of cross-section, then the drift velocity will be
a) $v/4$ b) $v/2$ c) v d) $4v$

592. The material of wire of potentiometer is
a) Copper b) Steel c) Manganin d) Aluminium

593. The resistance across A and Bin the figure below will be



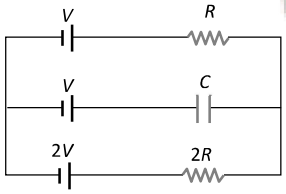
a) $3R$ b) R c) $\frac{R}{3}$ d) None of these

594. It is possible that any some constant value of emf, but the potential difference between the plates is zero?
a) Not, possible
b) Yes, if another identical battery is joined in series
c) Yes, if another identical battery is joined in opposition
d) Yes, possible, if another similar battery is joined in parallel

595. In a potentiometer experiment the balancing with a cell is at length 240 cm. on shunting the cell with a resistance of 2 Ω, the balancing length becomes 120cm. the internal resistance of cell is
a) 4 Ω b) 2 Ω c) 1 Ω d) 0.5 Ω

596. The resistance of a 10m long wire is 10Ω. Its length is increased by 25% by stretching the wire uniformly. Then the resistance of the wire will be
a) 12.5 Ω b) 14.5 Ω c) 15.6 Ω d) 16.6 Ω

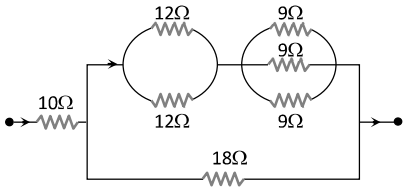
597. In the given circuit, with steady current, the potential drop across the capacitor must be



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

598. An ammeter gives full scale deflection when current 1.0 A is passed in it. To convert it into 10 A range ammeter, the ratio of its resistance and the shunt resistance will be
a) 1 : 9 b) 1 : 10 c) 1 : 11 d) 9 : 1

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

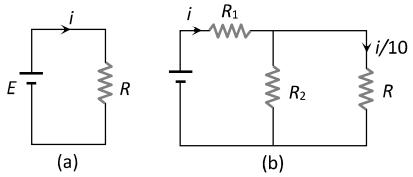


a) 125 W b) 10 W c) $\frac{4}{5}W$ d) 25 W

600. In which of the following substances does resistance decrease with increase in temperature?
a) Copper b) Carbon c) Constantan d) Silver

601. Consider the circuits shown in the figure. Both the circuits are taking same current from battery but

current through R in the second circuit is $\frac{1}{10}th$ of current through R in the first circuit. If R is 11 Ω, the value of R_1



a) 9.9 Ω b) 11 Ω c) 8.8 Ω d) 7.7 Ω

602. The resistance of a bulb filament is 100 Ω at a temperature of 100°C. If its temperature coefficient of resistance be 0.005 per°C, its resistance will become 200 Ω at a temperature of

a) 300°C b) 400°C c) 500°C d) 200°C

603. An electric heater is heated respectively by $d.c.$ and $a.c.$ Applied voltage for both the currents is equal. The heat produced per second will be

a) More on heating by $a.c.$ source b) More on heating by $d.c.$ source

c) Same for both d) None of the above

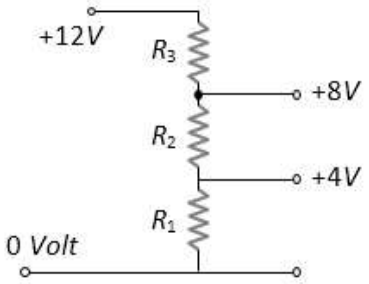
604. The electro chemical equivalent of metal is 3.3×10^{-7}kgC^{-1}. The mass of the metal liberated at the cathode when a 3 A current is passed for 2 s, will be

a) 19.8×10^{-7} kg b) 9.9×10^{-7} kg c) 6.6×10^{-7} kg d) 1.1×10^{-7} kg

605. 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

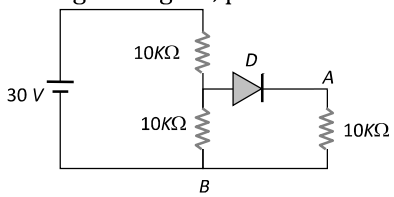
a) 2 Ω b) 3 Ω c) 6 Ω d) 1 Ω

606. A potential divider is used to give outputs of 4 V and 8 V from a 12 V source. Which combination of resistances, $(R_1 : R_2 : R_3)$ gives the correct voltages?



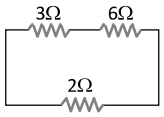
a) 2 : 1 : 2 b) 1 : 1 : 1 c) 2 : 2 : 1 d) 1 : 1 : 2

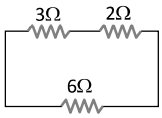
607. In the given figure, potential difference between A and B is

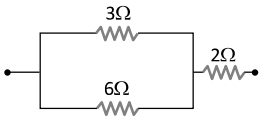


a) 0 b) 5 $volt$ c) 10 $volt$ d) 15 $volt$

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

a) 

b) 

c) 

d) None of these

609. 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

610. 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) $\frac{P}{9}$

611. How much current should be passed through a silver voltmeter to deposit 200 gm of silver per hour on the cathode? (Faraday constant =96500 C/mol and relative atomic mass of silver is 108)

a) 50 mA b) 50 A c) 15 mA d) 15 A

612. If the resistivity of an alloy is ρ' and that of constituent metal is ρ then

a) $\rho' > \rho$ b) $\rho' < \rho$

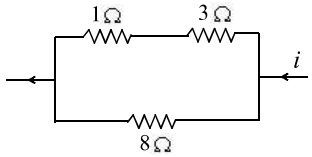
c) $\rho' = \rho$ d) There is no simple relation between ρ and ρ'

613. The thermo-emf of a thermocouple varies with the temperature θ of the hot junction as $E = a\theta + b\theta^2$ in volts where the ratio a/b is 700°C. If the cold junction is kept at 0°C, then the neutral temperature is

a) 700°C. b) 350°C.

c) 1400°C. d) No neutral temperature is possible for this thermocouple

614. 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



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

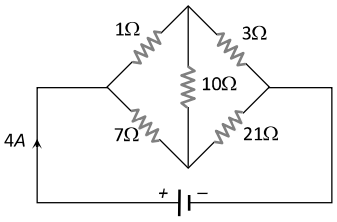
615. If potential $V = 100 \pm 0.5\ Volt$ and current $I = 10 \pm 0.2\ amp$ are given to us, then what will be the value of resistance

a) $10 \pm 0.7\ ohm$ b) $5 \pm 2\ ohm$ c) $0.1 \pm 0.2\ ohm$ d) None of these

616. A given resistor has the following colour scheme of the various strips on it, brown, black, green and silver. Its value in ohm is

a) $1.0 \times 10^4 \pm 10\%$ b) $1.0 \times 10^5 \pm 10\%$ c) $1.0 \times 10^6 \pm 10\%$ d) $1.0 \times 10^7 \pm 10\%$

617. 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



a) 1 A b) 2 A c) 3 A d) 0 A

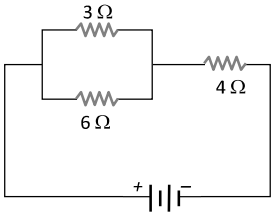
618. A straight conductor of uniform cross-section carries a current i, If s is the specific charge of an electron, the momentum of all the free electrons per unit length of the conductor, due to their drift velocity only is

a) is b) $\sqrt{i/s}$ c) i/s d) $(i/s)^2$

619. A cell supplies a current $i_1$through a resistance R_1 and a current I_2 through a resistance R_2. The internal resistance of a cell is

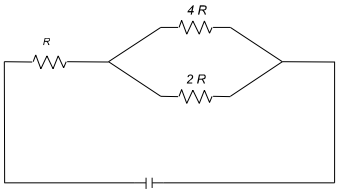
a) $R_2 - R_1$ b) $\frac{(i_1 + i_2)}{i_1 - i_2} R_1 R_2$ c) $\frac{i_1 R_2 - i_2 R_1}{i_1 - i_2}$ d) $\frac{i_2 R_2 - i_1 R_1}{i_1 - i_2}$

620. In the figure, current through the 3Ω resistor is 0.8 $ampere$, then potential drop through 4 Ω resistor is



a) 9.6 V b) 2.6 V c) 4.8 V d) 1.2 V

621. In a network as shown in the figure, the potential difference across the resistance $2R$ is (the cell has an emf of E volt and has no ingternal resistance)



a) $2E$ b) $\frac{4E}{7}$ c) $\frac{E}{7}$ d) E

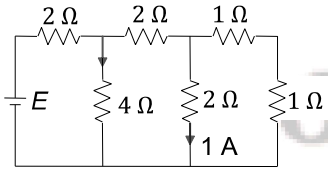
622. A galvanometer of resistance 20 Ω is to be converted into an ammeter of range 1 A. If a current of 1 mA produces full scale deflection, the shunt required for the purpose is

a) 0.01 Ω b) 0.05 Ω c) 0.02 Ω d) 0.04 Ω

623. Two cells A and B are connected in the secondary circuit of a potentiometer one at a time and the balancing length are respectively 400 cm and 440 cm. The emf of the cell A is 1.08V. The emf of the second cell B is volt is

a) 1.08 b) 1.188 c) 11.88 d) 12.8

624. The emf of the battery shown in figure, is



a) 12 V b) 13 V c) 16 V d) 18 V

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

a) 5/999 ohm b) 10/999 ohm c) 20/999 ohm d) 25/999 ohm

626. The resistance of hot tungsten filament is about 10 times the cold resistance. What will be the resistance of 100 W and 200 lamps, when not in use?

a) 40 Ω b) 20 Ω c) 400 Ω d) 200 Ω

627. If 400Ω of resistance is made by adding four 100Ω resistance of tolerance 5%, then the tolerance of the combination is

a) 20 % b) 5 % c) 10 % d) 15 %

628. A 12 V lead accumulator is being charged using 24 V supply with an external resistance 2Ω. The internal resistance of the accumulator is 1Ω. Find the time in which it will store 360 W-hour energy

a) 1 hr b) 7.5 hr c) 10 hr d) None of these

629. When two identical batteries of internal resistance 1 Ω each are connected in series across a resistor R, the rate of heat produced in R is J_1. When the same batteries are connected I parallel across R, the rate is J_2. If $J_1 = 2.25\, J_2$ then the value of R in Ω is

a) 4 b) 6 c) 4.8 d) 5.16

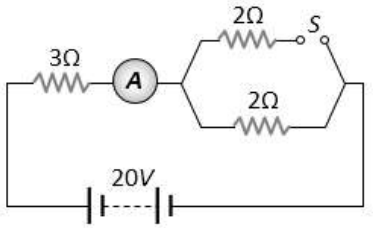
630. A strip of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

a) Each of these increases b) Each of these decreases

c) Copper strip increases and that of germanium d) Copper strip decreases and that of germanium

decreases increases

631. In the circuit shown, the reading of ammeter when switch S is open and when switch S is closed respectively are



a) 3 A and 4 A b) 4 A and 5 A c) 5 A and 6 A d) 6 A and 7 A

632. 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

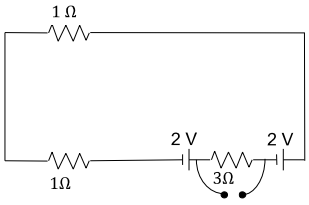
633. A thermocouple of resistance 1.6Ω is connected in series with a galvanometer of 8Ω resistance. The thermocouple develops an e.m.f. of $10\mu V$ per degree temperature difference between two junctions. When one junction is kept at 0°C and the other in a molten metal, the galvanometer reads 8 $millivolt$. The temperature of molten metal, when e.m.f. varies linearly with temperature difference, will be
a) 960°C b) 1050°C c) 1275°C d) 1545°C

634. E.C.E. of Cu and Ag are 7×10^{-6} and 1.2×10^{-6}. A certain current deposits 14 gm of Cu. Amount of Ag deposited is
a) 1.2 gm b) 1.6 gm c) 2.4 gm d) 1.8 gm

635. In a Wheatstone's bridge all the four arms have equal resistance R. If the resistance of the galvanometer arm is also R, the equivalent resistance of the combination as seen by the battery is
a) $R/2$ b) R c) 2 R d) $R/4$

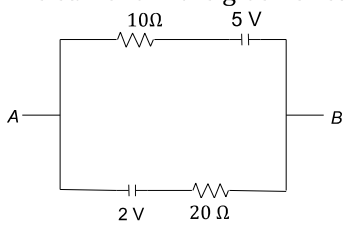
636. A source of e. m. f. $E = 15\ V$ and having negligible internal resistance is connected to a variable resistance so that the current in the circuit increases with time as $i = 1.2\ t + 3$. Then, the total charge that will flow in first five seconds will be
a) 10 C b) 20 C c) 30 C d) 40 C

637. For the circuit shown in the figure the potential difference between A and B will be (in volt)



a) 2 b) 1.5 c) 1.0 d) Zero

638. The current in the given circuit is



a) 0.3A b) 0.4A c) 0.1A d) 0.2A

639. 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 $6m$ and $2m$ 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

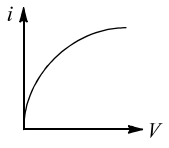
640. To convert a moving a coil galvanometer (MCG) into a voltmeter

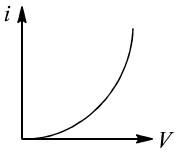
a) A high resistance R is connected in parallel with MCG
b) A low resistance r is connected in parallel with MCG
c) A low resistance r is connected in series with MCG
d) A high resistance R is connected in series with MCG

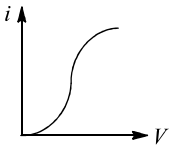
641. For a given temperature difference which of the following pairs will generate maximum thermo-emf?

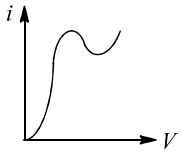
a) Lead-nickel b) Copper-iron c) Gold-silver d) Antimony-bismuth

642. The variation between $V - i$ has been shown by $V - i$ graph for heater filament.

a) 

b) 

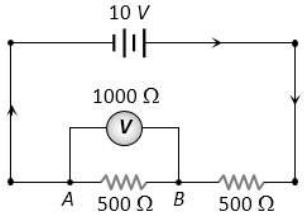
c) 

d) 

643. A 30, 90 W lamps are to be operated on a 120 V DC line. For proper glow, a resistor of ..... Ω should be connected in series with the lamp.

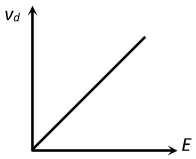
a) 40 b) 10 c) 20 d) 30

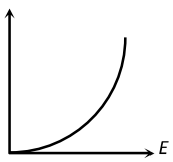
644. What is the reading of voltmeter in the following figure

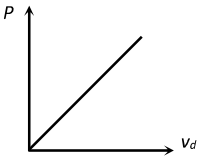


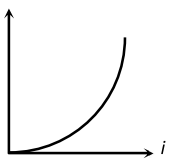
a) 3 V b) 2 V c) 5 V d) 4 V

645. 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) 

646. A copper voltmeter and a silver voltmeter are connected in series in a circuit. The rate of the increase in the weight of the cathode in the two voltmeters will be in the ratio of

a) Atomic weights of Cu and Ag
b) Densities of Cu and Ag
c) Half of the atomic weight of Cu to the atomic weight of Ag
d) Half of the atomic weight of Ag to half the atomic weight of Cu

647. Which of the following statement is correct

a) Electric field is zero on the surface of current carrying wire
b) Electric field is non-zero on the axis of hollow current carrying wire
c) Surface integral of magnetic field for any closed surface is equal to μ_0 times of total algebraic sum of current which are crossing through the closed surface
d) None

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

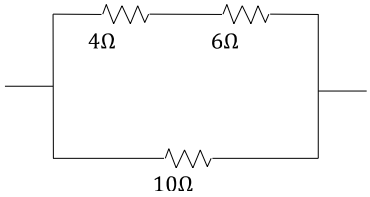
a) Increases for both b) Decreases for both c) Increases, decreases d) Decreases, increases

649. Constantan wire is used in making standard resistances because its

a) Specific resistance is low
b) Density is high
c) Temperature coefficient of resistance is negligible
d) Melting point is high

650. When a potential difference is applied across the ends of a linear metallic conductor
a) The free electrons are accelerated continuously from the lower potential end to the higher potential end of the conductor
b) The free electrons are accelerated continuously from the higher potential end to the lower potential end of the conductor
c) The free electrons acquire a constant drift velocity from the lower potential end to the higher potential end of the conductor
d) The free electrons are set in motion from their position of rest

651. The heat produced in 4 Ω resistance is 10 cal. The heat produced in 10 Ω resistance will be



a) 25 cal b) 14 cal c) 10 cal d) 20 cal

652. The tangent galvanometer, when connected in series with a standard resistance can be used as
a) An ammeter b) A voltmeter
c) A wattmeter d) Both ammeter and voltmeter

653. An electric heater of resistances 6 Ω is run for 10 min on 120 V line. The energy librated in this period of time is?
a) 7.2×10^5 J b) 14.4×10^5 J c) 43.2×10^5 J d) 28.8×10^5 J

654. In ballistic galvanometer, the frame in which the coil is wound is non-metallic to
a) Avoid the production of induced emf b) Avoid the production of eddy currents
c) Increase the production of eddy currents d) Increase the production of induced emf

655. 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]
a) 8 min 20 s b) 6 min 2 s c) 7 min d) 14 min

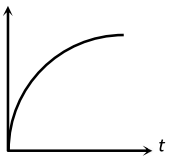
656. If nearly 10^5C liberate 1 g equivalent of aluminium, then the amount of aluminium (equivalent weight 9) deposited through electrolysis in 20 min by a current of 50 A will be
a) 0.09 g b) 0.6 g c) 5.4 g d) 10.8 g

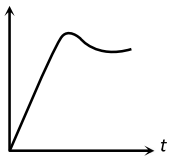
657. The resistance of an ideal voltmeter is
a) Zero b) Very low c) Very large d) Infinite

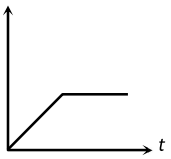
658. If the resistivity of an alloy of ρ' and that of constituent metals is ρ, then
a) $\rho' > \rho$ b) $\rho' < \rho$
c) $\rho' = \rho$ d) There is no simple relation between ρ and ρ'

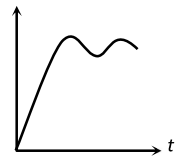
659. In hydrogen atom, the electron makes 6.6×10^{15} revolutions per second around the nucleus in an orbit of radius $0.5 \times 10^{-10} m$. It is equivalent to a current nearly
a) 1 A b) 1 mA c) 1 μA d) $1.6 \times 10^{-19} A$

660. When an electric heater is switched on, the current flowing through it (i) is plotted against time (t). Taking into account the variation of resistance with temperature, which of the following best represents the resulting curve

a) 

b) 

c) 

d) 

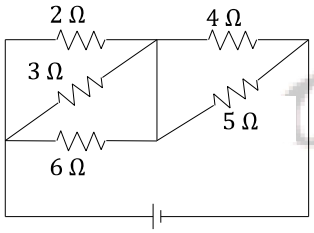
661. If an electric current is passed through a nerve of a man, then man
a) Begins to laugh
b) Begins to weep
c) Is excited
d) Becomes insensitive to pain

662. The reading of a high resistance voltmeter when a cell is connected across it is 2.2 V. When the terminals of the cell are also connected to a resistance of 5 Ω the voltmeter reading drops to 1.8 V. Find the internal resistance of the cell
a) 1.2 Ω
b) 1.3 Ω
c) 1.1 Ω
d) 1.4 Ω

663. Three resistances of values 2Ω, 3Ω and 6Ω are to be connected to produce an effective resistance of 4Ω. This can be done by connecting
a) 6Ω resistance in series with the parallel combination of 2Ω and 3Ω
b) 3Ω resistance in series with the parallel combination of 2Ω and 6Ω
c) 2Ω resistance in series with the parallel combination of 3Ω and 6Ω
d) 2Ω resistance in parallel with the parallel combination of 3Ω and 6Ω

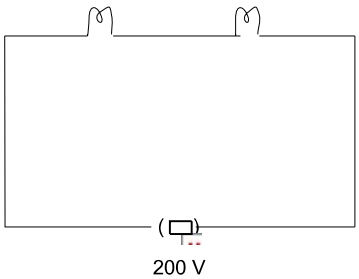
664. A meter bridge is used to determine the resistance of an unknown wire by measuring the balance point length l. If the wire is replaced by another wire of same material but with double the length and half the thickness, the balancing point is expected to be
a) $\frac{1}{8l}$
b) $\frac{1}{4l}$
c) $8l$
d) $16l$

665. The resistor in which maximum heat will be produced is



a) 2 Ω
b) 3 Ω
c) 4 Ω
d) 6 Ω

666. Two bulbs marked 200 V -100 W and 200 V-200 W are joined in series and connected to a power supply of



200 V. The total power consumed by the two will be near to
a) 35 W
b) 66 W
c) 100 W
d) 300 W

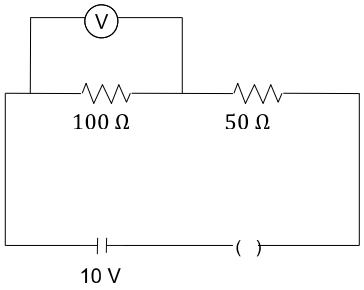
667. To sand 10% of main current through a moving coil galvanometer of resistance 9 Ω shut required
a) 9 Ω
b) 11 Ω
c) 10 Ω
d) 9.9 Ω

668. All of the following statements are true except
a) Conductance is the reciprocal of resistance and is measured in *Siemen*
b) $Ohm's$ law is not applicable at very low and very high temperatures
c) $Ohm's$ law is applicable to semiconductors
d) $Ohm's$ law is not applicable to electron tubes, discharge tubes and electrolytes

669. 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

670. In the given circuit, the voltmeter records 5V. The resistance of the voltmeter in ohm is



a) 200 b) 100 c) 10 d) 50

671. If a steady current of 100 A is passed then how much time is taken to deposit 0.254 kg of copper on the cathode of copper voltmeter. Use the known value of Faraday constant and relative atomic mass of copper is 63.5.

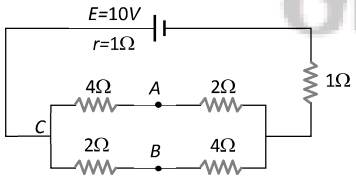
a) 15440 s b) 7720 s c) 3760 s d) 5480 s

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

a) $\frac{30E}{100.5}$ b) $\frac{30E}{100-0.5}$

c) $\frac{30(E-0.5i)}{100}$, Where i is the current in the potentiometer wire. d) $\frac{30E}{100}$

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

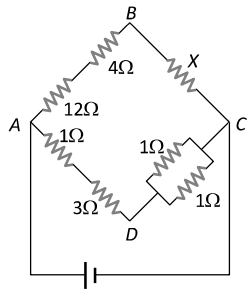


a) 6 V b) 4 V c) 2 V d) -2 V

674. Two electric bulbs (60W and 100W respectively) are connected in series. The current passing through them is

a) More in 100W bulb b) More in 60W bulb c) Same in both d) None of these

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



a) 4 Ω b) 2 Ω

c) 3 Ω d) $e.m.f.$ of a cell is required to find the value of X

676. The resistance of a wire is 5Ω at 50°C and 6Ω at 100°C.The resistance of the wire at 0°C will be

a) 2Ω b) 1Ω c) 4Ω d) 3Ω

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

a) $\frac{I\rho}{A}$ b) $\frac{I}{A\rho}$ c) $\frac{IA}{\rho}$ d) $IA\rho$

678. One junction of a thermo-couple is a particular temperature T_r and another is at T. Its thermo emf is expressed as

$$E = K(T - T_r)\left\{T_0 - \frac{1}{2}(T + T_r)\right\}$$

At a temperature $T = \frac{T_0}{2}$, the value of thermo-electric power will be

a) $\frac{1}{2}KT_0$ b) KT_0 c) $\frac{1}{2}KT_0^2$ d) $\frac{1}{2}K(T_0 - T_r)^2$.

679. Heat produced in a wire of resistance R due to current flowing at constant potential difference is proportional to

a) $\frac{1}{R^2}$ b) $\frac{1}{R}$ c) R d) R^2

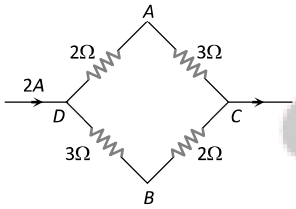
680. In meter bridge or wheatstone bridge for measurement of resistance, the known and the unknown resistance are interchanged. The error so removed is

a) End correction b) Index error
c) Due to temperature effect d) Random error

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

a) 6.67 ohm b) 60.0 ohm c) 120 ohm d) 180.0 ohm

682. 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) $-2V$

683. If R_1 and R_2 are respectively the filament resistances of a 200 $watt$ bulb and 100 $watt$ bulb designed to operate on the same voltage, then

a) R_1 is two times R_2 b) R_2 is two times R_1 c) R_2 is four times R_1 d) R_1 is four times R_2

684. If a wire is stretched to make it 0.1% longer, its resistance will

a) Increase by 0.2% b) Decrease by 0.2% c) Decrease 0.05% d) Increase by 0.05%

685. Two electric bulbs, each designed to operate with a power of 500 W in 220 V line are connected in series in a 110 V line. The power generated by each bulb will be

a) 31.25 W b) 40 W c) 60 W d) 3.125 W

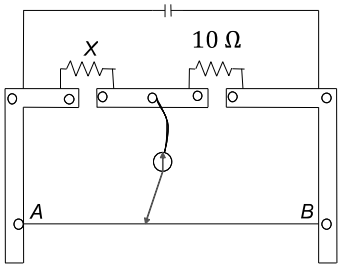
686. When a resistance of 100 Ω is connected in series with a gal vinometer of resistance R, its range is V. to double its range, a resistance of 1000 Ω is connected in series. Find R

a) 700 Ω b) 800 Ω c) 900 Ω d) 100 Ω

687. The resistivity of a wire depends on its

a) Length b) Area of cross-section c) Shape d) Material

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



a) 10.2 Ω b) 10.6 Ω c) 10.8 Ω d) 11.1 Ω

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

a) 0.18 Ω b) 0.0018 Ω c) 0.002 Ω d) 0.12 Ω

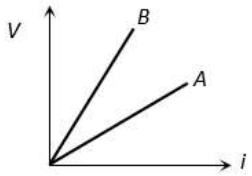
690. A storage cell is charged by 5 amp D.C. for 18 $hours$. Its strength after charging will be

a) 18 AH b) 5 AH c) 90 AH d) 15 AH

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

a) $\frac{3}{5}$ ohm b) 2 ohm c) $\frac{6}{5}$ ohm d) 3 ohm

692. $V - i$ graphs for parallel and series combination of two identical resistors are as shown in figure. Which graph represents parallel combination



a) A
b) B
c) A and B both
d) Neither A nor B

693. In a galvanometer 5% of the total current in the circuit passes through it. If the resistance of the galvanometer is G, the shunt resistance S connected to the galvanometer is

a) 19G b) G/19 c) 20G d) G/20

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

a) 10000 Ω b) 8000 Ω c) 4000 Ω d) All are equally good

695. Two wires have lengths, diameters and specific resistances all in the ratio of 1 : 2. The resistance of the first wire is 10Ω. Resistance of the second wire in ohm will be

a) 5 b) 10 c) 20 d) Infinite

696. An electric lamp is marked 60 W, 230 V. The cost of kilowatt hour of power is Rs 1.25. The cost of using this lamp 8 h a day for 30 days is

a) Rs 10 b) Rs 16 c) Rs 18 d) Rs 20

697. A 200 W and a 100 W bulb, both meant for operation at 220 V are connected in series. When connected to a 220 V supply the power consumed by the combination is

a) 33.3 W b) 66.7 W c) 300 W d) 100 W

698. A current of $\left(\frac{2}{3}\right)A$ produces a deflection of 60° in a tangent galvanometer. The reduction factor is

a) $\left(\frac{2}{3}\right)A$ b) 2A c) $\left(\frac{2}{3}\right)A$ d) $\left(\frac{2}{\sqrt{3}}\right)A$

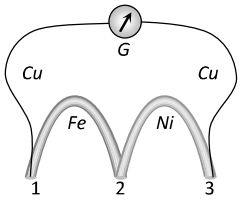
699. A charge of 2×10^{-1}C move at 30 revolutions per second in a circle of diameter 80 cm. The current linked with the circuit is

a) 0.02 A b) 20 A c) 0.60 A d) 60 A

700. Two copper wires have their masses in the ratio 2 : 3 and the lengths in the ratio 3 : 4 the ratio of their resistance is

a) 4 : 9 b) 27 : 32 c) 16 : 9 d) 27 :128

701. Three wires of copper, iron and nickel are joined to form three junctions as shown in Fig. When the temperature of junction 1 is kept 50°C with the other two junctions at 0°C, the sensitive galvanometer gives a deflection of 14 divisions. When the temperature of junction 3 is kept 50°C, with the other two junctions at 0°C, the galvanometer gives a deflection of 11 divisions. Then the deflection given by the galvanometer, when temperature of the junction 2 is kept at 50°C, with the other two junctions at 0°C, will be

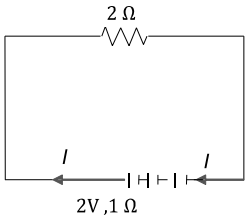


a) 3 div b) 11 div c) 14 div d) 25 div

702. In a potentiometer experiment, when three cells A, B and C care connected in series the balancing length is found to be 740 cm. if A and B are connected in series balancing length is 540 cm. then the emf of $E_A, E_B and\ E_C$ are respectively (in volts)

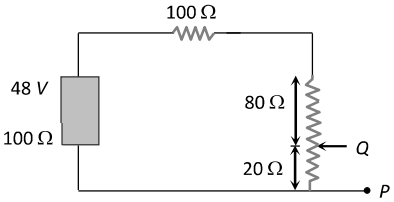
a) 1,1.2 and 1.5 b) 1,2 and 3 c) 1.5,2 and 3 d) 1.5, 2.5 and 3.5

703. In the electric circuit shown each cell has an emf of 2V and internal resistance of 1Ω. The external resistance is 2Ω. The value of the current I is(in ampere)



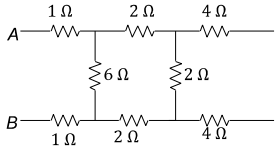
a) 2 b) 1.25 c) 0.4 d) 1.2

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



a) 9.6 V b) 6.6 V c) 4.8 V d) 3.2 V

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

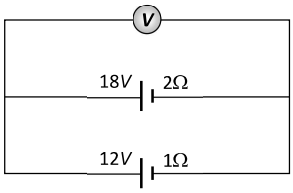


a) 5 Ω b) 8 Ω c) 2.5 Ω d) 6.8 Ω

706. The electromotive force of a primary cell is 2 $volt$. When it is short-circuited it gives a current of 4 $ampere$. Its internal resistance in ohm is

a) 0.5 b) 5.0 c) 2.0 d) 8.0

707. 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



a) 15 $volt$ b) 30 $volt$ c) 14 $volt$ d) 18 $volt$

708. Certain wire has resistance of 10Ω. If its is stretched by 1/10th of its length, then its resistance is nearly

a) 9 Ω b) 10 Ω c) 11 Ω d) 12 Ω

709. Heat produced (cals) in a resistance R when a current I amperes flows through it for t seconds is given by the expression

a) $\frac{I^2Rt}{4.2}$ b) $\frac{IR^2t}{4.2}$ c) $\frac{4.2IR}{t^2}$ d) $\frac{IRt^2}{4.2}$

710. One junction of thermocouple is at 0°C and the other is at T°C. The thermo emf (in volts) is given by $E = 20 \times 10^{-6}T - 0.02 \times 10^{-6}T^2$

The maximum value of E is

a) 5 mV b) 1 m V c) 10 m V d) Zero

711. 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

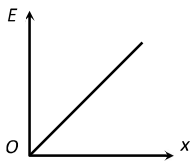
712. An electric heater rated 220 V and 550 W is connected to AC mains. The current drawn by it is

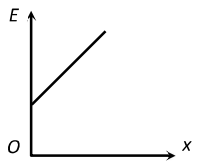
a) 0.8 A b) 2.5 A c) 0.4 A d) 1.25 A

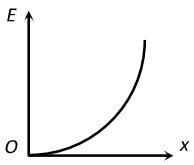
713. In the above question, the resistance between the square faces is

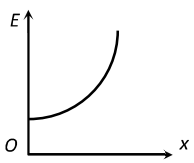
a) $3 \times 10^{-9} ohm$ b) $3 \times 10^{-7} ohm$ c) $3 \times 10^{-5} ohm$ d) $3 \times 10^{-3} ohm$

714. 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) 

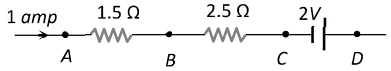
715. The effective resistance of two resistors in parallel is $\frac{12}{7}$ Ω. If one of the resistors is disconnected the resistance becomes 4 Ω. The resistance of the other resistor is

a) 4 Ω b) 3 Ω c) $\frac{12}{7}$ Ω d) $\frac{7}{12}$ Ω

716. 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

717. 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) $V_A = +1.5\ V, V_D = +0.5\ V$ d) $V_A = +1.5V, V_D = -0.5\ V$

718. At room temperature, copper has free electron density of 8.4×10^{28} per m^3. The copper conductor has a

cross-section of $10^{-6}m^2$ and carries a current of 5.4 A. The electron drift velocity in copper is

a) 400 m/s b) 0.4 m/s c) 0.4 mm/s d) 72 m/s

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

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

720. Which of the following has a negative temperature coefficient

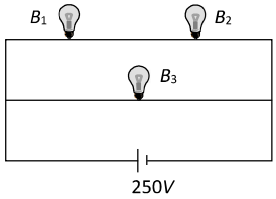
a) C b) Fe c) Mn d) Ag

721. In the above question if potential difference is applied, the drift velocity at temperature T is

a) Inversely proportional to T b) Proportional to $\sqrt{T}$

c) Zero d) Finite but independent of T

722. 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



a) $W_1 > W_2 = W_3$ b) $W_1 > W_2 > W_3$ c) $W_1 < W_2 = W_3$ d) $W_1 < W_2 < W_3$

723. In an electric heater 4 amp current passes for 1 $minute$ at potential difference of 250 $volt$, the power of heater and energy consumed will be respectively

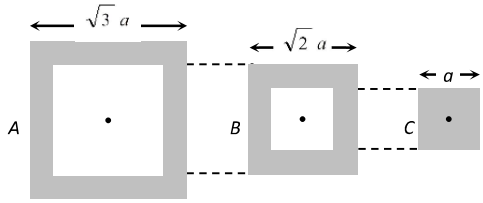
a) 1 $kW, 60\ kJ$ b) 0.5 $kW, 30\ kJ$ c) 10 $kW, 600\ kJ$ d) None of these

724. Which of the following characteristics of electron determines the current in a conductor?

a) Thermal velocity alone b) Drift velocity alone

c) Both thermal velocity and drift velocity d) None of the above

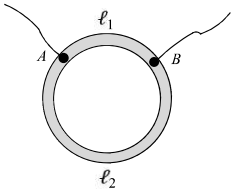
725. Following figure shows cross-sections through three long conductors of the same length and material, with square cross-section of edge lengths as shown. Conductor B will fit snugly within conductor A, and conductor C will fit snugly within conductor B. Relationship between their end to end resistance 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

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

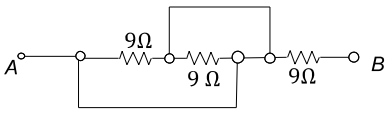


a) $\frac{\ell_1}{\ell_2}=\frac{5}{8}$ b) $\frac{\ell_1}{\ell_2}=\frac{1}{3}$ c) $\frac{\ell_1}{\ell_2}=\frac{3}{8}$ d) $\frac{\ell_1}{\ell_2}=\frac{1}{2}$

727. If a rod has resistance 4Ω and if rod is turned as half circle, then the resistance along diameter is

a) 1.56Ω b) 2.44Ω c) 4Ω d) 2Ω

728. In the circuit shown the equivalent resistance between A and B is



a) 27 Ω b) 18 Ω c) 9 Ω d) 3 Ω

729. For comparing the e.m.f.'s of two cells with a potentiometer, a standard cell is used to develop a potential gradient along the wires. Which of the following possibilities would make the experiment unsuccessful
a) The e.m.f. of the standard cell is larger than the E e.m.f.'s the two cells
b) The diameter of the wires is the same and uniform throughout
c) The number of wires is ten
d) The e.m.f. of the standard cell is smaller than the e.m.f.'s of the two cells

730. 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) $\frac{1}{3} ohm$

731. Two cells having the internal resistance 0.2 Ω and 0.4 Ω are connected in parallel. The voltage across the battery terminal is 1.5V. the emf of first cell is 1.2V. the emf of second cell is

a) 2.7 V b) 2.1 V c) 3 V d) 4.2V

732. Resistance of a wire at 20°C is 20Ω and at 500°C is 60Ω. At what temperature its resistance is 25Ω?

a) 160°C b) 250°C c) 100°C d) 80°C

733. Two wires of the same material and having same uniform area of cross-section are connected in series in an electrical circuit. The masses of the wires are m and $2m$. When a current I flows in the circuit, the heats produced by them in a given time are in ratio

a) 2 : 1 b) 1 : 2 c) 4 : 1 d) 1 : 4

734. A copper and a chromium voltmeter are connected in series with a battery. It found that in half an hour 0.475 g of copper and 0.130 g of chromium have been deposited. The ECE ratio of copper and chromium is

a) 0.274 b) 0.523 c) 3.65 d) 1.85

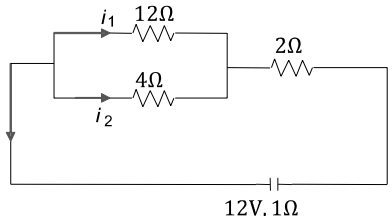
735. At neutral temperature, the thermoelectric power $\left(\frac{dE}{dT}\right)$ has the value

a) Zero b) Maximum but negative
c) Maximum but positive d) Minimum but positive

736. A thermocouple of negligible resistance produces an e.m.f. of 40μV/°C in the linear range of temperature. A galvanometer of resistance 10 ohm whose sensitivity is 1$\mu A/div$, is employed with the thermocouple. The smallest value of temperature difference that can be detected by the system will be

a) 0.1°C b) 0.25°C c) 0.5°C d) 1°C

737. In the circuit shown, the currents i_1 and i_2 are



a) $i_1 = 3\text{A}, i_2 = 1\text{A}$ b) $i_1 = 1\text{A}, i_2 = 3\text{A}$ c) $i_1 = 0.5\text{A}, i_2 = 1.5\text{ A}$ d) $i_1 = 1.5\text{ A}, i_2 = 0.5\text{ A}$

738. 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 $days$?

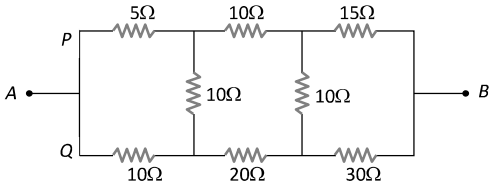
a) Rs 347 b) Rs 358 c) Rs 375 d) Rs 397

739. Combination of two identical capacitors, a resistor R and a DC voltage source of voltage 6 V is used in an experiment on $C - R$ circuit. It is found that for a parallel combination of the capacitor the time in which

the voltage of the fully charged combination reduces to half its original voltage is 10s. For series combination the time needed for reducing the voltage of the fully charged series combination by half is

a) 200s b) 10s c) 5s d) 2.5s

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

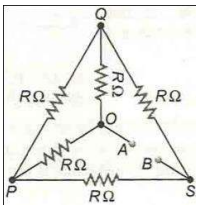


a) 20 Ω b) 30 Ω c) 90 Ω d) 110 Ω

741. Two filaments of same length are connected first in series and then in parallel. For the same amount of main current flowing the ratio of the heat produced is

a) 2 : 1 b) 1 : 2 c) 4 : 1 d) 1 : 4

742. If each of the resistances in the network in figure. R, the equivalent resistance between terminals A and B is



a) 5 R b) 2 R c) 4 R d) R

743. The resistance will be least in a wire with dimension

a) $L/2,2A$ b) $2L, A$ c) L, A d) None of these

744. A thermocouple uses Bismuth and Tellurium as the dissimilar metals. The sensitivity of bismuth is $-72\mu\ V/°C$ and that of the tellurium is $500\mu\ V/°C$. If the difference between hot and cold junction is 100°C, then the maximum output will be

a) 50 mV b) 7.2 mV c) 42.8 mV d) 57.2 mV

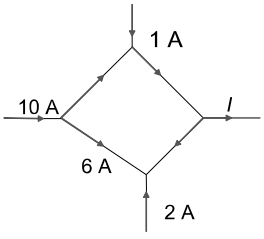
745. Two wires of the same dimensions but resistivities ρ_1 and ρ_2 are connected in series. The equivalent resistivity of the combination is

a) $\frac{\rho_1 + \rho_2}{2}$ b) $\rho_1 + \rho_2$ c) $2(\rho_1 + \rho_2)$ d) $\sqrt{\rho_1 \rho_2}$

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

a) 3 b) 2 c) 4 d) 6

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



a) 3A b) 9A c) 13A d) 19A

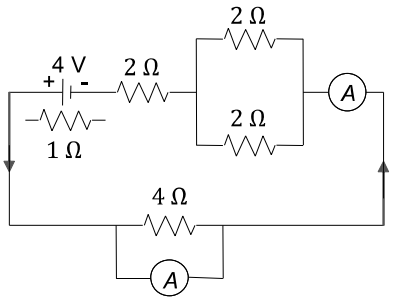
748. A conductor wire having 10^{29} free electrons/m^3 carries a current of 20A. If the cross-section of the wire is $1mm^2$, then the drift velocity of electrons will be

a) $6.25 \times 10^{-3} ms^{-1}$ b) $1.25 \times 10^{-5} ms^{-1}$ c) $1.25 \times 10^{-3} ms^{-1}$ d) $1.25 \times 10^{-4} ms^{-1}$

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

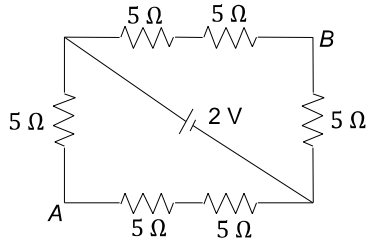
a) 32 b) 64 c) 50 d) 200

750. What is the total resistance of the circuit?



a) 6 Ω b) 7 Ω c) 8 Ω d) 9 Ω

751. In the circuit shown in figure the potential difference between the points A and B will be

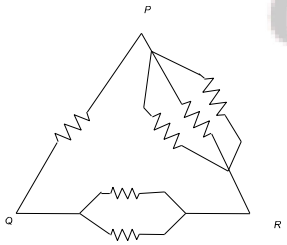


a) $\frac{2}{3}$V b) $\frac{8}{9}$V c) $\frac{4}{3}$V d) 2V

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

a) Be doubled b) Be halved c) Be quadrupled d) Remain unchanged

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



a) P and Q b) $Q$and R c) $P$and R d) Only two points

754. A silver voltameter of resistance 2 ohm and a 3 ohm resistor are connected in series across a cell. If a resistance of 2 ohm is connected in parallel with the voltameter, then the rate of deposition of silver

a) Decreases by 25% b) Increases by 25% c) Increases by 37.5% d) Decreases by 37.5%

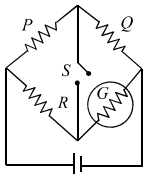
755. A, B, C and D are four resistances of 2Ω, 2Ω, 2Ω and 3Ω respectively. They are used to form a Wheatstone bridge. The resistance D is short circuted with a resistances R in order to get the bridge balanced. The value of R will be

a) 4 Ω b) 6 Ω c) 8 Ω d) 3 Ω

756. A nichrome wire 50 cm long and one square $millimetre$ cross-section carries a current of $4A$ when connected to a $2V$ 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}

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



a) The galvanometer shows a deflection when switch S is closed
b) The galvanometer shows a deflection when switch S is open
c) The galvanometer shows no change in deflection whether S is open or closed
d) The galvanometer shows no deflection

758. The Avogadro's number is 6×10^{23} per gm mole and electronic charge is $1.6 \times 10^{-19}C$. The Faraday's number is

a) $6 \times 10^{23} \times 1.6 \times 10^{-19}$ b) $\frac{6 \times 10^{23}}{1.6 \times 10^{-19}}$
c) $\frac{2}{6 \times 10^{23} \times 1.6 \times 10^{-19}}$ d) $\frac{1.6 \times 10^{-19}}{6 \times 10^{23}}$

759. Total surface area of a cathode is $0.05m^2$ and 1 A current passes through it for 1 $hour$. Thickness of nickle deposited on the cathode is (Given that density of nickle $= 9g/cc$ and it's E.C.E. $= 3.04 \times 10^{-4} g/C$)

a) 2.4 m b) 0.24 μm c) 2.4 μm d) None of these

760. A thermocouple is formed by two metals X and Y, metal X comes earlier to Y in Seebeck series. If temperature of hot junction increases beyond the temperature of inversion, then direction of current in thermocouple will be from

a) X to Y through cold junction b) X to Y through hot junction
c) Y to X through cold junction d) Both (b) and (c)

761. Two conductors have the same resistance at 0°C but their temperature coefficients of resistance are $\alpha_1 and\ \alpha_2$. The respective temperature coefficients of their series and parallel combinations are nearly

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

762. Three resistors 1 Ω, 2Ω and 3Ω are connected to form a triangle. Across 3Ω resistor a 3V battery is connected. The current through 3 Ωresistor is

a) 0.75A b) 1A c) 2A d) 1.5A

763. In a meter bridge experiment, null point is obtained at 20cm from one end of the wire when resistance $X$is balanced against another resistance Y. If X<Y, then 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?

a) 50 cm b) 80 cm c) 40 cm d) 70 cm

764. In a potentiometer arrangement, a cell of emf 1.5V gives a balance point at 27cm length of wire. If the cell is replaced by another cell and balance point shifts to 54cm, the emf of the second cell is

a) 3V b) 1.5V c) 0.75V d) 2.25V

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

a) 8 Ω b) 12 Ω c) $\frac{3}{8}\Omega$ d) $\frac{8}{3}\Omega$

766. Two identical cells connected in series send 1.0 A current through a 5Ω resistor. When they are connected in parallel, they send 0.8 A current through the same resistor. What is the internal resistance of the cell?

a) 0.5 Ω b) 1.0 Ω c) 1.5 Ω d) 2.5 Ω

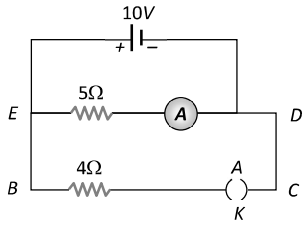
767. By ammeter, which of the following can be measured

a) Electric potential b) Potential difference c) Current d) Resistance

768. The temperature of hot junction of a thermocouple changes from 80°C to 100°C, the percentage change in thermo electric power is

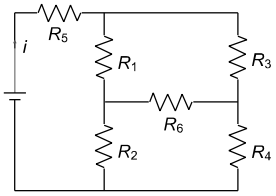
a) 25% b) 20% c) 10% d) 8%

769. In the given figure, when key K is opened, the reading of the ammeter A will be



a) 50 A b) 2 A c) 0.5 A d) $\frac{10}{9}A$

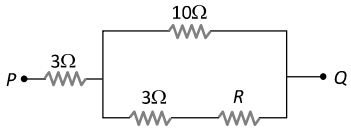
770. In the given circuit shown in figure it is observed that the current i is independent of the value of resistance R_6. Then the resistance values must satisfy



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) $R_1R_3 = R_2R_4 = R_5R_6$

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

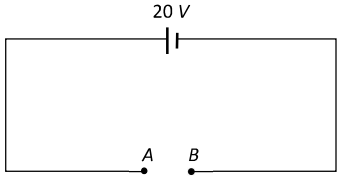


a) 3 ohm b) $\sqrt{39}\ ohm$ c) $\sqrt{69}\ ohm$ d) 10 ohm

772. An unknown resistance R_1 is connected in series with a resistance of 10Ω. This combination is connected to one gap of meter bridge while a resistance R_2 is connected in the other gap. The balance point is at 50 cm, Now, when the 10Ω resistance is removed the balance point shifts 40cm. The value of R_1 (in ohm) is

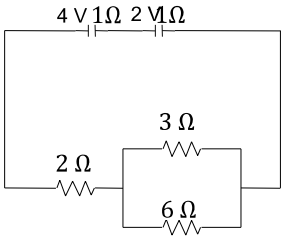
a) 20 b) 10 c) 60 d) 40

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



a) 50 V b) 45 V c) 30 V d) 20 V

774. Two cells having emf 4V, 2V and internal resistances 1 Ω, 1 Ω are connected as shown in figure below. Current through 6 Ω resistance is



a) $\frac{1}{3}A$ b) $\frac{2}{3}A$ c) 1A d) $\frac{2}{9}A$

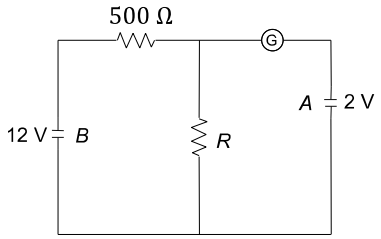
775. The electrochemical equivalent of a material in an electrolyte depends on

a) The nature of the material

b) The current though the electrolyte
c) The amount of charge passed through electrolyte
d) The amount of material present in electrolyte

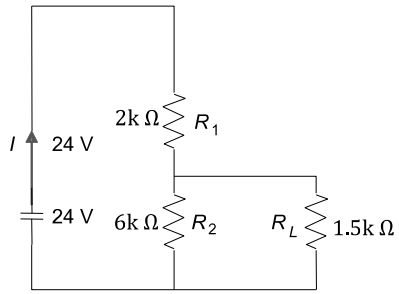
776. An electric water kettle rated 2.1 kW is filled with 1.5 kg of water at 20°C. How many seconds does it take to reach the boiling point of water? Assume that there are no heat losses from the kettle. Specific heat capacity of water is 4200 $Jkg^{-1}\ K^{-1}$
a) 60 b) 120 c) 240 d) 480

777. In the circuit, the galvanometer G shows zero deflection. If the batteries A and B have negligible internal resistance, the value of the resistor R will be



a) 200Ω b) 100 Ω c) 500 Ω d) 1000 Ω

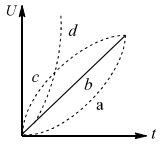
778. For the circuit shown in the figure



a) The current I through the battery is 7.5mA
b) The potential difference across R_L is 18 V
c) Ratio of powers dissipated in R_1 and R_2 is 3
d) If R_1 and R_2 are interchanged, magnitude of the power dissipated in R_L will decrease by a factor of 9

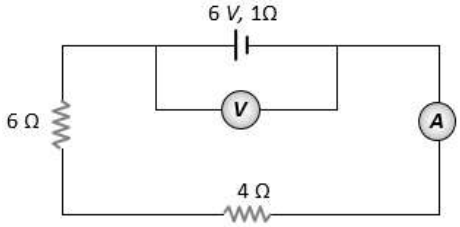
779. Constant current is flowing through a linear conductor of non-uniform area of cross-section. The charge flowing per second through the area of conductor at any cross-section is
a) Proportional to the area of cross- section
b) Inversely proportional to the area of cross-section
c) Independent of the area of cross-section
d) Dependent on the length of conductor

780. Which of the plots shown in figure may represent the thermal energy produced in a resistor in a given time as a function of the electric current?



a) a b) b c) c d) d

781. In the circuit shown here, the readings of the ammeter and voltmeter are



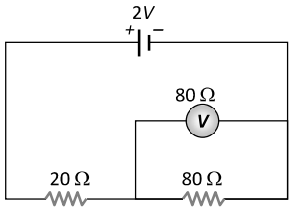
a) 6 A, 60 V
b) 0.6 A, 6 V

c) $6/11\ A, 60/11\ V$
d) $11/6\ A, 11/60\ V$

782. Two wires of same material have length L and $2L$ and cross-sectional areas $4A$ and A respectively. The ratio of their specific resistances would be
a) 1 : 2 b) 8 : 1 c) 1 : 8 d) 1 : 1

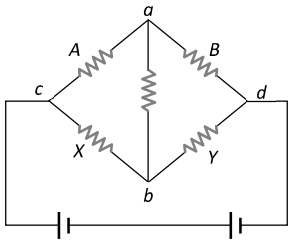
783. n identical cells each of e. m. f. E and internal resistance r are connected in series. An external resistance R is connected in series to this combination. The current through R is
a) $\frac{nE}{R+nr}$ b) $\frac{nE}{nR+r}$ c) $\frac{E}{R+nr}$ d) $\frac{nE}{R+r}$

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



a) 0.80 $volt$ b) 1.60 $volt$ c) 1.33 $volt$ d) 2.00 $volt$

785. 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

786. As the temperature of hot junction increases, the thermo e.m.f
a) Always increases b) Always decreases
c) May increases or de decreases d) Always remains constant

787. The resistance of a wire at room temperature 36°C 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 °C]
a) 36°C b) 83°C c) 63°C d) 33°C

788. Two resistances are connected in two gaps of a meter bridge. The balance point is 20cm from the zero end. A resistance of 15Ω is connected is series with the smaller of the two. The null point shifts to 40cm. The value of the smaller resistance in ohm is
a) 3 b) 6 c) 9 d) 12

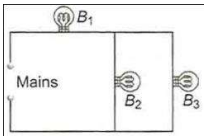
789. Two wires of resistance R_1 and R_2 have temperature coefficient of resistances α_1 and α_1 respectively. These are joined in series. The effective temperature coefficient of resistance is
a) $\frac{\alpha_1+\alpha_2}{2}$ b) $\sqrt{\alpha_1\alpha_2}$ c) $\frac{\alpha_1R_1+\alpha_2R_2}{R_1+R_2}$ d) $\frac{\sqrt{R_1R_2\alpha_1\alpha_2}}{\sqrt{R_1^2+R_2^2}}$

790. One $kilowatt$ hour is equal to
a) $36\times10^5\ joules$ b) $36\times10^3\ joules$ c) $10^3\ joules$ d) $10^5\ joules$

791. An aluminium (resistivity$\rho = 2.2\times10^{-8}\Omega - m$) wire of a diameter 1.4 mm is used to make a 4Ω esistor. The length of the wire is
a) 220 m b) 1000 m c) 280 m d) 1 m

792. Three bulbs B_1 , B_2 and B_3 are connected to the main as shown in figure. How will the brightness of bulb

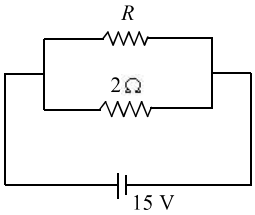
B_1 be affected if B_2 or B_3 are disconnected from the circuit?



a) Bulb B_1 become brighter
b) Bulb B_1 become dimmer
c) No change occurs in the brightness
Bulb B_1 becomes brighter if bulb B_2 is
d) disconnected and dimmer if bulb B_3 is disconnected.

793. If the resistance of a conductor is 5Ω at 50°C and 7Ω 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) 0.001/°C

794. If in the circuit, power dissipation is 150 W, then R is



a) 2 Ω b) 6 Ω c) 5 Ω d) 4 Ω

795. Resistance of rod is 1 Ω.It is bent in form of square. What is resistance across adjoint corners?
a) 1 Ω b) 3 Ω c) $\frac{3}{16}\Omega$ d) $\frac{3}{4}\Omega$

796. 2, 4 and 6 S are the conductance of three conductors. When they are joined in parallel, their equivalent conductance will be
a) 12 S b) $(1/12)S$ c) $(12/11)S$ d) $(11/12)S$

797. Amount of electricity required to pass through the H_2O voltmeter so as to liberate 11.2 $litre$ of hydrogen will be
a) 1 $faraday$ b) $\frac{1}{2}faraday$ c) 2 $faraday$ d) 3 $faraday$

798. When a battery connected across a resistor of 16 Ω, the voltage across the resistor is 12 V. When the same battery is connected across a resistor of 10 Ω, voltage across it is 11V. The internal resistance of the battery (in ohm) is
a) $\frac{10}{7}$ b) $\frac{20}{7}$ c) $\frac{25}{7}$ d) $\frac{30}{7}$

799. The potential difference between the terminals of a cell in open circuit is 2.2V with resistance of 5 Ω across the terminals of a cell, the terminal potential difference is 1.8V. the resistance of the cell is
a) $\frac{9}{10}\Omega$ b) $\frac{10}{9}\Omega$ c) $\frac{7}{12}\Omega$ d) $\frac{12}{7}\Omega$

800. What is immaterial for an electric fuse?
a) Its specific resistance
b) Its length
c) Its radius
d) Current flowing through it

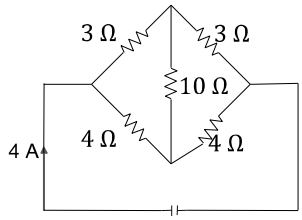
801. A metal wire of specific resistance $64 \times 10^{-6} ohm - cm$ and length 198 cm has a resistance of 7 ohm, the radius of the wire will be
a) 2.4 cm b) 0.24 cm c) 0.024 cm d) 24 cm

802. The thermocouple is based on the principle of
a) Seebeck effect b) Thomson effect c) Peltier effect d) Joule effect

803. A series combination of two resistors 1 Ω each is connected to a 12 V battery of internal resistance 0.4 Ω. The current flowing through it will be
a) 3.5 A b) 5 A c) 6 A d) 10 A

804. The electron dirft speed is small and the charge of the electron is also small but still, we obtain large current in a conductor. This is due to
a) The conducting property of the conductor
b) The resistance of the conductor is small
c) The electron number density of the conductor is small
d) The electron number density of the conductor is enormous

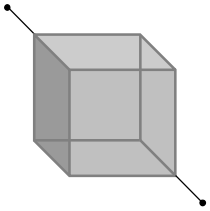
805. In the circuit shown, if the 10 Ω resistance is replaced by 20 Ω then what is the amount of current drawn from the battery?



a) 2.5A b) 3A c) 3.5A d) 4A

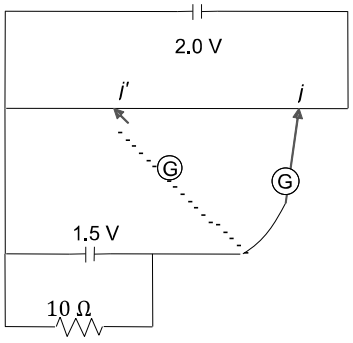
806. There is a current of 1.344 *amp* in a copper wire whose area of cross-section normal to the length of the wire is 1 mm^2. If the number of free electrons per cm^3 is 8.4×10^{22}, then the drift velocity would be
a) 1.0 mm/sec b) 1.0 m/sec c) 0.1 mm/sec d) 0.01 mm/sec

807. 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



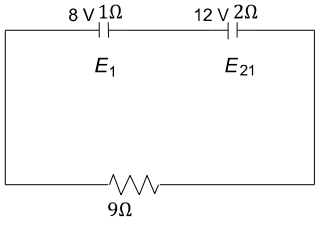
a) 2 R b) 12 R c) $\frac{5}{6}R$ d) 8 R

808. The figure below shows a 2.0 V potentiometer used for the determination of internal resistance of a 2.5 V cell. The balance point of the cell in the open circuit is 75cm. When a resistor of 10 Ωis used in the external circuit of the cell, the balance point shifts to 65 cm length of potentiometer wire. Then the internal resistance of the cell is



a) 2.5 Ω b) 2.0 Ω c) 1.54 Ω d) 1.0 Ω

809. In the figure shown below, the terminal voltage across E_2 is



a) 12 V b) 12.66 V c) 11.34 V d) 11.66 V

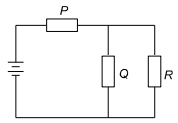
810. The relation between Faraday's constant F, electron charge e and avogadro number N is

a) $F = N/e$ b) $F = Ne$ c) $N = F^2$ d) $F = N^2e$

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

a) 2000 Ω b) 4000 Ω c) 6000 Ω d) 8000 Ω

812. The resistors P, Q and R in the circuit have equal resistance. The battery, of negligible internal resistance, supplies a total power of 12 W. What is the power dissipated by heating in resistor R?



a) 2 W b) 4 W c) 3 W d) 6 W

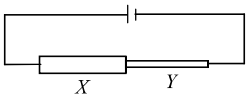
813. A potential difference V is applied to a copper wire of length l and thickness d. If V is doubled, the drift velocity

a) Is doubled b) Is halved c) Remains same d) Becomes zero

814. The maximum power dissipated in an external resistance R, when connected to a cell of emf E and internal resistance r, will be

a) $\frac{E^2}{r}$ b) $\frac{E^2}{2r}$ c) $\frac{E^2}{3r}$ d) $\frac{E^2}{4r}$

815. Figure below shows a thick copper rod X and a thin copper wire Y joined in series. They carry a current which is sufficient to make Y much hotter than X



Which one of the following is correct?

	Number density of Conduction electrons	Mean time between collisions of the electrons
a)	Same in X and Y	less in X than in Y
b)	Same in X and Y	same in X and Y
c)	Same in X and Y	more in X than in Y
d)	more in X and Y	less in X than in Y

816. A galvanometer of resistance 25 Ω measures 10^{-3}A. shunt required to increase range upto 2A is

a) 12.5 Ω b) 0.125 Ω c) 0.125 Ω d) 1.25 Ω

817. On passing 96500 $coulomb$ of charge through a solution $CuSO_4$ the amount of copper liberated is

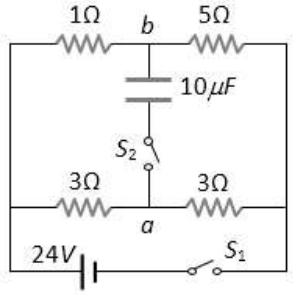
a) 64 gm b) 32 gm c) 32 kg d) 64 kg

818. A galvanometer acting as a voltmeter should have

a) Low resistance in series with its coil b) Low resistance in parallel with its coil

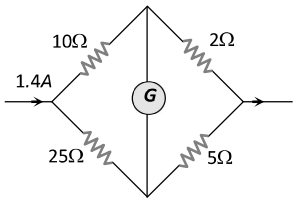
c) High resistance in series in series with its coil d) High resistance in parallel with its coil

819. In the circuit shown in the figure, switch S_1 is initially closed and S_2 is open. Find $V_a - V_b$



a) 4 V b) 8 V c) 12 V d) 16 V

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

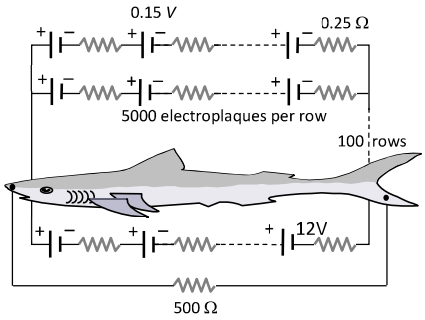


a) 1.4 A b) 1.2 A c) 0.4 A d) 1.0 A

821. The resistance of a 10 m long wire is 10 Ω. Its length is increased by 25% by stretching the wire uniformly. The resistance of wire will change to (approximately)

a) 12.5 Ω b) 14.5 Ω c) 15.6 Ω d) 16.6 Ω

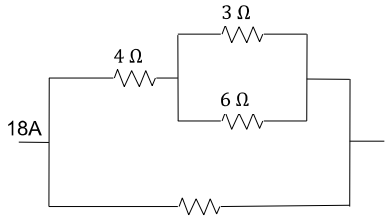
822. Eels are able to generate current with biological cells called electroplaques. The electroplaques in an eel are arranged in 100 rows, each row stretching horizontally along the body of the fish containing 5000 electroplaques. The arrangement is suggestively shown below. Each electroplaque has an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



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

823. In the electrical network shown in the figure, the potential difference across 3Ω resistance will be



a) 12V b) 2.4V c) 24 V d) 36 V

824. The mobility of free electrons (charge e, mass m and relaxation time τ) in a metal is proportional to

a) $\frac{e}{m}\tau$ b) $\frac{m}{e}\tau$ c) $\frac{e}{m\tau}$ d) $\frac{m}{e\tau}$

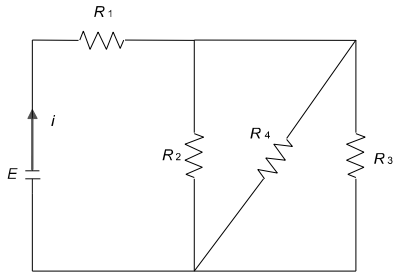
825. Two similar cells, whether joined in series or in parallel, have the same current through an external resistance of 2 Ω. The internal resistance of each cell is

a) 1 Ω b) 2 Ω c) 0.5 Ω d) 1.5 Ω

826. With a potentiometer null point were obtained at 140 cm and 180 cm with cells of emf 1.1 V and one unknown X volt. Unknown emf is

a) 1.1 V b) 1.8 V c) 2.4 V d) 1.41 V

827. In the circuit given E=0.6V, R_1=100Ω, $R_2 = R_3 = 50\Omega$, $R_4 = 75\Omega$. The equivalent resistance of the circuit, in ohm is



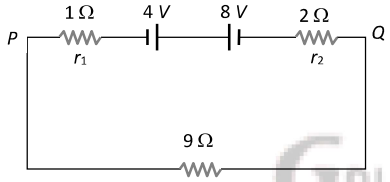
a) 11.875 b) 26.31 c) 118.75 d) None of these

828. The cell has an emf of 2V and the internal resistance of 3.9 Ω, the voltage across the cell will be
a) 1.95 V b) 1.5V c) 2V d) 1.8V

829. Silver and copper voltameter are connected in parallel with a battery of e.m.f. 12 V. In 30 $minutes$, 1g of silver and 1.8g of copper are liberated. The power supplied by the battery is
($Z_{Cu} = 6.6 \times 10^{-4} g/C$ and $Z_{Ag} = 11.2 \times 10^{-4} g/C$)
a) 24.13 J/sec b) 2.413 J/sec c) 0.2413 J/sec d) 2413 J/sec

830. 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 due to the current, the temperature of the wire is raised by ΔT is a time t. A number N of similar cells is now connected in series with a wire of the same material and cross-section but of length $2L$. The temperature of the wire is raised by the same amount ΔT in the same time t. The value of N is
a) 4 b) 6 c) 8 d) 9

831. Two batteries of e.m.f. 4 V 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

832. In an experiment of meter bridge, a null point is obtained at the centre of the bridge wire. When a resistance of 10 ohm is connected in one gap, the value of resistance in other gap is
a) 10Ω b) 5Ω c) $\frac{1}{5}$Ω d) 500Ω

833. If an ammeter is joined in parallel through a circuit, it can be damaged due to excess
a) Resistance b) Current c) Voltage d) None of these

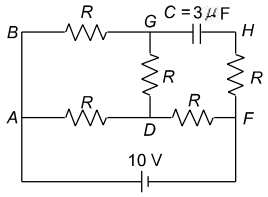
834. Two wires have resistances R and $2R$. When both are joining in series and in parallel, then ratio of heats generated in these situations on applying the same voltage, is
a) 2 : 1 b) 1 : 2 c) 2 : 9 d) 9 : 2

835. 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

836. A steady current of 5 $amps$ is maintained for 45 $mins$. During this time it deposits 4.572 gm of zinc at the cathode of a voltmeter. E.C.E. of zinc is
a) $3.387 \times 10^{-4} gm/C$ b) $3.387 \times 10^{-4} C/gm$ c) $3.384 \times 10^{-3} gm/C$ d) $3.394 \times 10^{-3} C/gm$

837. How much current should be passed through acidified water for 100s to liberate 0.224 L of hydrogen?
a) 22.4 A b) 19.3 A c) 9.65 A d) 1 A

838. In the circuit shown, the cell is ideal, with emf=10V. Each resistance is of 2Ω. The potential difference across the capacitor is



a) 12 V b) 10 V c) 8 V d) zero

839. 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 decreases
b) Decreases, thermal velocity of the electron decreases
c) increases, thermal velocity of the electron increases
d) Decreases, thermal velocity of the electron increases

840. Three resistors each of 2 ohm are connected together in a triangular shape. The resistance between any two vertices will be
a) $4/3ohm$ b) $3/4\ ohm$ c) $3\ ohm$ d) $6\ ohm$

841. All the edges of a block with parallel faces are unequal. Its tangent edge is twice its shortest edge. The ratio of the maximum to minimum resistance between parallel faces is
a) 8 b) 4 c) 2 d) None of these

842. A current of 16 $ampere$ flows through molten $NaCl$ for 10 $minute$. The amount of metallic sodium that appears at the negative electrode would be
a) $0.23\ gm$ b) $1.15\ gm$ c) $2.3\ gm$ d) $11.5\ gm$

843. The relation between voltage sensitivity (σ_V) and current sensitivity (σ_i) of a moving coil galvanometer is (resistance of galvanometer is G).
a) $\frac{\sigma_i}{G} = \sigma_v$ b) $\frac{\sigma_v}{G} = \sigma_i$ c) $\frac{G}{\sigma_v} = \sigma_i$ d) $\frac{G}{\sigma_i} = \sigma_V$

844. 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

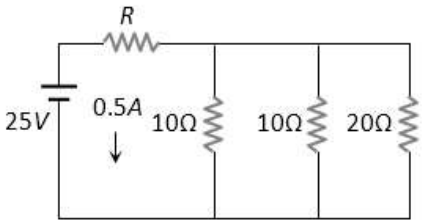
845. The current flowing in a copper voltmeter is 1.6 A. The number of Cu^{++} ions deposited at the cathode per minute are
a) 1.5×10^{20} b) 3×10^{20} c) 6×10^{20} d) 1×10^{19}

846. Consider a rectangular slab of length L and area of cross section A. A current I is passed through it. If the length is doubled, the potential drop across the end faces
a) Becomes half of the initial value b) Becomes one-fourth of the initial value
c) Becomes double the initial value d) Remains same

847. A thick wire is stretched, so that its length become two times. Assuming that there is no change in its density, then what is the ratio of change in resistance of wire to the initial resistance of wire?
a) 2 : 1 b) 4 : 1 c) 3 : 1 d) 1 : 4

848. A potentiometer wire of length L and resistance 10 Ω 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. 1V 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

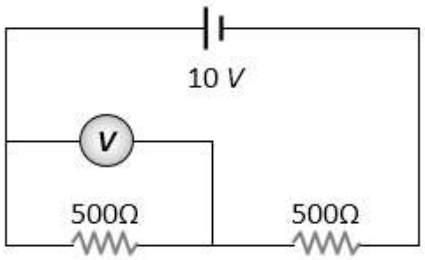
849. In the circuit as shown in figure the



a) Resistance $R = 46\ \Omega$
b) Current through 20 Ω resistance is 0.1 A
c) Potential difference across the middle resistance is 2 V
d) All option are correct

850. Neutral temperature of a thermocouple is defined as the temperature at which
a) The thermo e.m.f. changes sign
b) The thermo e.m.f. is maximum
c) The thermo e.m.f. is minimum
d) The thermo e.m.f. is zero

851. A voltmeter of resistance 1000 Ω is connected across a resistance of 500 Ω in the given circuit. What will be the reading of voltmeter



a) 1 V
b) 2 V
c) 6 V
d) 4V

852. A heater of 220 V heats a volume of water in 5 min. The same heater when connected to 110 V heats the same volume of water in (minute)
a) 5
b) 20
c) 10
d) 2.5

853. A wire 100cm long and 2.0 mm diameter has a resistance of 0.7 ohm, the electrical resistivity of the material is
a) $4.4 \times 10^{-6}\ ohm \times m$
b) $2.2 \times 10^{-6} ohm \times m$
c) $1.1 \times 10^{-6}\ ohm \times m$
d) $0.22 \times 10^{-6}\ ohm \times m$

854. Two conductors are made of the same material and have the same length. Conductor A is a solid wire of diameter 1.0 mm. Conductor B is a hollow tube of outside diameter 2.0 mm and inside diameter 1.0 mm. The resistance ratio R_A/R_B will be
a) 1
b) 2
c) 3
d) 4

855. The internal resistance of a primary cell is 4 Ω . It generates a current of 0.2 A in an external resistance of 21 Ω. The rate at which chemical energy is consumed in providing the current is
a) 0.42 J s^{-1}
b) 0.84 J s^{-1}
c) 1 J s^{-1}
d) 5 J s^{-1}

856. The potential gradient along the length of a uniform wire is 10 $volt/metre$. B and C are the two points at 30 cm and 60 cm point on a meter scale fitted along the wire. The potential difference between B and C will be
a) 3 $volt$
b) 0.4 $volt$
c) 7 $volt$
d) 4 $volt$

857. An electric bulb rated for 500 W at 100V is used in a circuit having a 200 V supply. The resistance R that must be put in series with the bulb, so that the bulb drawn 500 W is
a) 18Ω
b) 20Ω
c) 40Ω
d) 700Ω

858. The two bulbs, one of 60W and other 200W are connected in series to a 200 volt line, then
a) The potential drop across two bulbs in the same
b) The potential drop across the 60 W bulb is greater than the potential drop across the 200 W bulb

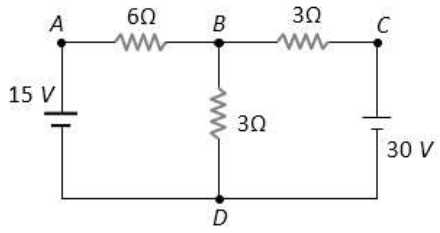
c) The potential drop across the 200 W bulb is greater than the 60 W bulb

d) The potential drop across both the bulbs is 200 volt

859. A capacitor is connected to a cell of emf E having some internal resistane r. The potential difference across the

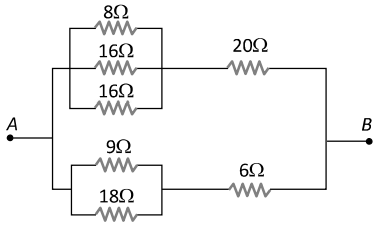
a) Cell is $< E$ b) Cell is E c) Capacitor is $> E$ d) Capacitor is $< E$

860. In the circuit shown in figure, find the current through the branch BD



a) 5 A b) 0 A c) 3 A d) 4 A

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

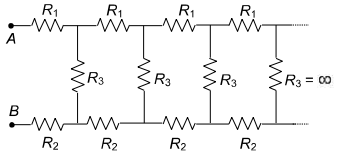


a) 6 ohm b) 8 ohm c) 16 ohm d) 24 ohm

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

a) 7.5 Ω b) 45 Ω c) 90 Ω d) 270 Ω

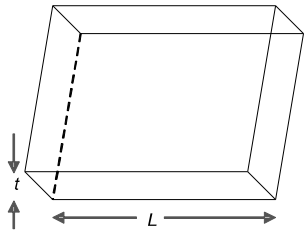
863. The equivalent resistance of the figure ie, infinite network of resistors between the terminals A and B is



a) Zero b) Infinite

c) $\frac{R_1 + R_2 + R_3}{3}$ d) $\frac{1}{2}\left[(R_1 + R_2) + \sqrt{(R_1 + R_2)(R_1 + R_2 + 4R_3)}\right]$

864. 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



a) Directly proportional to L b) Directly proportional to t

c) Independent of L d) Independent of t

865. Which of the following statements is wrong

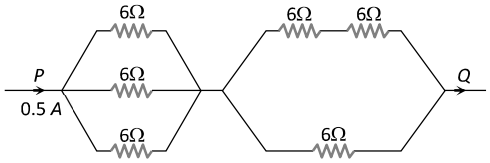
a) Voltmeter should have high resistance

b) Ammeter should have low resistance

c) Ammeter is placed in parallel across the conductor in a circuit

d) Voltmeter is placed in parallel across the conductor in a circuit

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

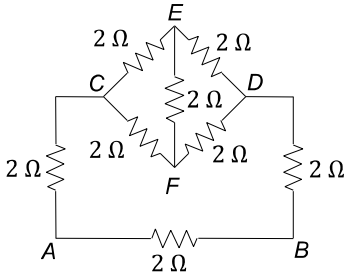


a) 3.6 V b) 6.0 V c) 3.0 V d) 7.2 V

867. Two bulbs when connected in parallel to a source take 60 W each. The total power consumed when they are connected in series with the same source is

a) 15 W b) 30 W c) 60 W d) 120 W

868. The resistance of the following circuit figure between A and B is



a) $(3/2)\ \Omega$ b) 2 Ω c) 4 Ω d) 8 Ω

869. An electric heater kept in vacuum is heated continuously by passing electric current. Its temperature

a) Will go on rising with time

b) Will stop after sometime as it will loose heat to the surroundings by conduction

c) Will rise for sometime and there after will start falling

d) Will become constant after sometime because of loss of heat due to radiation

870. Assume that each atom of copper contributes one free electron. What is the average drift velocity of conduction electrons in a copper wire of cross-sectional area 10^{-7} m^2, carrying a current of 1.5 A? (Given density of copper $=9 \times 10^{-3} kgm^{-3}$; atomic mass of copper =63.5; Avogadro's number= 6.023×10^{23} per gram atom)

a) $1.1 \times 10^{-2} ms^{-1}$ b) $1.1 \times 10^{-3} ms^{-1}$ c) $2.2 \times 10^{-2} ms^{-1}$ d) $2.2 \times 10^{-3} ms^{-1}$

871. A uniform copper wire of length 1 m and cross-section area $5 \times 10^{-7} m^2$ carries a current of 1 A. Assuming that there are 8×10^{28} free electron m^{-3}in copper, how long will an electron take to drift from one end of the wire to the other?

a) $0.8 \times 10^3 s$ b) $1.6 \times 10^3 s$ c) $3.2 \times 10^3 s$ d) $6.4 \times 10^3 s$

872. Two resistances are joined in parallel whose resistance is $3/5\Omega$. One of the resistance wire is broken and the effective resistance become 3Ω.The resistance in ohm of the wire that got broken was

a) 4/3 b) 2 c) 6/5 d) 3/4

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

a) x/n^2 b) $n^2 x$ c) x/n d) nx

874. 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

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

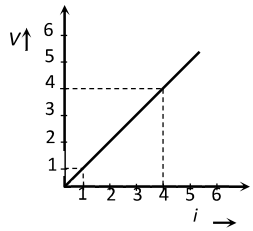
value of resistance R in Ω is

a) 10000 b) 10025 c) 975 d) 9975

876. Two identical batteries each of emf 2 V and internal resistance 1 Ω are available to produce heat in an external resistance by passing current through it. The maximum Joulean power that can be developed across the resistance using these batteries it.

a) 2W b) 3.2 W c) 1.28 W d) 8/9 W

877. Variation of current and voltage in a conductor has been shown in the diagram below. The resistance of the conductor is

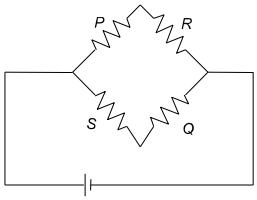


a) 4 *ohm* b) 2 *ohm* c) 3 *ohm* d) 1 *ohm*

878. 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

a) 1 V b) 1.5 V c) 2 V d) 3 V

879. In the circuit given, the current relation to a balanced Wheatstone's bridge is



a) $\frac{P}{Q}=\frac{R}{S}$ b) $\frac{P}{Q}=\frac{S}{R}$ c) $\frac{P}{S}=\frac{Q}{R}$ d) $\frac{P}{R}=\frac{S}{Q}$

880. A voltmeter has a range $0-V$ with a series resistance R. With a series resistance $2R$, the range is $0-V'$. The correct relation between V and V' is

a) $V'=2V$ b) $V'>2V$ c) $V'\gg 2V$ d) $V'<2V$

881. The production of *e*.m.f. by maintaining a difference of temperature between the two junctions of two different metals is known as

a) Joule effect b) Seebeck effect c) Peltier effect d) Thomson effect

882. A battery has an emf of 15V and internal resistance of 1Ω. Is the terminal to terminal potential difference less than, equal to or greater than 15V if the current in the battery is (1) from negative to positive terminal, (2) from positive to negative terminal (3) zero current?

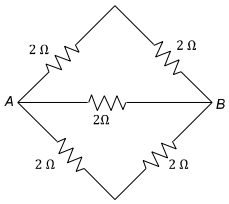
a) Less, grater, equal b) Less, less, equal

c) Greater, greater, equal d) Greater, less, equal

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

a) $\sqrt{\rho_1\rho_2}$ b) $(\rho_1+\rho_2)$ c) $\frac{\rho_1+\rho_2}{2}$ d) None of these

884. Each resistance shown in figure is 2 Ω. The equivalent resistance between A and B is



a) 2 Ω b) 4 Ω c) 8 Ω d) 1 Ω

885. Two identical heaters rated 220 $volt$, 1000 watt are placed in series with each other across 220 $volt$ lines. If resistance does not change with temperature, then the combined power is

a) 1000 $watt$ b) 2000 $watt$ c) 500 $watt$ d) 4000 $watt$

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

a) $10^{10} m/sec$ b) $10^{-2} cm/sec$ c) $10^{4} cm/sec$ d) $10^{-1} cm/sec$

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

a) n b) $\frac{1}{n^2}$ c) n^2 d) $\frac{1}{n}$

888. A heater coil is cut into two equal parts and only one part is now used in the heater. The heat generated will now be

a) Doubled b) Four times c) One-fourth d) Halved

889. Two conductors made of the same material are connected across a common potential difference. Conductor A has twice the diameter and twice the length of conductor B. The power delivered to the two conductors P_A and P_B respectively is such that P_A/P_B equals to

a) 0.5 b) 1.0 c) 1.5 d) 2.0

890. Resistance of tungsten wire at 150°C is 133Ω. Its resistance temperature coefficient is 0.0045/°C. The resistance of this wire at 500°C will be

a) 180Ω b) 225Ω c) 258Ω d) 317Ω

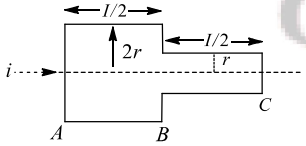
891. The resistance of a galvanometer is 25 ohm and it requires 50 μA for full deflection. The value of the shunt resistance required to convert it into an ammeter of 5 amp is

a) $2.5 \times 10^{-4} ohm$ b) $1.25 \times 10^{-3} ohm$ c) 0.05 ohm d) 2.5 ohm

892. In voltaic air cell if 5g zinc is consumed, how many ampere hours shall we get?

a) 2.05 b) 8.2 c) 4.1 d) $5 \times 5.38 \times 10^{-3}$

893. Two bars of radius r and $2r$ are kept in contact as shown. An electric current i is passed through the bars. Which one of the following is correct?



a) Heat produced in bar BC is 4 times the heat produced in bar AB

b) Electric field in both halves is equal

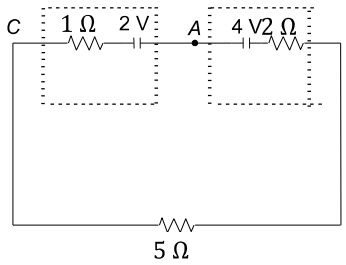
c) Current density across AB is doubled that of across BC

d) Potential difference across AB is 4 times that of across BC

894. A new flashlight cell of e. m. f. 1.5 $volt$ gives a current of 15 amp, when connected directly to an ammeter of resistance 0.04 Ω. The internal resistance of cell is

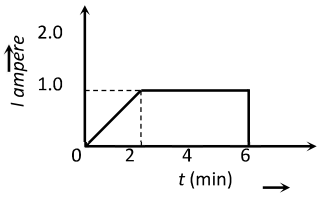
a) 0.04 Ω b) 0.06 Ω c) 0.10 Ω d) 10 Ω

895. What is the potential drop between points A and C in the following circuit? Resistances 1 Ω and 2 Ω represent the internal resistance of the respective cells



a) 1.75V b) 2.25V c) $\frac{5}{4}V$ d) $\frac{4}{5}V$

896. In a copper voltameter, mass deposited in 6 minutes is m gram. If the current-time graph for the voltameter is as shown here, then the E.C.E of the copper is



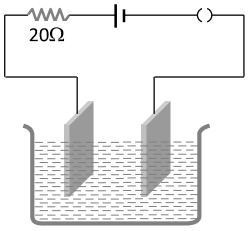
a) $m/5$ b) $m/300$ c) $5\,m$ d) $m/18000$

897. When a metal conductor connected to the left gap of a meter bridge is heated, the balancing point
a) Shifts towards right b) Shifts towards left
c) Remains unchanged d) Remains at zero

898. A wire of resistance R is elongated $n-$ fold to make a new uniform wire. The resistance of new wire
a) nR b) n^2R c) $2nR$ d) $2n^2R$

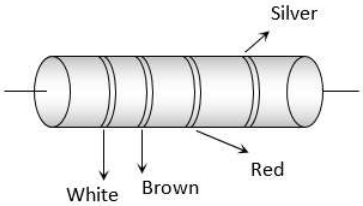
899. The heat developed in an electric wire of resistance R by a current I for a time t is
a) $\frac{I^2Rt}{4.2}cal$ b) $\frac{I^2t}{4.2R}cal$ c) $\frac{I^2R}{4.2\,t}cal$ d) $\frac{Rt}{4.2\,I^2}cal$

900. In a Ag voltameter 2.68 g of silver is deposited in 10 min. The heat developed in 20Ω resistor during the same period will be



a) 192 kJ b) 192 J c) 200 J d) 132 kJ

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



a) 2.2 $k\,\Omega$ b) 3.3 $k\,\Omega$ c) 5.6 $k\,\Omega$ d) 9.1 $k\,\Omega$

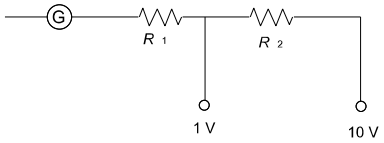
902. In $Cu-Fe$ couple, the flow of current at the temperature of inversion is
a) From Fe to Cu through the hot junction
b) From Cu to Fe through the hot junction
c) Maximum
d) None of the above

903. A parallel combination of two resistors, of 1Ω each, is connected in series with a 1.5Ω resistor. The total combination is connected across a 10V battery. The current flowing in the circuit is
a) 5A b) 20A c) 0.2A d) 0.4A

904. Two tangent galvanometer A and B are identical except in their number of turns. They are connected in series. On passing a current through them, deflections of 60° and 30° are produced. The ratio of the number of units A and B is
a) 1:3 b) 3:1 c) 1:2 d) 2:1

905. 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 10 V (refer circuit digram) the resistance R_1 and R_2 respectively are



a) 950 Ω and 9150 Ω b) 900 Ω and 9950 Ω c) 900 Ω and 9000Ω d) 950 Ω and 9950 Ω

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

a) 9 *ohm* b) 12 *ohm* c) 6 *ohm* d) 8/3 *ohm*

907. 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

a) 1Ω b) 0.5Ω c) 1/3Ω d) 1/4Ω

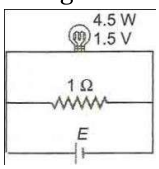
908. If the free electron density be n and relaxation time be τ, the electrical conductivity of a conductor may be expressed as

a) $\frac{ne\tau}{m_e}$ b) $\frac{ne^2\tau}{m_e}$ c) $\frac{ne^2}{\tau m_e}$ d) $\frac{m_e e^2\tau}{n}$

909. Two electrolytic cells containing $CuSO_4$ and $AgNO_3$ respectively are connected in series and a current is passed through them until 2 mg of copper is deposited in the first cell. The amount of silver deposited in the second cell during this time in approximately (atomic weight of copper and silver are 63.6 and 108.0)

a) 1.7 mg b) 3.4 mg c) 5.1 mg d) 6.8 mg

910. A torch bulb rated at 4.5 W, 1.5 V is connected as shown in figure. The emf of the cell needed to make the bulb glow at full intensity if



a) 4.5 V b) 1.5 V c) 2.67 V d) 13.5 V

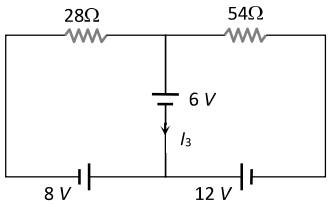
911. The potential gradient along the length of a uniform wire is 10Vm^{-1}.The length of the potentiometer wire is 4 m. What is the potential difference across two points on the wire separated by 50cm?

a) 2.5 V b) 5.0 V c) 1.25 V d) 4.0 V

912. If n, e, τ and m respectively represent the density, charge relaxation time and mass of the electron, then the resistance of a wire of length l and area of cross-section A will be

a) $\frac{ml}{ne^2\tau A}$ b) $\frac{m\tau^2 A}{ne^2 l}$ c) $\frac{ne^2\tau A}{2ml}$ d) $\frac{ne^2 A}{2m\tau l}$

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



a) 5 *amp* b) 3 *amp* c) −3 *amp* d) −5/6 *amp*

914. A rod of a certain metal is 1.0 m long and 0.6 cm in diameter. Its resistance is $3.0 \times 10^{-3}\Omega$. 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?

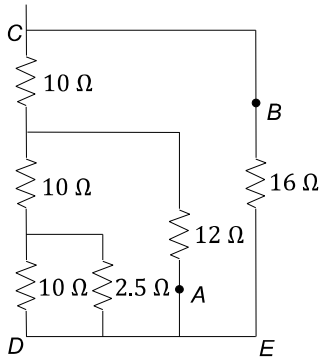
a) $1.35 \times 10^{-8}\Omega$ b) $2.70 \times 10^{-7}\Omega$ c) $4.05 \times 10^{-6}\Omega$ d) $8.10 \times 10^{-5}\Omega$

915. The density of copper is 9×10^3 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 metre in copper.

a) 10^{19} b) 10^{23} c) 10^{25} d) 10^{29}

916. What is the equivalent resistance across the points A and B in the circuit given below?



a) 8 Ω b) 12 Ω c) 16 Ω d) 32 Ω

917. Consider the following two statements A and B, and identify the correct choice out of given answers

A. Thermo e.m.f. is minimum at neutral temperature of a thermocouple

B. When two junctions made of two different metallic wires are maintained at different temperatures, an electric current is generated in the circuit

a) A is false and B is true b) A is true and B is false

c) Both A and B are false d) Both A and B are true

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

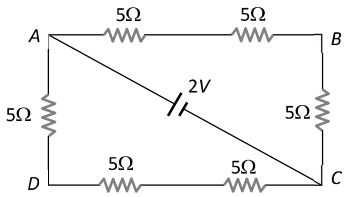
a) 5 : 3 : 1 b) $\sqrt{125}$: 15 : 1 c) 1 : 15 : 125 d) 1 : 3 : 5

919. The resistance of an incandescent lamp is

a) Greater when switched off b) Smaller when switched on

c) Greater when switched on d) The same whether it is switched off or switched on

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



a) $\frac{2}{3}V$ b) $\frac{8}{9}V$ c) $\frac{4}{3}V$ d) $2V$

921. 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 l_B/l_A of their respective lengths must be

a) 1 b) 1/2 c) 1/4 d) 2

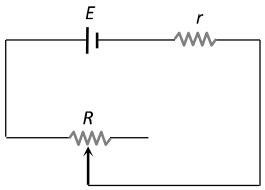
922. Two identical batteries each emf E =2V and internal resistance $r = 1\Omega$ are available to produce heat in an external resistance by passing a current through it. The maximum Joulean power that can be developed across R using these batteries is

a) 1.28 W b) 2.0 W c) $\frac{8}{9}$ W d) 3.2 W

923. A battery of e.m.f. 3 volt and internal resistance 1.0 ohm is connected in series with copper voltmeter. The current flowing in the circuit is 1.5 amperes. The resistance of voltmeter will be

a) Zero b) 1.0 ohm c) 1.5 ohm d) 2.0 ohm

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



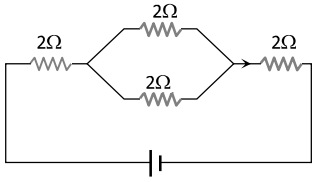
a) Potential difference across the terminals of the battery is maximum when $R = r$
b) Power delivered to the resistor is maximum when $R = r$
c) Current in the circuit is maximum when $R = r$
d) Current in the circuit is maximum when $R \gg r$

925. Four resistances of 100 Ω each are connected in the form of square. Then, the effective resistance along the diagonal points is
a) 200 Ω b) 400 Ω c) 100 Ω d) 150 Ω

926. A 2 $volt$ battery, a 15 Ω resistor and a potentiometer of 100 cm length, all are connected in series. If the resistance of potentiometer wire is 5Ω, then the potential gradient of the potentiometer wire is
a) 0.005 V/cm b) 0.05 V/cm c) 0.02 V/cm d) 0.2 V/cm

927. A wire P has a resistance of 20Ω. Another wire Q of same material but length twice that of P has resistance of 8Ω. If r is the radius of cross-section of P, the radius of cross-section of $Q$is
a) r b) $\frac{r}{\sqrt{2}}$ c) $\sqrt{5r}$ d) $2r$

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

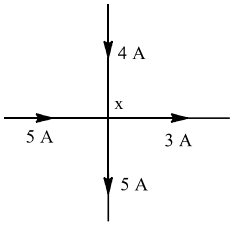


a) 8 Ω b) 6 Ω c) 5 Ω d) 4 Ω

929. Two copper wires of lengths l and $2l$ have radii r and $2r$ respectively. What is ratio of their specific resistances?
a) 1 : 2 b) 2 : 1 c) 1 : 1 d) 1 : 3

930. 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
a) 0.8 Ω b) 0.5 Ω c) 0.4 Ω d) 0.25 Ω

931. Five conductors are meeting at a point $x$as shown in the figure. What is the value of current in fifth conductor?



a) 3 A away from x b) 1 A away from x c) 4 A away from x d) 1 A towards x

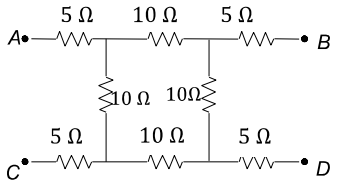
932. If 1 A current is passed through $CuSO_4$ solution for 10 s, the number of copper atoms deposited at the cathode will be
a) 8×10^{19} b) 3.1×10^{19} c) 6.2×10^{19} d) 1.6×10^{20}

933. Charge Q is divided into two parts which are then kept some distance apart. The force between them will be maximum if the two parts are having the charge
a) $Q/2$ each b) $Q/4$ and $3Q/4$
c) $Q/3$ and $2Q/3$ d) e and $(Q - e)$,where e =electronic charge

934. The specific resistance of manganin is 50×10^{-8} $ohm \times m$. The resistance of a cube of length $50cm$ will be

a) $10^{-6}\ ohm$ b) $2.5 \times 10^{-5}\ ohm$ c) $10^{-8}\ ohm$ d) $5 \times 10^{-4}\ ohm$

935. The equivalent resistance between the terminals A and B in the following circuit is



a) 10 Ω b) 20 Ω c) 5 Ω d) 30 Ω

936. Resistance of a voltameter is 2Ω, it is connected in series to a battery of 10 V through a resistance of 3Ω. In a certain time mass deposited on cathode is $1g$. Now the voltameter and the 3Ω resistance are connected in parallel with the battery. Increase in the deposited mass on cathode in the same time will be

a) 0 b) 1.5 g c) 2.5 g d) 2 g

937. If the electric current through an electric bulb is 3.2 A, the number of electrons flow through it in one second is

a) 2×10^{9} b) 2×10^{19} c) 3.2×10^{19} d) 1.6×10^{18}

938. If the total emf in a thermocouple is a parabolic function expressed as $E = at + \frac{1}{2}\ bt^2$, which of the following relation does not hold good?

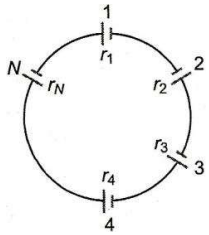
a) Neutral temperature $t_n = -\frac{a}{b}$ b) Temperature of inversion, $t_i = -\frac{-2a}{b}$

c) Thermoelectric power $P = a + bt$ d) $t_n = \frac{a}{b}$

939. 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

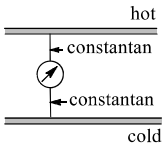
a) 82.5% b) 80% c) 90% d) 87.5%

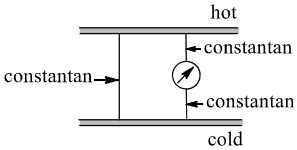
940. A group of N cells whose emf varies directly with the internal resistance as per the equation $E_N = 1.5r_N$ are connected as shown in the figure. The current I in the circuit is

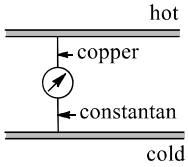


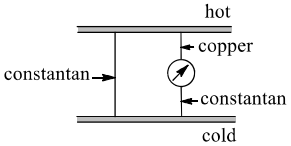
a) 5.1A b) 0.51A c) 1.5A d) 0.15A

941. A cold-water pipe and a hot-water pipe are both made of copper and are initially electrically isolated. In which one of the following arrangements will the galvanometer indicate a thermo-electric current?

a)


b)


c)


d)


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

a) 10 ohm in series b) 10 ohm in parallel c) 810 ohm in series d) 810 ohm in parallel

943. 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

944. The conductivity of a superconductor is

a) Infinite b) Very large c) Very small d) Zero

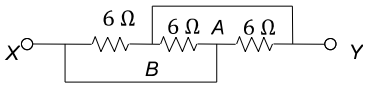
945. For driving a current of 2 A for 6 $minutes$ in a circuit, 1000 J of work is to be done. The e.m.f. of the source in the circuit is

a) 1.38 V b) 1.68 V c) 2.04 V d) 3.10 V

946. A moving coil galvanometer has 150 equal divisions. Its current sensitivity is 10 divisions per milliampere and voltage sensitivity is 2 divisions per millivolt. In order that each division reads 1V, the resistance in Ohm's needed to be connected in series with the coil will be

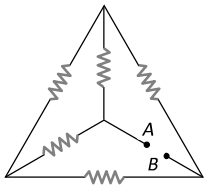
a) 10^3 b) 10^5 c) 99995 d) 9995

947. In a given network, each resistance has value of 6Ω. The point X is connected to point A by a copper wire of negligible resistance and point Y is connected to point B by the same wire. The effective resistance between X and Y will be



a) 18Ω b) 6 Ω c) 3 Ω d) 2 Ω

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



a) 1 Ω b) 4 Ω c) 3 Ω d) 2 Ω

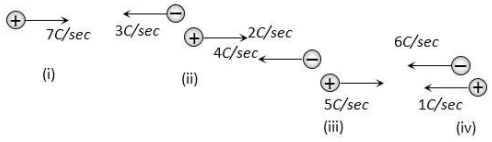
949. Which factor is immaterial for the wire used in electric fuse?

a) Length b) Radius c) Material d) Current

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

a) 19.9995 Ω b) 199.995 Ω c) 1999.95 Ω d) 19995 Ω

951. Following figure shows four situations in which positive and negative charges move horizontally through a region and gives the rate at which each charge moves. Rank the situations according to the effective current through the region greatest first



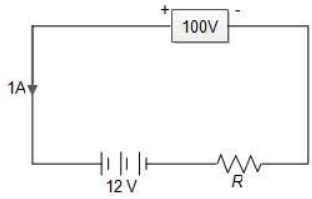
a) $i = ii = iii = iv$ b) $i > ii > iii > iv$ c) $i = ii = iii > iv$ d) $i = ii = iii < iv$

952. Faraday's laws of electrolysis are related to

a) The atomic number of positive ion b) The equivalent weight of electrolyte

c) The atomic number of negative ion d) The velocity of positive ion

953. A battery is charged by a supply of 100 V as shown in figure. The charging current is 1.0A. the value of R is

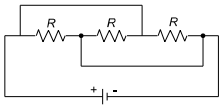


a) 88 Ω b) 68 Ω c) 44 Ω d) None of these

954. If for a thermocouple T_n is the neutral temperature, T_c is the temperature of the cold junction and T_i is the temperature of inversion, then

a) $T_i = 2T_n - T_c$ b) $T_n = T_i - 2T_c$ c) $T_i = T_n - T_c$ d) None of these

955. Three equal resistances, each of R ohm, are connected as shown in figure. A battery of 2 V and internal resistance 0.1 Ω is connected across the circuit. The value of R for which the heat generated in the circuit will by maximum is



a) 0.3Ω b) 0.01Ω c) 0.1Ω d) 0.03Ω

956. The potential difference across the terminals of a battery is $50V$ when $11A$ current is drawn and $60V$ when $1A$ current is drawn. The $e.m.f.$ and the internal resistance of the battery are

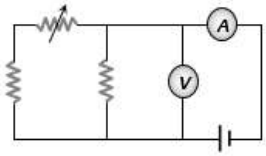
a) $62V, 2\Omega$ b) $63V, 1\Omega$ c) $61V, 1\Omega$ d) $64V, 2\Omega$

957. Two electric bulbs have ratings respectively of 25 W, 220 V and 100 W, 220 V. If the bulbs are connected in series with a supply of 440, which bulb will fuse?

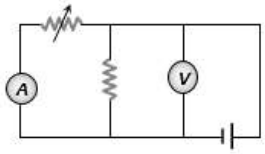
a) 25 W bulb b) 100 W bulb c) Both of these d) None of these

958. Express which of the following setups can be used to verify Ohm's law

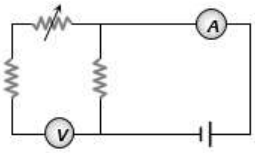
a)



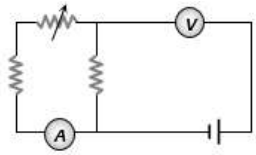
b)



c)



d)



959. The thermo emf produced in a thermo-couple is 3 microvolt per degree centigrade. If the temperature of the cold junction is 20°C and the thermo emf is 0.3 millivolt, the temperature of the hot junction is

a) 80°C b) 100°C c) 120°C d) 140°C

960. Two cells of equal $e.m.f.$ and of internal resistance 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

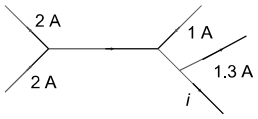
the first cell becomes zero. The value of R will be

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

961. The power of heater is 500 W at 800°C. What will be its power at 200°C ? (Given : temperature coefficient of resistance, $\alpha = 4 \times 10^{-4}°C^{-1}$)

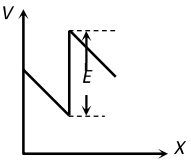
a) 484 W b) 672 W c) 526 W d) 620 W

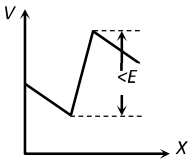
962. In the figure a part of electric circuit has been shown. The value of current i is

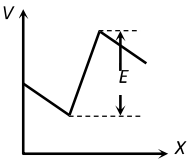


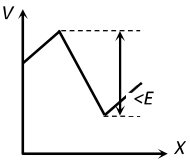
a) 1.7 A b) 3.7 A c) 1.3 A d) 1A

963. 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) 

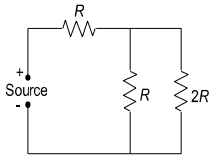
964. How many calories of heat will be produced approximately in a 210 W electric bulb in 5 min?

a) 80000 cal b) 63000 cal c) 1050 cal d) 15000 cal

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

a) 0.25 amp b) 0.5 amp c) 1.0 amp d) 1.5 amp

966. The charge supplied by source varies with time t as $Q = at - bt^2$. The total heat produced in resistor $2R$ is



a) $\frac{a^3R}{6b}$ b) $\frac{a^3R}{27b}$ c) $\frac{a^3R}{3b}$ d) None of these

967. An electric kettle has two heating coils. When one coil is used, water in the kettle boils in 5 minutes, while when second coil is used, same water boils in 10 minutes. If the two coils, connected in parallel are used simultaneously, the same water will boil in time

a) 3 min 20 sec b) 5 min c) 7 min 30 sec d) 2 min 30 sec

968. In a potentiometer experiment for measuring the emf of a cell, the null point is at 480 cm when we have a 400 Ω resistor in series with the cell and galvanometer. If the series resistances is reduced to half, the null point will be at

a) 120 cm b) 240 cm c) 480 cm d) 600 cm

969. A 25 W and 100 W bulbs are joined in series and connected to the mains. Which bulb will glow brighter?

a) 25 W bulb b) 100 W bulb

c) Both bulb will glow brighter d) None will glow brighter

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

a) 1 amp b) 2 amp c) 4 amp d) Infinite

971. Assume that each atom of copper contributes one electron. If the current flowing through a copper wire of 1 mm diameter is 1.1 A, the drift velocity of electrons will be (density of Cu=9 g cm^{-3}, atomic wt. of

Cu=63)

a) 0.3 mm s^{-1} b) 0.5 mm s^{-1} c) 0.1 mm s^{-1} d) 0.2 mm s^{-1}

972. If an observer is moving with respect to a stationary electron, then he observes
a) Only magnetic field b) Only electric field c) Both (a) and (b) d) None of the above

973. The value of internal resistance of an ideal cell is
a) Zero b) 0.5 Ω c) 1 Ω d) Infinity

974. Two bulbs 25 W, 220 V and 100 W, 220 V are given. Which has higher resistance?
a) 25 W bulb b) 100 W bulb
c) Both bulbs will have equal resistance d) Resistance of bulbs cannot be compared

975. A heater of 220 V heats a volume of water in 5 min time. A heater of 110 V heats the same volume of water is
a) 5 min b) 8 min c) 4×10^4 min d) 20 min

976. The resistance of the series combination of two resistance is S. When they are joined in parallel, the total resistance is P. If $S = nP$, then the minimum possible value of n is
a) 4 b) 3 c) 2 d) 1

977. A galvanometer of resistance 20 Ω shows a deflection of 10 divisions when a current of 1 mA is passed through it. If a shunt of 4 Ωis connected and there are 50 divisions on the scale, the range of the galvanometer is
a) 1A b) 3A c) 10mA d) 30mA

978. In a potentiometer experiment two cells of e.m.f.' s E_1 and E_2 are used in series and in conjunction and the balancing length is found to be 58 cm of the wire. If the polarity of E_2 is reversed, then the balancing length becomes 29 cm. The ratio $\frac{E_1}{E_2}$ of the e.m.f. of the two cells is
a) 1 : 1 b) 2 : 1 c) 3 : 1 d) 4 : 1

979. A coil of wire of resistance 50 Ω is embedded in a block of ice and a potential difference of 210 V is applied across it. The amount of ice which melts in 1 sec is
a) 0.262 g b) 2.62 g c) 26.2 g d) 0.0262 g

980. A hot electric iron has a resistance of 80 Ω and is used on a 200 V source. The electrical energy spent, if it is used for two hours, will be
a) 8000 Wh b) 2000 Wh c) 1000 Wh d) 800 Wh

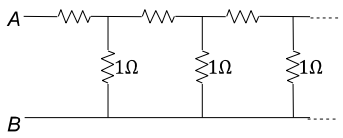
981. The following four wires are made of the same material and are at the same temperature. Which one of them has highest electrical resistance?
a) Length =50 cm, diameter=0.5 mm b) Length =100 cm, diameter=1 mm
c) Length=200 cm , diameter=2 mm d) Length=300cm, diameter=3 mm

982. $e = \alpha\, t - \frac{1}{2}\beta\, t^2$, if temperature of cold junction is 0°C then temperature of inversion is (if $\alpha = 500.0\mu V/°C, \beta = 5.0\mu V/$square°C)
a) 100 b) 200 c) 300 d) 400

983. 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

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

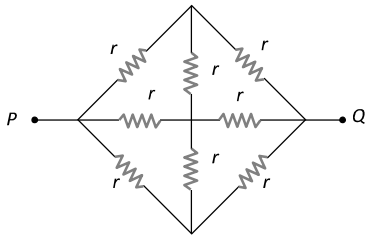
1Ω 1Ω 1Ω



a) Infinite b) 2 Ω c) $\frac{1+\sqrt{5}}{2}\Omega$ d) zero

985. The masses of three wires of copper are in the ratio 1: 3: 5 and lengths are in the ratio 5: 3: 1. Then the ratio of their electrical resistances are
a) 1: 3: 5 b) 5: 3: 1 c) 1: 15: 25 d) 125: 15: 1

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



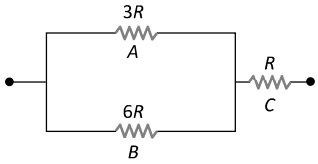
a) $\frac{1}{2}\Omega$ b) 1 Ω c) $\frac{3}{2}\Omega$ d) 2 Ω

987. Electric power is transmitted over long distances through conducting wires at high voltage because
a) High voltage travels faster
b) Power loss is large
c) Power loss is less
d) Generator produce electrical energy at a very high voltage

988. Two bulbs of 250 V and 100 W are first connected in series and then in parallel with a supply of 250 V. Total power in each of the case will be respectively
a) 100 W, 50 W b) 50 W, 100 W c) 200 W, 150 W d) 50 W, 200 W

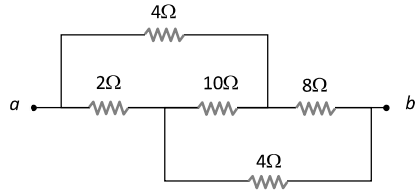
989. In a wire of circular cross-section with radius r, free electrons travel with a drift velocity V when a current I flows through the wire. What is the current in another wire of half the radius and of the same material when the drift velocity is $2V$
a) $2I$ b) I c) $I/2$ d) $I/4$

990. Three resistance A, B and C have values $3R, 6R$ 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

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



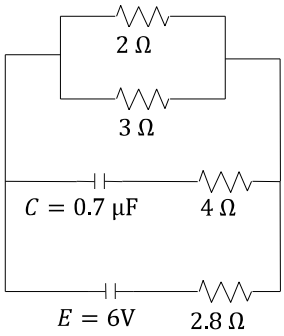
a) 2 Ω b) 4 Ω c) 8 Ω d) 16 Ω

992. One end each of a resistance r capacitor C and resistance 2r are connected together. The other ends are respectively connected to the positive terminals of batteries, P, Q, R having respectively emf's E,E and 2E.

the negative terminals of the batteries are then connected together. In this circuit, with steady current the potential drop across the capacitor is

a) $\frac{E}{3}$ b) $\frac{E}{2}$ c) $\frac{2E}{3}$ d) E

993. In the circuit shown, the internal resistance of the cell is negligible. The steady state current in the 2 Ω resistance is



a) 0.6A b) 1.2A c) 0.9A d) 1.5A

994. Which of the following statement is correct

a) Both Peltier and Joule effects are reversible

b) Both Peltier and Joule effects are irreversible

c) Joule effect is reversible, whereas Peltier effect is irreversible

d) Joule effect is reversible, whereas Peltier effect is reversible

995. In producing chlorine through electrolysis 100 *watt* power at 125 V is being consumed. How much chlorine per minute is liberated? E.C.E. chlorine is $0.367 \times 10^{-6} kg/coulomb$

a) 24.3 mg b) 16.6 mg c) 17.6 mg d) 21.3 mg

996. For a thermocouple the neutral temperature is 270°C when its cold junction is at 20°C. What will be the neutral temperature and the temperature of inversion when the temperature of cold junction is increased to 40°C

a) 290°C, 580°C b) 270°C, 580°C c) 270°C, 500°C d) 290°C, 540°C

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

a) 3×10^{-4} ms^{-1} b) 3×10^{-5} ms^{-1} c) 4×10^{6} ms^{-1} d) 3×10^{8} ms^{-1}

998. An ammeter, suspected to give inaccurate reading, is connected in series with a *silver* voltameter. The ammeter indicates 0.54 A. A steady current passed for one hour deposits 2.0124 g of *silver*. If the E.C.E. of *silver* is $1.118 \times 10^{-3} g/C^{-1}$, then the error in ammeter reading is

a) + 0.04 A b) + 0.02 A c) −0.03 A d) −0.01 A

999. 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

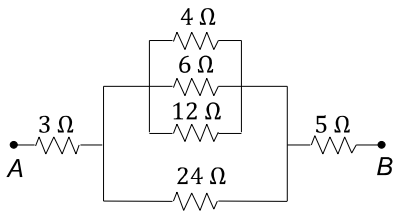
1000. A cell of internal resistance r is connected to an external resistance R. The current will be maximum in R, if

a) $R = r$ b) $R < r$ c) $R > r$ d) $R = r/2$

1001. One junction of a certain thermoelectric couple is at a fixed temperature T_r and the other junction is at temperature T. The thermo-electromotive force for this is expressed by $E = k(T - T_r)\left[T_0 - \frac{1}{2}(T + T_r)\right]$. At temperature $T = \frac{1}{2} T_0$, the thermoelectric power is

a) $\frac{1}{2} kT_0$ b) kT_0 c) $\frac{1}{2} kT_0^2$ d) $\frac{1}{2} k (T_0 - T_r)^2$

1002. The effective resistance between points A and B in figure



a) 10 Ω b) 12 Ω c) 9.85 Ω d) 10.85 Ω

100 3. The inversion temperature of a copper-iron thermocouple is 540°C when the cold junction temperature is 0°C. If the cold junction temperature is increased by 10°C, then the inversion temperature and neutral temperature of the thermocouple respectively are

a) 270°C and 530°C b) 270°C and 550°C c) 280°C and 530°C d) 280°C and 550°C

100 4. Two resistors 400 Ω and 800 Ω are connected in series with 6 V battery. The potential difference measured by voltmeter of 10k Ω across 400 Ω resistor is

a) 2 V b) 1.95 V c) 3.8 V d) 4 V

100 5. When connected across the terminals of a cell, a voltmeter measures $5V$ 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

100 6. Kirchhoff's I law and II law of current, prove the

a) Conservation of charge and energy b) Conservation of current and energy
c) Conservation of mass and charge d) None of these

100 7. A lead-acid battery of a car has an emf of 12 V. If the internal resistance of the battery is 0.5 Ω, the maximum current that can be drawn from the battery will be

a) 30 A b) 20 A c) 6 A d) 24 A

100 8. The expression for thermo e.m.f. in a thermocouple is given by the relation $E = 40\theta - \frac{\theta^2}{20}$, where θ is the temperature difference of two junctions. For this, the neutral temperature will be

a) 100°C b) 200°C c) 300°C d) 400°C

100 9. 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

a) 16°C b) 10°C c) 20°C d) 12°C

101 0. An electric heater boils 1 kg of water in a time t_1. Another heater boils the same amount of water in a time t_2. When the two heaters are connected in parallel, the time required by them together to boil the same amount of water is

a) $t_1 + t_2$ b) $t_1 t_2$ c) $\frac{t_1 + t_2}{2}$ d) $\frac{t_1 t_2}{t_1 + t_2}$

101 1. A potentiometer has uniform potential gradient. The specific resistance of the material of the potentiometer wire is $10^{-7}\ ohm - meter$ and the current passing through it is 0.1 $ampere$; cross-section of the wire is $10^{-6} m^2$. The potential gradient along the potentiometer wire is

a) $10^{-4}\ V/m$ b) $10^{-6}\ V/m$ c) $10^{-2}\ V/m$ d) $10^{-8}\ V/m$

101 2. 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

101 3. 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

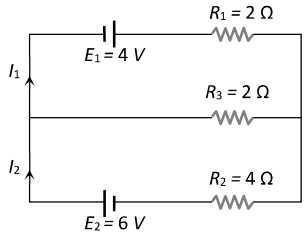
a) 1 :2 b) 2 :1 c) 1 :8 d) 8 :1

101 A 100 V voltmeter of internal resistance 20 $k\Omega$ in series with a high resistance R is connected to a 110 V

4. line. The voltmeter reads 5 V, the value of R is

a) 210 $k\Omega$ b) 315 $k\Omega$ c) 420 $k\Omega$ d) 440 $k\Omega$

101 5. 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

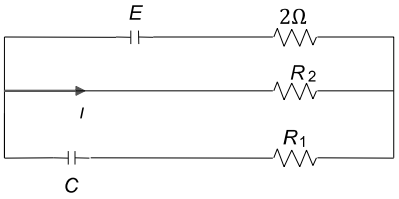
101 6. A solenoid is at potential difference of 60 V and current flowing through it is 15 $ampere$, then the resistance of coil will be

a) 4Ω b) 8Ω c) 0.25Ω d) 2Ω

101 7. Five equal resistors when connected in series dissipated 5 W power. If they are connected in parallel, the power dissipated will be

a) 25 W b) 50 W c) 100 W d) 125 W

101 8. The charge on the capacitor of capacitance C shown in the figure below will be



a) CE b) $\frac{CER_1}{R_1 + r}$ c) $\frac{CER_2}{R_2 + r}$ d) $\frac{CER_2}{R_1 + r}$

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

a) $\frac{R}{n^4}$ b) $\frac{R}{n^2}$ c) $\frac{R}{n}$ d) nR

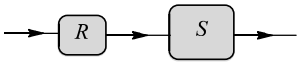
102 0. $Ohm's$ law is true

a) For metallic conductors at low temperature
b) For metallic conductors at high temperature
c) For electrolytes when current passes through them
d) For diode when current flows

102 1. A thermo couple develops 200$\mu\ V$ between 0°C and 100°C. If it develops 64 $\mu\ V$ and 76 $\mu\ V$ respectively between (0°C − 32°C) and (32°C − 70°C) then what will be the thermo emf it develops between 70°C and 100°C

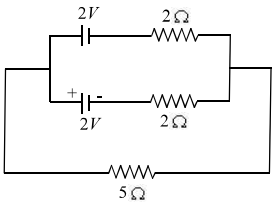
a) 65 $\mu\ V$ b) 60 $\mu\ V$ c) 55 $\mu\ V$ d) 50 $\mu\ V$

102 2. Two plates R and S are in the form of a square and have the same thickness. A side of S is twice the side of R Compare their resistances. The direction of current is shown by an arrow head figure.



a) The resistance of R is twice that of S b) Both have the same resistance
c) The resistance of S is four times that of R d) The resistance of R is half that of S

102 3. In the circuit shown, the current through the 5 Ω resistor is

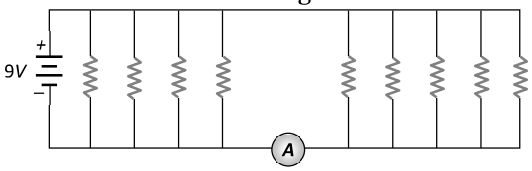


a) $\frac{8}{3}A$ b) $\frac{9}{13}A$ c) $\frac{4}{13}A$ d) $\frac{1}{3}A$

102 4. The resistance of an ammeter is 3 Ω and its scale is graduated for a current upto 100A. After an additional shunt has been connected to this ammeter it becomes possible to measure currents upto 750A by this meter. The value of shunt resistance is

a) 20Ω b) 2 Ω c) 0.2 Ω d) 2K Ω

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

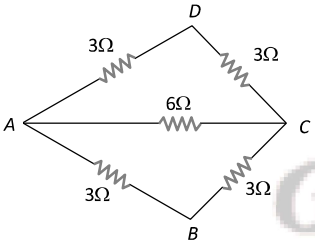


a) 5 A b) 8 A c) 2 A d) 9 A

102 6. A battery is made by connecting 6 cells each having capacity 5 Ah at 1.5V. The battery will have capacity equal to

a) 20 Ah at 9 V b) 30 Ah at 1.5 V c) 5 Ah at 9 V d) 5 Ah at 1.5 V

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



a) 5Ω b) 2Ω c) 3Ω d) 4Ω

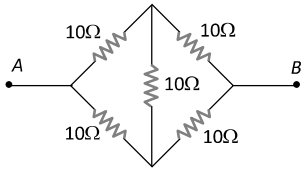
102 8. Kirchhoff's first law $i.e.\sum i = 0$ at a junction is based on the law of conservation of

a) Charge b) Energy c) Momentum d) Angular momentum

102 9. A given carbon resistor has the following colour code of the various strips: orange, red, yellow and gold. The value of resistance in ohm is

a) $32 \times 10^4 \pm 5\%$ b) $32 \times 10^4 \pm 10\%$ c) $23 \times 10^4 \pm 5\%$ d) $23 \times 10^4 \pm 10\%$

103 0. The effective resistance between points A and B is

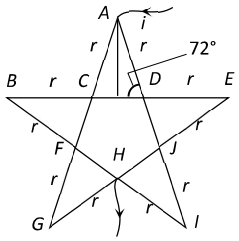


a) 10 Ω b) 20 Ω
c) 40 Ω d) None of the above three values

103 1. An electrical cable having a resistance of 0.2 Ω delivers 10 kW at 200 V DC to a factory. What is the efficiency of transmission

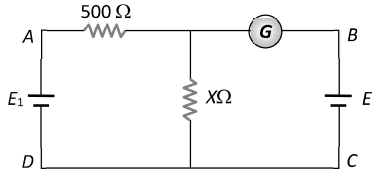
a) 65% b) 75% c) 85% d) 95%

103 2. In the following star circuit diagram (figure), the equivalent resistance between the points A and H will be



a) $1.944\,r$ b) $0.973\,r$ c) $0.486\,r$ d) $0.243\,r$

103 In the adjoining circuit, the battery E_1 has an $e.m.f.$ of $12 volt$ and zero internal resistance while the
3. 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



a) 10 b) 100 c) 500 d) 200

103 Twelve wires of equal resistance R are connected to form a cube. The effective resistance between two
4. opposite diagonal ends will be

a) $(5/6)R$ b) $(6/5)R$ c) $3R$ d) $12R$

103 The maximum power drawn out of the cell from a source is given by (where r is internal resistance)
5.

a) $E^2/2r$ b) $E^2/4r$ c) E^2/r d) $E^2/3r$

103 A moving coil galvanometer of resistance 100Ωis used as an ammeter using a resistance 0.1Ω. The
6. maximum deflection current in the galvanometer is 100μA. Find the minimum current in the circuit so that the ammeter shows maximum deflection

a) 100.1mA b) 1000.1mA c) 10.01mA d) 1.01mA

103 Temperature of cold junction in a thermocouple is 270°C, then the temperature of inversion is
7.

a) 540°C b) 530°C c) 280°C d) 260°C

103 A galvanometer of resistance, G, is shunted by a resistance S ohm. To keep the main current in the circuit
8. unchanged, the resistance to be put in series with the galvanometer is

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

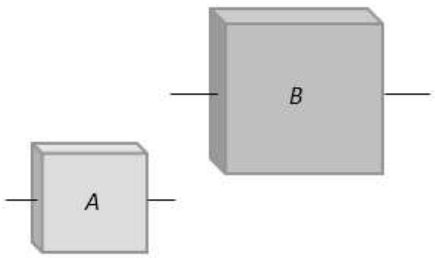
103 A bulb of 220 V and 300 W is connected across 110 V circuit, the percentage reduction in power is
9.

a) 100% b) 25% c) 70% d) 75%

104 A tap supplies water at 22°C, a man takes of 1 L of water per min at 37°C from the geyser. The power of
0. geyser is

a) 525 W b) 1050 W c) 1775 W d) 2100 W

104 A and B are two square plates of same metal and same thickness but length of B is twice that of A. Ratio of
1. resistances of A and B is

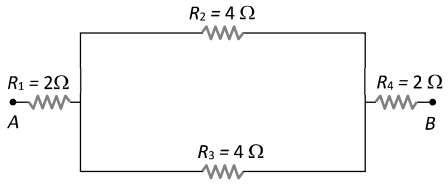


a) 4 : 1 b) 1 : 4 c) 1 : 1 d) 1 : 2

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

a) $4 \times 10^{-1} volt$ b) $2 \times 10^{-3} volt$ c) $4 \times 10^{-3}\ volt$ d) $2 \times 10^{-1}\ volt$

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

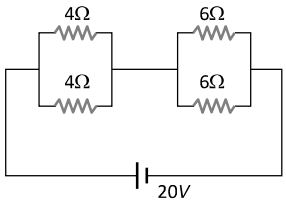


a) 8 Ω b) 6 Ω c) 4 Ω d) 2 Ω

104 4. Twelve cells, each having emf E volts are connected in series and kept in a closed box. Some of these cells are wrongly connected with positive and negative terminals reversed. This 12-cell battery is connected with an ammeter, an external resistance R ohm and a two-cell battery (two cells of the same type used earlier, connected perfectly in series). The current in the circuit when the 12-cell battery and 2-cell battery aid each other is 3A and 2A when they oppose each other. Then, the number of cell in 12-cell battery that are connected wrongly is

a) 4 b) 3 c) 2 d) 1

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



a) 2 *amp* and 4 *amp* b) 1 *amp* and 2 *amp* c) 1 *amp* and 1 *amp* d) 2 *amp* and 2 *amp*

104 6. A galvanometer of resistance 240Ωallows only 4% of the main current after connecting a shunt resistance. The value of the shunt resistance is

a) 10 Ω b) 20 Ω c) 8 Ω d) 5 Ω

104 7. If 100 kWh of energy is consumed at 66 V in a copper voltmeter, then the mass of copper liberated will be (Given ,ECE of Cu $= 0.33 \times 10^{-6}$kg C^{-1})

a) 1.65 kg b) 1.8 kg c) 3.3 kg d) 3.6 kg

104 8. A bulb has specification of one kilowatt and 250 *volts*, the resistance of bulb is

a) 125 Ω b) 62.5 Ω c) 0.25 Ω d) 625 Ω

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

a) $2R$ b) $4R$ c) R d) $\frac{R}{4}$

105 0. The temperature coefficient of resistance of a wire is 0.00125 K^{-1}. At 300K, its resistance is 1Ω. The resistance of the wire will be 2Ω at

a) 1154 K b) 1100 K c) 1400 K d) 1127 K

105 1. Resistors P and Q are connected in the gaps of the meter bridge. The balancing point is obtained $\frac{1}{3}$m from the zero end. If a 6 Ω resistance is connected in series with P the balance point shifts to $\frac{2}{3}$m from the same end. P and Q are

a) 4,2 b) 2,4

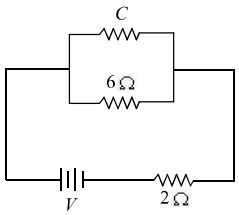
c) Both (a) and (b) d) Neither (a) nor (b)

105 Equal potentials are applied on an iron and copper wire of same length. In order to have the same current

2. flow in the two wires, the ration r (iron)$/r$ (copper) of their radii must be (Given that specific resistance of iron $= 1.0 \times 10^{-7}\ ohm - m$ and specific resistance of copper $= 1.7 \times 10^{-8} ohm - m$)

a) About 1.2 b) About 2.4 c) About 3.6 d) About 4.8

105 3. If power dissipated in the 9 Ω resistor in the circuit shown is 36 Watt, the potential difference across the 2 Ω resistor is



a) 2 $volt$ b) 4 $volt$ c) 8 $volt$ d) 10 $volt$

105 4. Antimony and bismuth are usually used in a thermocouple, because

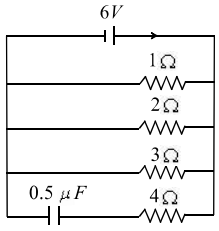
a) Negative thermal e.m.f. is produced b) Constant thermal e.m.f. is produced

c) Lower thermal e.m.f. is produced d) Higher thermal e.m.f. is produced

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

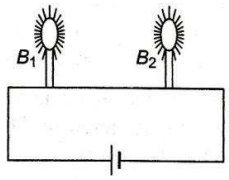
a) (3/8) Ω b) (8/3) Ω c) 8 Ω d) 12 Ω

105 6. In the given circuit diagram the current through the battery and the charge on the capacitor respectively in steady state are



a) 1A and 3 μC b) 17 A and 0 μC c) $\frac{6}{7}A$ and $\frac{12}{7}\mu C$ d) 11A and 3μC

105 7. Bulb B_1 (100 W-250 V) and bulb B_2 (100 W-200 V) are connected across 250 V. What is potential drop across B_2?

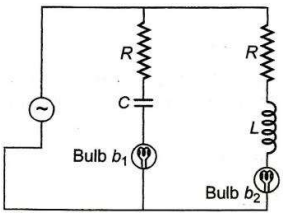


a) 200 V b) 250 V c) 98 V d) 48 V

105 8. To deposit one gm equivalent of an element at an electrode, the quantity of electricity needed is

a) One $ampere$ b) 96000 $amperes$ c) 96500 $farads$ d) 96500 $coulombs$

105 9. Two identical incandescent light bulbs are connected as shown in the figure. When the circuit is an AC voltage source of frequency f, which of the following observations will be correct?



a) Both bulbs will glow alternatively

b) Both bulbs will glow with same brightness provided frequency $f = \frac{1}{2\pi}\sqrt{(1/LC)}$

c) Bulb b_1 will light up initially and goes off, bulb b_2 will be ON constantly

d) Bulb b_1 will blink and bulb b_2 will be ON constantly

106 In a thermocouple, which of the following statements is not true

0.

a) Neutral temperature depends upon the nature of materials in the thermocouple

b) Temperature of inversion depends upon the temperature of cold junction

c) When the temperature of the hot junction is equal to the temperature of inversion, the thermo $e$mf becomes zero

d) When the temperature of cold junction increases, the temperature of inversion also increases

106 A galvanometer has 30 divisions and a sensitivity 16 μA/div. It can be converted into a voltmeter to read

1. 3 V by connecting

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

b) $6k\ \Omega$ in parallel

c) 500 Ω in series

d) It cannot be converted

106 A voltmeter essentially consists of

2.

a) A high resistance, in series with a galvanometer

b) A low resistance, in series with a galvanometer

c) A high resistance in parallel with a galvanometer

d) A low resistance in parallel with a galvanometer

106 The resistance of ideal voltmeter is

3.

a) Zero

b) Greater than zero but finite value

c) Infinite

d) 5000 Ω

106 In the process of electrolysis, the current is carried out inside the electrolyte by

4.

a) Electrons

b) Atoms

c) Positive and negative ions

d) All the above

106 In Seebeck series Sb appears before Bi. In a $Sb - Bi$ thermocouple current flows from

5.

a) Sb to Bi at the hot junction

b) Sb to Bi at the cold junction

c) Bi to Sb at the cold junction

d) None of the above

106 An energy source will supply a constant current into, the load, if its internal resistance is

6.

a) Equal to the resistance of the load

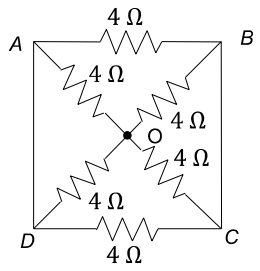
b) Very large as compared to the load resistance

c) Zero

d) Non-zero but less than the resistance of the load

106 Six equal resistances each of 4Ω are connected to form a figure. The resistance between two corners A and

7. B is



a) 4 Ω b) 4/3 Ω c) 12 Ω d) 2 Ω

106 When a resistance of $2ohm$ is connected across the terminals of a cell, the current is 0.5 $ampere$. When the

8. resistance is increased to 5 ohm, the current is 0.25 $ampere$. The internal resistance of the cell is

a) 0.5 ohm b) 1.0 ohm c) 1.5 ohm d) 2.0 ohm

106 The resistances of a wire at temperatures t°C and 0°C are related by
9.

a) $R_t = R_0(1 + \alpha t)$ b) $R_t = R_0(1 - \alpha t)$ c) $R_t = R_0^2(1 + \alpha t)$ d) $R_t = R_0^2(1 - \alpha t)$

107 The value of current required to deposit 0.972 gm of chromium in 3 $hours$ if the E.C.E. of chromium is
0. 0.00018 gm per coulomb, is

a) 1 amp b) 1.5 amp c) 0.5 amp d) 2 amp

107 Conductivity increases in the order of
1.

a) Al, Ag, Cu b) Al, Cu, Ag c) Cu, Al, Ag d) Ag, Cu, Al

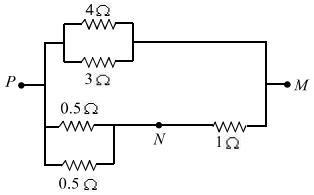
107 Peltier coefficient for the junction of a pair of metals is proportional to
2.

a) Absolute temperature of junction T b) Square of absolute temperature of junction
c) $1/T$ d) $1/T^2$

107 A fuse wire of circuit cross-section and having diameter of 0.4 mm, allows 3 A of current to pass through it.
3. But if another fuse wire of same material and circular cross-section and having diameter of 0.6 mm is taken, then the amount of current passed through the fuse is

a) 3 A b) $3 \times \sqrt{\frac{3}{2}}$ A c) $3 \times \left(\frac{3}{2}\right)^{3/2}$ A d) $3 \times \left(\frac{3}{2}\right)$ A

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



a) 0.5 V b) 3.2 V c) 1.5 V d) 1.0 V

107 Fifty electric bulbs, all identical, are connected in series across the mains of a 220 V supply. After one bulb
5. is fused, the remaining 49 bulbs connected in series across the same mains. The illumination will be

a) More with 50 bulbs than with 48 bulbs b) More with 49 bulbs than with 50 bulbs
c) Equal in both cases d) In the ratio $(50)^2 : (49)^2$ in the first and second case respectively

107 For obtaining chlorine by electrolysis a current of 100 KW and 125 V is used. (Electro chemical equivalent
6. of chlorine is $0.367 \times 10^6 \text{kgC}^{-1}$). The amount of chlorine obtained in one min will be

a) 1.7616 g b) 17.616 g c) 0.17161 kg d) 1.7616 kg

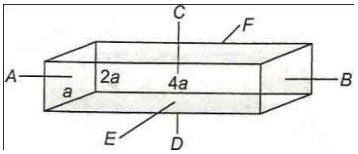
107 The resistance of a cell does not depend on
7.

a) Current drawn from the cell b) Temperature of electrolyte
c) Concentration of electrolyte d) The e.m.f. of the cell

107 The amount of heat produced in a resistor when a current is passed through it can be found using
8.

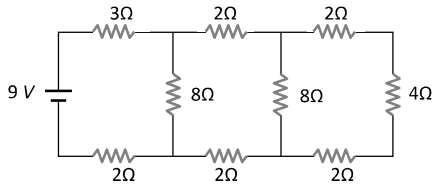
a) Faraday's Law b) Kirchhoff's Law c) Laplace's Law d) Joule's Law

107 A conductor with rectangular cross-section has dimensions $(a \times 2a \times 4a)$ as shown in figure. Resistance
9. across AB is R_1, across CD is R_2 and across EF is R_3.Then

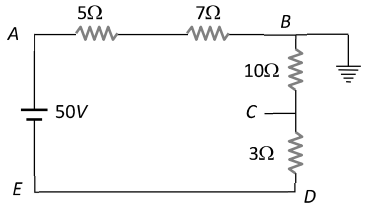


a) $R_1 = R_2 = R_3$ b) $R_1 > R_2 > R_3$ c) $R_2 > R_3 > R_1$ d) $R_1 > R_3 > R_2$

108 In the circuit shown in the figure, the current through

0. 

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

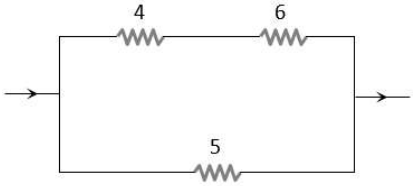
108 In the circuit shown, the point $'B'$ is earthed. The potential at the point $'A'$ is
1. 

a) 14 V b) 24 V c) 26 V d) 50 V

108 The heating coils rated at 220 $volt$ and producing 50 cal/sec heat are available with the resistance
2. 55 Ω, 110 Ω, 220 Ω and 440 Ω. The heater of maximum power will be of

a) 440 Ω b) 220 Ω c) 110 Ω d) 55 Ω

108 In the circuit shown in figure, the heat produced in 5 ohm resistance is 10 $calories$ per $second$. The heat
3. produced in 4 ohm resistance is



a) 1 cal/sec b) 2 cal/sec c) 3 cal/sec d) 4 cal/sec

108 A heating coil can heat the water of a vessel from 20°C to 60°C in 30 $minutes$. Two such heating coils are
4. put in series and then used to heat the same amount of water through the same temperature range. The time taken now will be (neglecting thermal capacity of the coils)

a) 60 $minutes$ b) 30 $minutes$ c) 15 $minutes$ d) 7.5 $minutes$

108 The n rows each containing m cells in series are joined in parallel. Maximum current is taken from this
5. combination across as external resistance of 3 Ω 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) $m = 2, n = 12$

108 Under what condition will the strength of current in a wire of resistance R be the same for connection is n
6. series or in parallel of n identical cells each of the internal resistance r, when

a) $R = nr$ b) $R = r/n$ c) $R = r$ d) $R \to \infty, r \to 0$

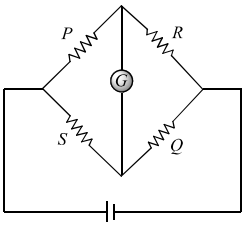
108 If three bulbs $60W$, $100W$ and 200 W are connected in parallel, then
7.

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

108 Which of the following are true, when the cells are connected in series?
8.

a) Current capacity decreases b) Current capacity increases
c) The emf decreases d) The emf increases

108 In the circuit given, the correct relation to a balanced Wheatstone bridge is
9.

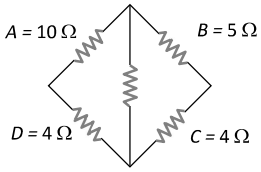


a) $\frac{P}{Q}=\frac{R}{S}$ b) $\frac{P}{Q}=\frac{S}{R}$ c) $\frac{P}{R}=\frac{S}{Q}$ d) None of these

109 0. A current of 5 A is passing through a metallic wire of cross-sectional area $4\times10^{-6}\text{m}^2$. If the density of charge carries of the wire is $5\times10^{26}\text{m}^{-3}$, the drift velocity of the electrons will be

a) $1\times10^{2}\text{ms}^{-1}$ b) $1.56\times10^{-2}\text{ms}^{-1}$ c) $1.56\times10^{-3}\text{ms}^{-1}$ d) $1\times10^{-2}\text{ms}^{-1}$

109 1. In a typical Wheatstone network, the resistances in cycle 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

109 2. Two identical heaters of 220V , 1000 W are placed in parallel with each other across 220V line, then the combined power is

a) 1000 W b) 2000 W c) 500 W d) 4000 W

109 3. In a Wheatstone's network $P=2\Omega, Q=2\Omega$, R $=2\Omega$ and S $=3\Omega$. The resistance with which S is to be shunted in order that the bridge may be balanced is

a) 1 Ω b) 2 Ω c) 4 Ω d) 6 Ω

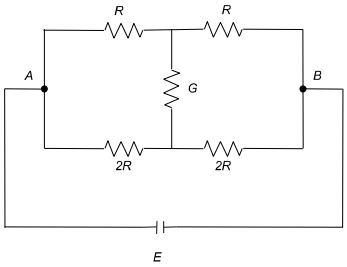
109 4. Consider the following statements regarding the network shown in the figure.

1. The equivalent resistance of the network between point A and B is independent of value of G.

2. The equivalent resistance of the network between points A and B is $\frac{4}{3}R$

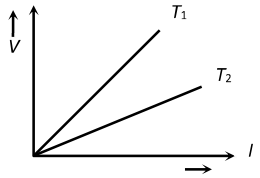
3. The current through G is zero.

Which of the above statements is/zero true?



a) 1,2 and 3 b) 2 and 3 c) 2 alone d) 1 alone

109 5. 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) $T_1 < T_2$

109 The current flowing in a copper voltmeter is 3.2 A. The number of copper ions (Cu^{2+}) deposited at the cathode per minute is

a) 0.5×10^{20} b) 1.5×10^{20} c) 3×10^{20} d) 6×10^{20}

109 An electron revolves $6 \times 10^{15} times/sec$ in circular loop. The current in the loop is

a) 0.96 mA b) 0.96 μA c) 28.8 A d) None of these

109 A 10 Ω electric heater operates on a 110V line. The rate at which heat is developed in watts is

a) 1310 W b) 670 W c) 810 W d) 1210 W

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

a) 4.1 m b) 3.1 m c) 2.1 m d) 1.1 m

110 When two resistances R_1 and R_2 are connected in series and parallel with 120 V line power consumed will be 25 W and 100 W respectively. Then the ratio of power consumed by R_1 to that consumed by R_2 will be

a) 1 :1 b) 1 :2 c) 2 :1 d) 1 :4

110 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

110 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

a) 0.4 m/s b) 16 m/s c) Zero d) 0.1 m/s

110 A uniform resistance R and length L is cut into for equal parts, each of length $L/4$, which are then connected in parallel combination. The effective resistance of the combination will be

a) R b) $4R$ c) $\frac{R}{4}$ d) $\frac{R}{16}$

110 Two resistors of 6 Ω and 9Ω are connected in series to a 120 $volt$ source. The power consumed by the 6 Ω resistor is

a) 384 W b) 576 W c) 1500 W d) 1200 W

110 In water voltmeter, the electrolysis of …… takes place

a) H_2O b) H_2SO_4 c) H_2O and H_2SO_4 both d) H_2 and O_2

110 A copper wire of cross-sectional area 2.0 mm^2, resistivity =$1.7 \times 10^{-8} \Omega m$, carries a current of 1A. The electric field in the copper wire is

a) $8.5 \times 10^{-5} Vm^{-1}$ b) $8.5 \times 10^{-4} Vm^{-1}$ c) $8.5 \times 10^{-3} Vm^{-1}$ d) $8.5 \times 10^{-2} Vm^{-1}$

110 A resistor is constructed as hollow cylinder of dimensions $r_a = 0.5$ cm and $r_b = 1.0$cm and $\rho = 3.5 \times 10^{-5} \Omega m$. The resistance of the configuration for the length of 5 cm cylinder is ….$\times 10^{-3} \Omega$.

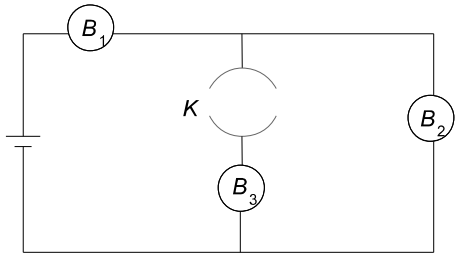
a) 7.42 b) 10.56 c) 14.38 d) 16.48

110 The $V - i$ graph for a conductor makes an angle θ with V-axis. Here V denotes the voltage and i denotes current. The resistance of conductor is given by

a) $\sin\theta$ b) $\cos\theta$ c) $\tan\theta$ d) $\cot\theta$

110 B_1, B_2 and B_3 are the three identical bulbs connected to a battery of steady emf with key K closed. What

9. happens to the brightness of the bulbs, B_1 and B_2 when the key is opened?



a) Brightness of the bulb B_1 increases and that of B_2 decreases
b) Brightness of the bulbs B_1 and B_2 increases
c) Brightness of the bulb B_1 decreases and B_2 increases
d) Brightness of the bulbs B_1 and B_2 decreases

111 0. Identify the incorrect statement regarding a superconducting wire

a) Transport current flows through its surface
b) Transport current flows through the entire area of cross-section of the wire
c) It exhibits zero electrical resistivity and expels applied magnetic field
d) It is used to produce large magnetic field

111 1. If the electronic charge is 1.6×10^{-19} C, then the number of electrons passing through a section of wire per second, when the wire carries a current of 2 A is

a) 1.25×10^{17} b) 1.6×10^{17} c) 1.25×10^{19} d) 1.6×10^{19}

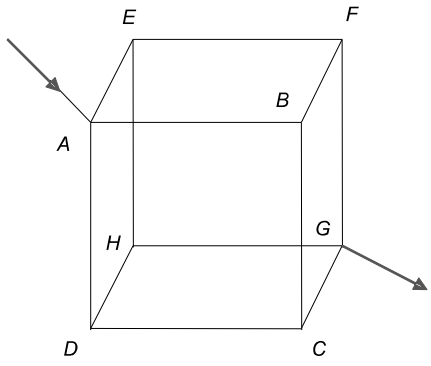
111 2. A milli voltmeter of 25 milli volt range is to be converted into an ammeter to 25 ampere range. The value (in ohm) of necessary shunt will be

a) 0.001 b) 0.01 c) 1 d) 0.05

111 3. A current through a wire depends on time t as $i = 10 + 4t$. The charge crossing through the section of the wire in 10 s is

a) 50 C b) 300 C c) 400 C d) 4C

111 4. Twelve wires of resistance 6 Ω are connected to form a cube as shown in the figure. The current centers at a corner A and leaves at the diagonally opposite corner G. the joint resistance across the corner A and G are

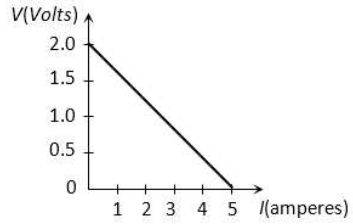


a) 12 Ω b) 6 Ω c) 3 Ω d) 5 Ω

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

a) 490 Ω b) 790 Ω c) 590 Ω d) 990 Ω

111 6. 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) $2V, 0.5\Omega$ b) $2V, 0.4\Omega$ c) $> 2V, 05\Omega$ d) $> 2V, 0.4\Omega$

111 7. The resistance of a straight conductor does not depend on its

a) Length b) Temperature
c) Material d) Shape of cross-section

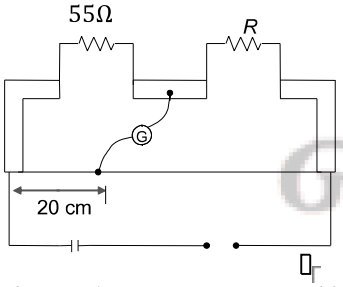
111 8. The rate of increase of thermo *e*.m.f. with temperature at the neutral temperature of a thermocouple

a) Is negative
b) Is positive
c) Is zero
d) Depends upon the choice of the two materials of the thermocouple

111 9. When 1 A current flows for 1 min through a silver voltmeter, it deposits 0.067 g of silver on the cathode, then how much charge will flow to deposit 108 g of silver?

a) $10.6 \times 10^4 \text{Cg}_{\text{eq}}^{-1}$ b) $9.67 \times 10^4 \text{Cg}_{\text{eq}}^{-1}$ c) $8.7 \times 10^4 \text{Cg}_{\text{eq}}^{-1}$ d) $4.3 \times 10^4 \text{Cg}_{\text{eq}}^{-1}$`

112 0. Shown in the figure adjacent is a meter-bridge set up with null deflection in the galvanometer. The value of the unknown resistor R is



a) 13.75 Ω b) 220 Ω c) 110 Ω d) 55 Ω

112 1. A galvanometer of resistance 36 Ω is changed into an ammeter by using a shunt of 4 Ω. The fraction f_0 of total current passing through the galvanometer is

a) $\frac{1}{40}$ b) $\frac{1}{4}$ c) $\frac{1}{140}$ d) $\frac{1}{10}$

112 2. The resistance of the filament of an electric bulb changes with temperature. If an electric bulb rated 220 volt and 100 watt is connected to $(220 \times .8)$ *volt* sources, then the actual power would be

a) 100×0.8 *watt* b) $100 \times (0.8)^2$ *watt*
c) Between 100×0.8 *watt* and 100 *watt* d) Between $100 \times (0.8)^2$ *watt* and 100×0.8 *watt*

112 3. Three similar cells, each of emf 2V and internal resistance r send the same current through an external resistance of 2Ω,when connected in series or in parallel. The strength of current flowing through the external resistance is

a) 0.75 A b) 1 A c) 1.5 A d) zero

112 4. In order to pass 10% of main current through a moving coil galvanometer of 99 *ohm*, the resistance of the required shunt is

a) 9.9 Ω b) 10 Ω c) 11 Ω d) 9 Ω

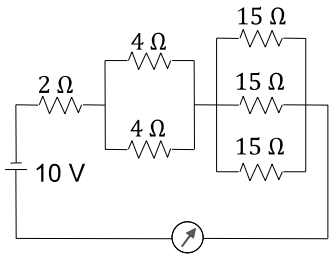
112 5. If six identical cells each having an e. m. f. of $6V$ are connected in parallel, the e.m.f. of the combination is

a) 1 V b) 36 V c) $\frac{1}{6}V$ d) 6 V

112 6. The resistance of a wire at 300 K is found to be 0.3Ω. If the temperature coefficient of resistance of wire is $1.5 \times 10^{-3}\text{K}^{-1}$, the temperature at which the resistance becomes 0.6Ω is

a) 720 K b) 345 K c) 993 K d) 690 K

112 7. The current through the circuit shown in figure 1A. If each of 4Ω the resistors is replaced by 2Ω resistor, the current in circuit will become nearly

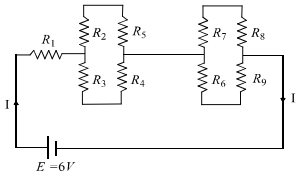


a) 1.11 A b) 1.25 A c) 1.34 A d) 1.67 A

112 8. A wire of resistance 5.5 ohm is drawn out uniformly so that its length is increased twice. Then its new resistance is

a) 44Ω b) 42Ω c) 40Ω d) 22Ω

112 9. Nine resistors each of 1 $k\Omega$ are conneted to a battery of 6 V as shown in the circuit given below. What is the total current flowing in the circuit



a) $3mA$ b) $\frac{2}{3}mA$ c) $\frac{3}{2}mA$ d) $2mA$

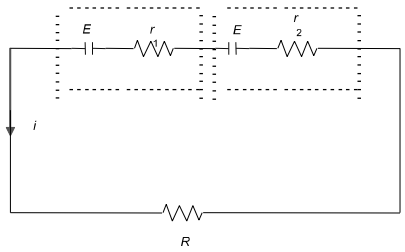
113 0. Given $R_1 = 5.0 \pm 0.2\Omega, R_2 = 10.0 \pm 0.1\Omega$. What is total resistance in parallel with possible percentage error?

a) $15\Omega \pm 2\%$ b) $3.3\,\Omega \pm 7\%$ c) $15\,\Omega \pm 7\%$ d) $3.3\Omega \pm 2\%$

113 1. If N is the Avogadro's number and e is the electronic charge then the Faraday's constant F is equal to

a) Ne b) N^2e c) Ne^2 d) $\frac{1}{Ne}$

113 2. If the potential difference across the internal resistance r_1 is equal to the emf E of the battery, then



a) $R = r_1 + r_2$ b) $R = \frac{r_1}{r_2}$ c) $R = r_1 - r_2$ d) $R = \frac{r_2}{r_1}$

113 3. A uniform wire of resistance 9 Ω 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

113 4. Resistance of a resistor at temperature $t°\ C$ is $R_t = R_0(1 + \alpha t + \beta t^2)$. Here R_o is the resistance at 0°C. The temperature coefficient of resistance at temperature t°C is

a) $\frac{(1+\alpha t+\beta t^2)}{\alpha+2\beta t}$ b) $(\alpha+2\beta t)$ c) $\frac{\alpha+2\beta t}{(1+\alpha t+\beta t^2)}$ d) $\frac{(\alpha+2\beta t)}{2(1+\alpha t+\beta t^2)}$

113 5. Potentiometer measures the potential difference more accurately than a voltmeter because

a) It has a wire of high resistance b) It has a wire of low resistance

c) It does not draw current from external circuit d) It draws a heavy current from external circuit

113 6. In a meter bridge a 30Ω resistance is connected in the left gap and a pair of resistances P and Q in the right gap. Measured from the left, the balance point is 37.5 cm, when P and Q are in series and 71.4 cm when they are parallel. The values of P and Q (in ohm) are

a) 40, 10 b) 35, 15 c) 30, 20 d) 25, 25

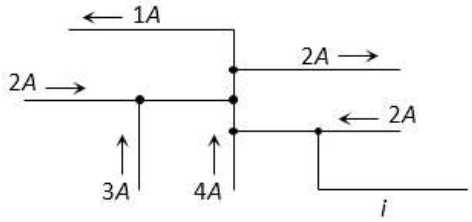
113 7. The thermocouple among the following that can produce maximum thermo-emf for the same temperature difference between the junction is

a) Fe-Cu b) Ag-Au c) Sb-Bi d) Cu-Pb

113 8. Water boils in an electric kettle in 15 *minutes* after switching on. If the length of the heating wire is decreased to 2/3 of its initial value, then the same amount of water will boil with the same supply voltage in

a) 15 *minutes* b) 12 *minutes* c) 10 *minutes* d) 8 *minutes*

113 9. 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

114 0. The current density (number of free electrons per m^3) in metallic conductor is of the order of

a) 10^{22} b) 10^{24} c) 10^{26} d) 10^{28}

114 1. The smallest temperature difference that can be measured with a combination of a thermocouple of thermo e.m.f. 30 μV per degree and a galvanometer of 50 ohm resistance, capable of measuring a minimum current of $3\times10^{-7} amp$ is

a) 0.5 degree b) 1.0 degree c) 1.5 degree d) 2.0 degree

114 2. 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

a) 1 b) 4 c) 2 d) 3

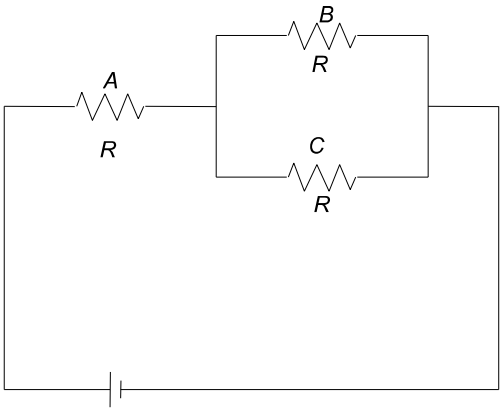
114 3. A wire of resistance R is cut into $'n'$ equal parts. These parts are then connected in parallel. The equivalent resistance of the combination will be

a) nR b) $\frac{R}{n}$ c) $\frac{n}{R}$ d) $\frac{R}{n^2}$

114 4. A steady current is set up in a metallic wire of non-uniform cross-section. How is the rate of flow of electrons (R) related to the area of cross-section (A)?

a) $R\propto A^{-1}$ b) $R\propto A$ c) $R\propto A^2$ d) R is independent of A

114 5. Three identical resistances A, B and C are connected as shown in figure.



The heat produced will be maximum

a) In B b) In B and C c) In A d) Same for A, B and C

114 6. If a current is allowed to pass through a circuit consisting of two dissimilar metals, there is either evolution or absorption of heat at the junction, depending upon the direction of the current. The effect is known as

a) Seebeck effect b) Joule effect c) Peltier effect d) Thomson effect

114 7. Two electric bulbs A and B are rated as 60 W and 100 W. They are connected in parallel to the same source. Then

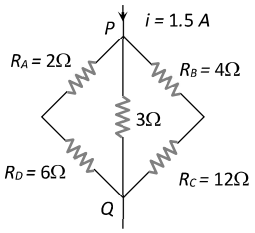
a) B draws more current than A

b) Currents drawn are in the ratio of their resistances

c) Both draw the same current

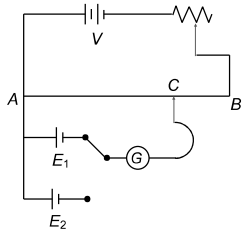
d) A draws more current than B

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



a) 4.5 V b) 1.2 V c) 2.4 V d) 2.88 V

114 9. The circuit shown here is used to compare the emf of two cells E_1 and $E_2 (E_1 > E_2)$. The null point is at C when the galvanometer is connected to E_2. when the galvanometer is connected to E_2, the null point will be



a) To the left of C b) To the right of C c) At C itself d) None where on AB

115 0. A steady current of 1.5 A flows through a copper voltameter for 10 min. If the electrochemical equivalent of copper is 30×10^{-5} g C^{-1}, the mass of copper deposited on the electrode will be

a) 0.40 g b) 0.50 g c) 0.67 g d) 0.27 g

115 1. The atomic weight of silver and copper are 108 and 64. A silver voltmeter and a copper voltmeter are connected in series and when current is passed 10.8 gm of silver is deposited. The mass of copper deposited will be

a) 6.4 gm b) 12.8 gm c) 3.2 gm d) 10.8 gm

115 In order to increase the sensitivity of galvanometer
2.

a) The suspension wire should be made stiff
b) Area of the coil should be reduced
c) The magnetic field should be increased
d) The number of turns in the coil should be reduced

115 If the cold junction of a thermocouple is kept at 0°C and the hot junction is kept at T°C, then the relation
3. between neutral temperature (T_n) and temperature of inversion (T_i) is

a) $T_n = \frac{T_i}{2}$ b) $T_n = 2T_i$ c) $T_n = T_i - T$ d) $T_n = T_i + T$

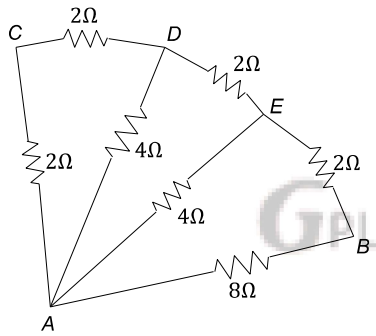
115 Two wires of same metal have the same length but their cross sections are in the retio 3:1. They are joined
4. in series. The resistance of the thicker wire is 10Ω. The total resistance of the combination is

a) $5/2\ \Omega$ b) $40/3\ \Omega$ c) $40\ \Omega$ d) $100\ \Omega$

115 (1)The product of a volt and a coulomb is a joule
5. (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

115 What is the equivalent resistance between A and B in the given circuit?
6.



a) 4Ω b) 2Ω c) $\frac{8}{3}\Omega$ d) $\frac{3}{8}\Omega$

115 Two bulbs consume same power when operated at 200 V and 300 V respectively. When these bulbs are
7. connected in series across a DC source of 400 V, then the ratio of power consumed across them is

a) 2/3 b) 3/2 c) 4/9 d) 9/4

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

a) 25 W b) $< 25\ W$ c) $> 25\ W$ d) None of these

115 An ammeter gives full scale deflection when a current of 2A flows through it. The resistance of ammeter is
9. 12 Ω. If the same ammeter is to be used for measuring a maximum current of 5A, then ammeter must be connected with a resistance of

a) 18 Ωin parallel b) 8 Ωin parallel c) 18 Ω in series d) 8 Ω in series

116 100 cells each of e. m. f. 5 V and internal resistance 1 ohm are to be arranged so as to produce maximum
0. current in a 25 ohm resistance. Each row is to contain equal number of cells. The number of rows should be

a) 2 b) 4 c) 5 d) 10

116 The equivalent resistance of n resistors each of same resistance when connected in series is R. If the same
1. resistances are connected in parallel, the equivalent resistance will be

a) R/n^2 b) R/n c) n^2R d) nR

116 2. The resistance of a wire is $R\ \Omega$.The wire is stretched to double its length keeping volume constant. Now the resistance of the wire will become

a) $4\ R\ \Omega$ b) $2\ R\ \Omega$ c) $R/2\ \Omega$ d) $R/4\ \Omega$

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

a) $\frac{R}{4}$ b) $\frac{R}{8}$ c) $4R$ d) $\frac{R}{2}$

116 4. 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) $1\ \Omega$ d) $0.10\ \Omega$

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

a) $10^{-2} volt/m$ b) $10^{-1} volt/m$ c) $3.2 \times 10^{-2} volt/m$ d) $1\ volt/m$

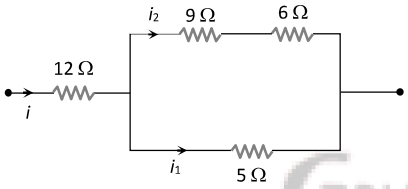
116 6. The length of the resistance wire is increased by 10%. What is the corresponding change in the resistance of wire?

a) 10 % b) 25 % c) 21 % d) 9 %

116 7. In a neon gas discharge tube Ne^{+}ions moving through a cross-section of the tube each second to the right is 2.9×10^{18}, while 1.2×10^{18} electron move towards left in the same time; the electronic charge being 1.6×10^{-19}C, the net electric current is

a) 0.27 A to the right b) 0.66 A to the right c) 0.66 A to the left d) Zero

116 8. In the following circuit, 5Ω 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) $64\ W$

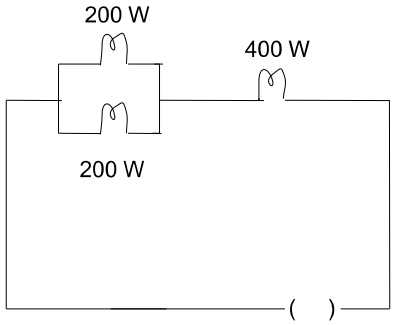
116 9. Two cells with the same emf E and different internal resistances r_1 and r_2 are connected in series to an external resistance R. the value of R so that the potential difference across the first cell be zero is

a) $\sqrt{r_1 r_2}$ b) $r_1 + r_2$ c) $r_1 - r_2$ d) $\frac{r_1 + r_2}{2}$

117 0. Silver and copper voltameters are connected in parallel with a battery of emf 12 V. In 30 min 1 g of silver and 1.8 g of copper are liberated. The energy supplied by the battery is

a) 720 J b) 2.41 J c) 24.12 J d) 4.34×10^4 J

117 1. Three electric bulbs of 200 W, 200 W and 400 W are shown in figure. The resultant power of the combination is



a) 800 W b) 400 W c) 200 W d) 600 W

117 2. 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

117 3. According to Joule's law, if the potential difference across a conductor having a material of specific resistance remains constant, then the heat produced in the conductor is directly proportional to

a) ρ b) ρ^2 c) $\frac{1}{\sqrt{\rho}}$ d) $\frac{1}{\rho}$

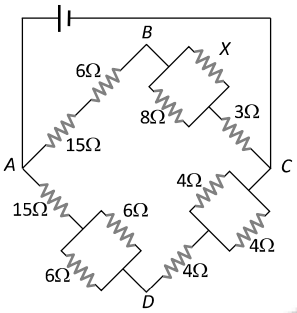
117 4. A piece of metal weighing 200 g is to be electroplated with 5% of its weight in gold. How long it would take to deposits the required amount of gold, if the strength of the available current is 2 A? (Given, electrochemical equivalent of $H = 0.0104 \times 10^{-4}$ gC^{-1} atomic weight of gold = 197.1, atomic weight of hydrogen = 1.008)

a) 7347.9 s b) 7400.5 s c) 7151.7 s d) 70 s

117 5. n conducting wires of same dimensions but having resistivites 1,2,3.....n are connected in series. The equivalent resistivity of the combinations is

a) $\frac{n(n+1)}{2}$ b) $\frac{n+1}{2}$ c) $\frac{n+2}{2n}$ d) $\frac{2n}{n+1}$

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

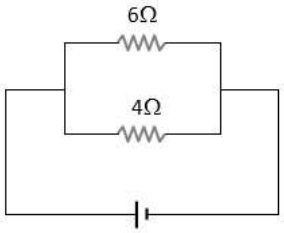


a) 4 *ohm* b) 6 *ohm* c) 8 *ohm* d) 9 *ohm*

117 7. In a region 10^{19} α −particales and 10^{19} protons move to the left, while 10^{19} electrons move to the right per second. The current is

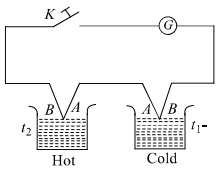
a) 3.2 A towards left b) 3.2 A towards right c) 6.4 A towards left d) 6.4 A towards right

117 8. 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



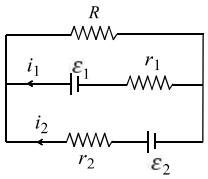
a) 16 b) 9 c) 6 d) 4

117 9. Two similar thermocouples, made of dissimilar metals A and B are connected as shown in figure through a key K and a sensitive galvanometer G. One of the thermocouples is dipped in a hot bath maintained at temperature t_2 and the other in a cold bath at temperature t_1. When the key is pressed, a deflection is seen in the galvanometer because



a) An emf of the order of a few microvolt is generated which is proportional to $(t_2 - t_1)$
b) An emf is generated the value of which will depend upon the temperature of the hot bath only
c) An emf of about one volt is generated which will be proportional to $(t_2 - t_1)$
d) An emf of a few microvolt is generated which will be proportional to t_2 only.

118 See the electrical circuit shown in this figure. Which of the following equations is a *correct* equation for it
0.



a) $\varepsilon_1 - (i_1 + i_2)R - i_1 r_1 = 0$
b) $\varepsilon_2 - i_2 r_2 - \varepsilon_1 - i_1 r_1 = 0$
c) $-\varepsilon_2 - (i_1 + i_2)R + i_2 r_2 = 0$
d) $\varepsilon_1 - (i_1 + i_2)R + i_1 r_1 = 0$

118 A resistor R_1 dissipates power P when connected to a certain generator. If the resistor R_2 is put in series
1. with R_1, the power dissipated by R_1
a) Decreases
b) Increases
c) Remains the same
d) Any of the above depending upon the relative values of R_1 and R_2

118 If a wire of resistance 20Ω is covered with ice and a voltage of $210\ V$ is applied across the wire, then the
2. rate of melting of ice is
a) $0.85 g/s$ b) $1.92 g/s$ c) $6.56 g/s$ d) All of these

118 A torch battery consists of two cells of 1.45 *volt* and an internal resistance 0.15 Ω. If each cell sends
3. current through the filament of the lamps having resistance 1.5 *ohm*, the value of current will be
a) 16.11 *amp* b) 1.611 *amp* c) 0.1611 *amp* d) 2.6 *amp*

118 A copper wire of length L and radius r is nickel plated till its final radius become R but length remains L. If
4. the resistivity of nickel and copper be ρ_n and ρ_c respectively, the conductance of the nickelled wire is
a) $\frac{\pi r^2}{L.\rho_c}$ b) $\frac{\pi(R^2 - r^2)}{L.\rho_n}$ c) $\frac{\pi}{L}\left[\frac{r^2}{\rho_c} + \frac{(R^2 - r^2)}{\rho_n}\right]$ d) $\frac{L\rho_c}{\pi r^2} + \frac{L.\rho_n}{\pi(R^2 - r^2)}$

118 As the temperature of hot junction of a thermo-couple is increased (while cold junction is at constant
5. temperature), the thermo *e*.m.f
a) Increases uniformly at constant rate
b) Increases slowly in the beginning and more rapidly at higher temperatures
c) Increases more rapidly in the beginning but less rapidly at higher temperatures
d) Is minimum at neutral temperature

118 Three moving coil galvanometers *A, B* and *C* are made of coils of three different material having torsional
6. constant 1.8×10^{-8}, 2.8×10^{-8} and 3.8×10^{-8} respectively. If the three galvanometers are identical in all other respect, then in which of the above cases sensitivity is maximum?
a) A b) C c) B d) Same in each case

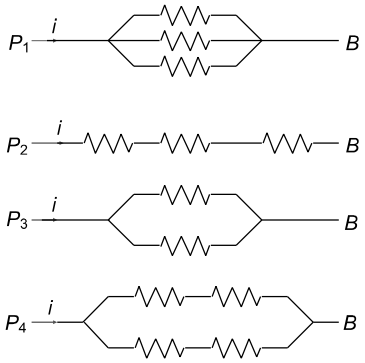
118 The electron of hydrogen atom is considered to be revolving round in circular orbit of radius h^2/me^2 with
7. velocity e^2/h, where $h = h/2\pi$. The current i is
a) $\frac{4\pi^2 me^5}{h^2}$ b) $\frac{4\pi^2 me^2}{h^3}$ c) $\frac{4\pi^2 m^2 e^5}{h^3}$ d) $\frac{4\pi^2 me^5}{h^3}$

118 The amount of charge Q passed in time t through a cross-section of a wire is $Q = 5t^2 + 3t + 1$. The value
8. of current at time $t = 5$s is
a) 9 A b) 49 A c) 53 A d) None of the above

118 A conductor wire having 10^{29} free electrons/m^3 carries a current of 20A. If the cross-section of the wire is
9. $1mm^2$, then the drift velocity of electrons will be
a) $6.25 \times 10^{-3} ms^{-1}$ b) $1.25 \times 10^{-5} ms^{-1}$ c) $1.25 \times 10^{-3} ms^{-1}$ d) $1.25 \times 10^{-4} ms^{-1}$

119 Arrange the order of power dissipated in the given circuits, if the same current is passing through all the

0. circuits. The resistance of each resistor is r.



a) $P_1 > P_2 > P_3 > P_4$ b) $P_2 > P_3 > P_4 > P_1$

c) $P_4 > P_3 > P_2 > P_1$ d) $P_1 = P_2 = P_3 = P_4$

119 1. 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) 200 % b) 100 % c) 50 % d) 300 %

119 2. The plates of a charged condenser is connected to a voltmeter. If the plates are moved apart, the reading of voltmeter will

a) Increase b) Decrease

c) Remain unchanged d) Information is insufficient

119 3. If the length of filament of a heater is reduced by 10%, the power of the heater will

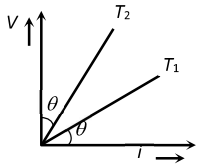
a) Increase by about 9% b) Increase by about 11%

c) Increase by about 19% d) Decrease by about 10%

119 4. 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) $\frac{\rho_1 l_1 - \rho_2 l_2}{l_1 - l_2}$

119 5. The $V - i$ graph for a conductor at temperatures T_1 and T_2 are as shown in the figure. $(T_2 - T_1)$ is proportional to

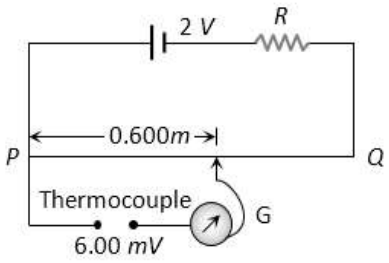


a) $\cos 2\theta$ b) $\sin\theta$ c) $\cot 2\theta$ d) $\tan\theta$

119 6. Two resistors of resistances 200 $k\Omega$ and 1$M\Omega$ respectively form a potential divider with outer junctions maintained at potentials of $+3V$ and $-15V$. Then, the potential at the junction between the resistors is

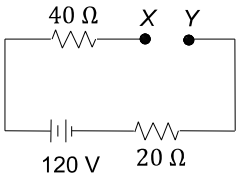
a) $+1\ V$ b) $-0.6\ V$ c) $0\ V$ d) $-12\ V$

119 7. 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 Ω and the driver cell has an e.m.f. of 2 V. If a balance point is obtained 0.600m along PQ when measuring an e.m.f. of 6.00 mV, what is the value of resistance R



a) 995 Ω b) 1995 Ω c) 2995 Ω d) None of these

119 8. In the circuit shown figure potential difference between X and Y will be

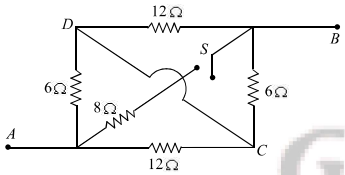


a) Zero b) 20 V c) 60 V d) 120 V

119 9. For goldplating on a copper chain, the substance required in the form of solution is

a) Copper sulphate b) Copper chloride
c) Potassium cyanide d) Potassium aurocyanide

120 0. 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

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

a) 400°C b) 450°C c) 500°C d) 550°C

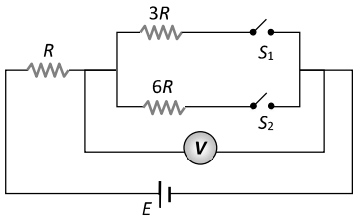
120 2. A cylindrical metal wire of length l and cross sectional area S, has resistance R, conductance G, conductivity σ and resistivity ρ. Which one of the following expressions for σ is valid

a) $\frac{GR}{\rho}$ b) $\frac{\rho R}{G}$ c) $\frac{GS}{l}$ d) $\frac{Rl}{S}$

120 3. If 96500 *coulombs* of electricity liberates one gram equivalent of any substance, the time taken for a current of 0.15 *amperes* to deposit 20mg of copper from a solution of copper sulphate is (Chemical equivalent of copper = 32)

a) 5 min 20 sec b) 6 min 42 sec c) 4 min 40 sec d) 5 min 50 sec

120 4. In the circuit shown in the 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



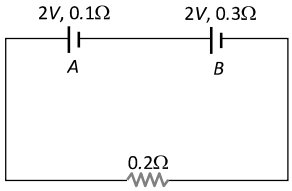
a) $V_3 > V_2 > V_1$ b) $V_2 > V_1 > V_3$ c) $V_3 > V_1 > V_2$ d) $V_1 > V_2 > V_3$

120 Two bulbs when connected in parallel to a source take 100 W each. The total power consumed when they

5. are connected in series with the same source is
   a) 25 W b) 50 W c) 100 W d) 200 W

120 6. A current of 2.0 *ampere* passes through a cell of e.m.f. 1.5 *volt* having internal resistance of 0.15 *ohm*. The potential difference measured, in *volt*, across both the ends of the cell will be
   a) 1.35 b) 1.50 c) 1.00 d) 1.20

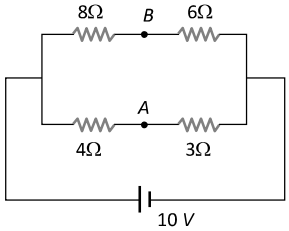
120 7. The internal resistances of two cells shown are 0.1 Ω and 0.3 Ω. If $R = 0.2\Omega$, the potential difference across the cell



   a) B will be zero b) A will be zero
   c) A and B will be $2V$ d) A will be $> 2V$ and B will be $< 2V$

120 8. The resistance of a heater coil is 110 *ohm*. A resistance R is connected in parallel with it and the combination is joined in series with a resistance of 11 *ohm* to a 220 *volt* main line. The heater operates with a power of 110 *watt*. The value of R in *ohm* is
   a) 12.22 b) 24.42
   c) Negative d) That the given values are not correct

120 9. The potential difference between point A & B is

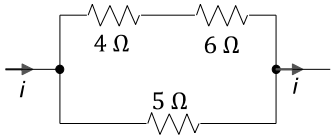


   a) $\frac{20}{7}V$ b) $\frac{40}{7}V$ c) $\frac{10}{7}V$ d) 0

121 0. A galvanometer, having a resistance of 50 Ω, gives a full scale deflection for a current of 0.05A. The length in meter of a resistance wire of area of cross-section $2.97 \times 10^{-2}\text{cm}^2$ that can be used to convert the galvanometer into a ammeter which can read a maximum of 5A current is
   (Specific resistance of the wire $= 5 \times 10^{-7}$ Ωm)
   a) 9 b) 6 c) 3 d) 1.5

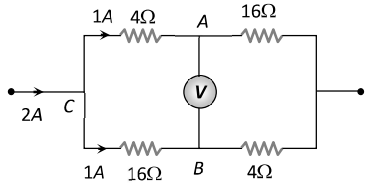
121 1. Two identical electric lamps marked 500 W, 220 V are connected in series and then joined to a 110 V line. The power consumed by each lamp is
   a) $\frac{125}{4}W$ b) $\frac{25}{4}W$ c) $\frac{225}{4}W$ d) 125 W

121 2. In the circuit shown in figure the heat produced in the 5Ω resistor due to the current flowing through it is 100Js^{-1}.The heat generated in the 4Ω resistor is



   a) $10\ \text{Js}^{-1}$ b) $20\ \text{Js}^{-1}$ c) $30\ \text{Js}^{-1}$ d) $40\ \text{Js}^{-1}$

121 3. In the circuit shown below, the reading of the voltmeter V is



a) 12 V b) 8 V c) 20 V d) 16 V

121 The potentiometer is superior to a voltmeter for measuring a potential difference because
4.

a) The resistance of the voltmeter
b) The potentiometer does not draw any current from the source of the potential
c) The sensitivity of potentiometer is better than that of the voltmeter
d) The voltmeter has a dial and of small size

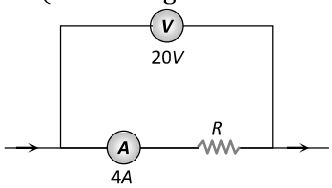
121 Two wires A and B of same material and mass have their lengths in the ratio 1:2. On connecting them to
5. the same source, the rate of heat dissipation in B is found to be $5W$. The rate of heat dissipation in A is

a) $10W$ b) $5W$ c) $20W$ d) None of these

121 The range of a voltmeter of resistance 500 Ω is 10V. the resistance to be connected to convert it into an
6. ammeter of range 10A is

a) 1 Ω in parallel b) 1 Ω in series c) 0.1 Ω in parallel d) 0.1 Ω in series

121 In the diagram shown, the reading of voltmeter is 20 V and that of ammeter is 4 A. The value of R should
7. be (Consider given ammeter and voltmeter are not ideal)



a) Equal to 5 Ω b) Greater than 5 Ω

c) Less than 5 Ω d) Greater or less than 5 Ω depending on the material of R

121 Two resistance R_1 and R_2 are made of different materials. The temperature coefficient of the material of R_1
8. 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) $\frac{\beta}{\alpha}$

121 The heat produced by a 100 W heater in 2 min will be equal to
9.

a) 12×10^3 J b) 10×10^3 J c) 6×10^3 J d) 3×10^3 J

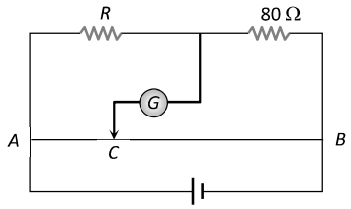
122 The thermo-emf of a thermocouple is 25μ V/°C at room temperature. A galvanometer of 40 Ω resistance,
0. capable of detecting current as low as 10^{-5} A, is connected with the thermocouple. The smallest temperature difference that can be detected by this system is

a) 16°C b) 12°C c) 8°C d) 20°C

122 There are two concentric spheres of radius a and b respectively. If the space between them is filled with
1. medium of resistivity ρ, then the resistance of the inter gap between the two spheres will be

a) $\frac{\rho}{4\pi(b+a)}$ b) $\frac{\rho}{4\pi}\left(\frac{1}{b}-\frac{1}{a}\right)$ c) $\frac{\rho}{4\pi}\left(\frac{1}{a^2}-\frac{1}{b^2}\right)$ d) $\frac{\rho}{4\pi}\left(\frac{1}{a}-\frac{1}{b}\right)$

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



a) 2 Ω b) 8 Ω c) 20 Ω d) 40 Ω

122 For a thermocouple, the neutral temperature is 270°C and the temperature of its cold junction is 20°C. If
3. there is no deflection in the galvanometer, the temperature of the hot junction should be

a) 210°C b) 540°C c) 520°C d) 209°C

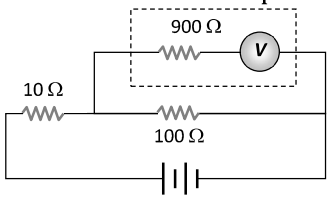
122 If $2.2kW$ power is transmitted through a 100Ω line at $22{,}000V$, the power loss in the form of heat will be
4.

a) 0.1 W b) 1 W c) 10 W d) 100 W

122 In a conductor 4 $coulomb$ of charge flows for 2 $seconds$. The value of electric current will be
5.

a) 4 $volt$ b) 4 $ampere$ c) 2 $ampere$ d) 2 $volt$

122 The potential difference across the 100Ω resistance in the following circuit is measured by a voltmeter of
6. 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

122 A current i passes through a wire of length l, radius of cross-section r and resistivity ρ. The rate of heat
7. generation is

a) $\frac{i^2 l\rho}{\pi r^2}$ b) $i^2\left(\frac{l\rho}{\pi r^2}\right)^2$ c) $i^2 l\,\rho/r$ d) $il\,\rho/r$

122 The resistivity of a wire
8.

a) Increase with the length of the wire
b) Decreases with the area of cross-section
c) Decreases with the length and increases with the cross-section of wire
d) None of the above statement is correct

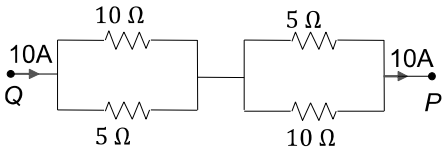
122 The potential difference in open circuit for a cell is 2.2 $volt$. When a 4 ohm resistor is connected between
9. its two electrodes the potential difference becomes 2 $volt$. The internal resistance of the cell will be

a) 1 ohm b) 0.2 ohm c) 2.5 ohm d) 0.4 ohm

123 Two resistances of 400 Ω and 800 Ω are connected in series with 6 $volt$ battery of negligible internal
0. 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

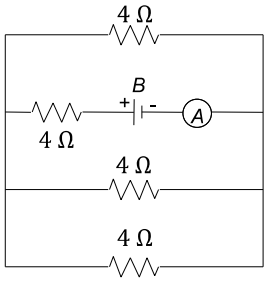
a) 0.01 b) 0.02 c) 0.03 d) 0.05

123 Four resistances carrying a current shown in the circuit diagram re immersed in a box containing ice at
1. 0°C. How much ice must be put in the box every 10 min to keep the average quantity of in the box constant?



a) 5 kg b) 1.19 kg c) 3 kg d) 2.29 kg

123 2. Four identical resistors of 4 Ω each are joined in circuit as shown in figure. The cell B has emf 2V and its internal resistance is negligible. The ammeter reading is



a) $\frac{3}{8}$A b) 2A c) $\frac{1}{2}$A d) $\frac{1}{8}$A

123 3. Find the true statements

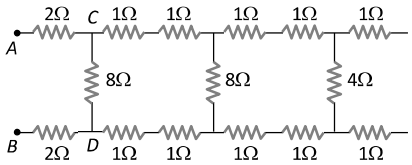
a) Ohm's law is applicable to all conductors of electricity
b) In an electrolyte solution, the electric current is mainly due to the movement of electrons
c) The resistance of an incandescent lamp is lesser when the lamp is switched on
d) Specific resistance of a wire depends upon its dimension

123 4. 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 potential difference. 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 $\frac{E}{r}$, V approaches zero

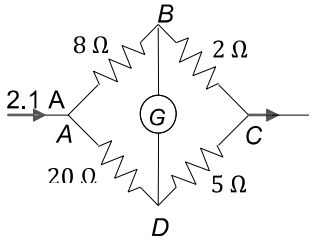
c) i approaches $\frac{E}{r}$, V approaches E d) i approaches infinity, V approaches E

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



a) 12 Ω b) 4 Ω c) 6 Ω d) 8 Ω

123 6. In the given figure when galvanometer shows no deflection current flowing through 5Ω resistance will be



a) 0.5 A b) 0.6 A c) 1.5 A d) 2.0 A

123 7. There is a current of 0.21 A in a copper wire whose area of cross-section is 10^{-6}m^2. If the number of free electrons per m^3 is 8.4×10^{28}, then find the drift velocity,

$(e = 1.6 \times 10^{-19}\text{C})$

a) $2 \times 10^{-5}\ \text{ms}^{-1}$ b) $1.56 \times 10^{-5}\ \text{ms}^{-1}$ c) $1 \times 10^{-5}\ \text{ms}^{-1}$ d) $0.64 \times 10^{-5}\ \text{ms}^{-1}$

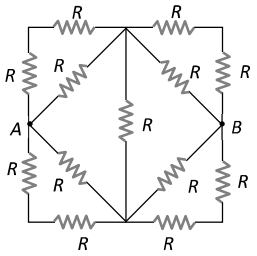
123 For electroplating a spoon, it is placed in the voltmeter at
8.

a) The position of anode
b) The position of cathode
c) Exactly in the middle of anode and the cathode
d) Anywhere in the electrolyte

123 The ratio of voltage sensitivity (V_S) and current sensitivity (I_s) of a moving coil galvanometer is
9.

a) $\frac{1}{G}$ b) $\frac{1}{G^2}$ c) G d) G^2

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



a) $2R\ \Omega$ b) $\frac{4R}{3}\ \Omega$ c) $\frac{2\,R}{3}\ \Omega$ d) $R\ \Omega$

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

a) 2010 b) 4050 c) 5040 d) 4960

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

a) 0.01 R b) 0.1 R c) 10 R d) 100 R

124 We are able to obtain fairly large currents in a conductor because
3.

a) The electron drift speed is usually very large
b) The number density of free electrons is very high and this can compensate for the low values of the electron drift speed and the very small magnitude of the electron charge
c) The number density of free electrons as well as the electron drift speeds are very large and these compensate for the very small magnitude of the electron charge
d) The very small magnitude of the electron charge has to be divided by the still smaller product of the number density and drift speed to get the electric current

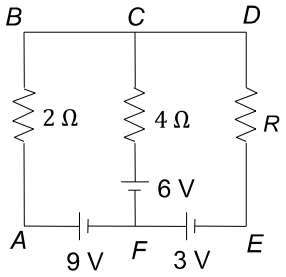
124 Two electroplating cells, one of silver and another of aluminium are connected in series. The ratio of the
4. number of silver atoms to that of aluminium atoms deposited during time t will be

a) 1 : 3 b) 3 : 1 c) 1 : 9 d) 9 : 1

124 An electric kettle boils some water in 16 min. Due to some defect, it becomes necessary to remove 10%
5. turns of heating coil of the kettle. Now, how much time will it take to boil the same of water?

a) 17.7 min b) 14.4 min c) 20.9 min d) 13.7 min

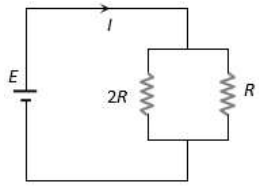
124 For what value of R in the circuit as shown in figure, current passing through 4Ω resistance will be zero.
6.



a) 1 Ω b) 2 Ω c) 3 Ω d) 4 Ω

124 What is the ratio of heat generated in R and $2R$

7.



a) 2 :1 b) 1 :2 c) 4 :1 d) 1 :4

124 If $E = at + bt^2$, what is the neutral temperature

8.

a) $-\frac{a}{2b}$ b) $+\frac{a}{2b}$ c) $-\frac{a}{b}$ d) $+\frac{a}{b}$

124 A 5.0 A current is setup in an external circuit by a 6.0 storage battery for 6.0 min. The chemical energy of

9. the battery is reduced by

a) 1.08×10^4 J b) 1.08×10^3 J c) 1.8×10^4 J d) 1.8×10^3 J

125 An electric bulb is marked 100 W, 230 V. If the supply voltage drops to 115 V, what is the total energy

0. produced by the bulb in 10 min?

a) 30 kJ b) 20 kJ c) 15 kJ d) 10 kJ

125 The internal resistance of a cell of e.m.f. $12V$ is $5 \times 10^{-2}\Omega$. It is connected across an unknown resistance.

1. Voltage across the cell, when a current of 60 A is drawn from it, is

a) 15 V b) 12 V c) 9 V d) 6 V

125 50 Ω and 100 Ω resistors are connected in series. This connection is connected with a battery of 2.4 $volt$.

2. When a voltmeter of 100 Ω resistance is connected across 100 Ω resistor, then the reading of the voltmeter will be

a) 1.6 V b) 1.0 V c) 1.2 V d) 2.0 V

125 The current in the primary circuit of a potentiometer is 0.2A. the specific resistance and cross-section of

3. the potentiometer wire are $4 \times 10^{-7}\Omega$m and $8 \times 10^{-7} m^2$ respectively. Potential gradient will be equal to

a) 0.2 V/m b) 1V/m c) 0.3V/m d) 0.1V/m

125 A colour coded carbon resistor has the colours orange, blue, green and silver. Its resistance value and

4. tolerance percentage respectively are

a) $36 \times 10^5\Omega$ and 10% b) $36 \times 10^4\Omega$ and 5% c) $63 \times 10^5\Omega$ and 10% d) $35 \times 10^6\Omega$ and 5%

125 Every atom makes one free electron in copper. If 1.1 A Current is flowing in the wire of copper having 1

5. mm diameter, then the drift velocity(approx.) will be (density of copper=9×10^3 kg m^{-3}and atomic weight of copper=63)

a) 0.1 mms^{-1} b) 0.2 mms^{-1} c) 0.3 mms^{-1} d) 0.2 mms^{-1}

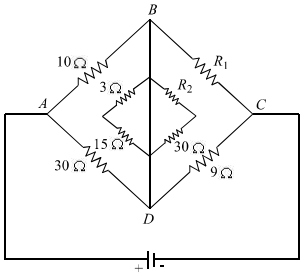
125 A battery of emf 10V and internal resistance 3 Ωis connected to an external resistor. The current in the

6. circuit is 0.5A. the terminal voltage of the battery when the circuit is close is

a) 10V b) Zero c) 1.5 V d) 8.5 V

125 In the Wheatstone bridge shown below, in order to balance the bridge, we must have

7.



a) $R_1 = 3\ \Omega\,;R_2 = 3\ \Omega$ b) $R_1 = 6\ \Omega\,;R_2 = 15\ \Omega$
c) $R_1 = 1.5\ \Omega\,;R_2 =$ any finite value d) $R_1 = 3\Omega\,;R_2 =$ any finite value

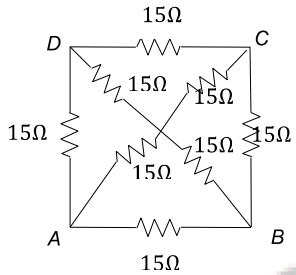
125 Kirchhoff's second law is based on the law of conservation of
8.

a) Charge b) Energy
c) Momentum d) Sum of mass and energy

125 A battery of $e.\,m.\,f.$ 10 V and internal resistance 0.5 ohm is connected across a variable resistance R. The
9. value of R for which the power delivered in it is maximum is given by

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

126 The equivalent resistance between the points A and B will be (each resistance is
0. 15 Ω)



a) 30 Ω b) 8 Ω c) 10 Ω d) 40 Ω

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

a) 160 Ω b) 80 Ω c) 40 Ω d) 20 Ω

126 A 3°C rise in temperature is observed in a conductor by passing certain current. When the current is
2. doubled, the rise in temperature will be

a) 15°C b) 12°C c) 9°C d) 3°C

126 Metals have
3.

a) Zero resistivity b) High resistivity c) Low resistivity d) Infinite resistivity

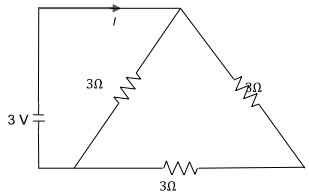
126 The kirchoff;s forst law ($\sum i = 0$)and second law ($\sum iR = \sum E$)where the symbols have their usual
4. meanings, are respectively based on

a) Conservation of charge, conversion of momentum
b) Conservation of energy, conservation of charge
c) Conservation of momentum, conservation of charge
d) Conservation of charge, conservation of energy

126 When 1 g hydrogen (ECE=1.044×106^{-8} kg C^{-1}) forms water, 34 kilo cal heat is liberated. The minimum
5. voltage required to decompose water is

a) 0.75 V b) 1.5 V c) 3.0 V d) 4.5 V

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



a) 1A b) 1.5A c) 2A d) $\frac{1}{3}A$

126 The resistivity of iron is $1 \times 10^{-7} ohm - m$. The resistance of a iron wire of particular length and thickness
7. 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}

126 A galvanometer has a resistance of 3663Ω. A shunt S is connected across it such that (1/34) of the total
8. current passes through the galvanometer. Then the value of shunt is
a) 3663Ω b) 111Ω c) 107.7Ω d) 3555.3Ω

126 A dry cell of emf 1.5 V and internal resistance 0.10Ω is connected across a resistor in series with a very low
9. resistance ammeter. When the circuit is switched on, the ammeter reading settles to a steady rate of 2A. Find (i) chemical energy consumption of the cell (ii) energy dissipation inside the cell (iii) energy dissipation inside the resistor (iv) power output of source is
a) (i) 3 W (ii) 0.4 W (iii) 2.6 W (iv) 2.6 W b) (i) 0.4 W (ii) 3 W (iii) 2.6 W (iv) 2.6 W
c) (i) 2.6 W (ii) 0.4 W (iii) 9 W (iv) 1 W d) None of the above

127 A galvanometer of resistance 100Ω is converted to a voltmeter of range 10 V by connecting a resistance of
0. $10k\Omega$. The resistance required to convert the same galvanometer to an ammeter of range 1 A is
a) 0.4Ω b) 0.3Ω c) 1.2Ω d) 0.1Ω

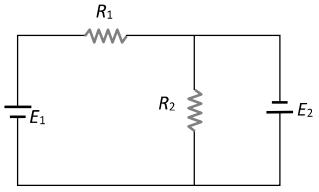
127 When a charged particle of charge e revolves in circular orbit of radius r with frequency n, then orbital
1. current will be
a) $\frac{ev}{\pi r^2}$ b) $\frac{ev}{4\pi r}$ c) $\frac{ev}{2\pi r}$ d) $\frac{ev}{4\pi r^2}$

127 If a 2 kW boiler is used everyday for 1 hour, then electrical energy consumed by boiler in thirty days is
2.
a) 15 unit b) 60 unit c) 120 unit d) 240 unit

127 A steady current i is flowing through a conductor of uniform cross-section. Any segment of the conductor
3. has
a) Zero charge b) Only positive charge
c) Only negative charge d) Charge proportional to current i

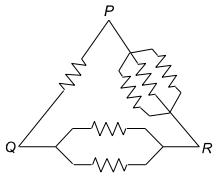
127 A coil takes 15 min to boil a certain amount of water; another coil takes 20 min for the same process. Time
4. taken to boil the same amount of water when both coils are connected in series
a) 5 min b) 8.6 min c) 35 min d) 30 min

127 Two resistance R_1 and R_2 are joined as shown in the figure to two batteries of e.m.f. E_1 and E_2. If E_2 is
5. short-circuited, the current through R_1 is



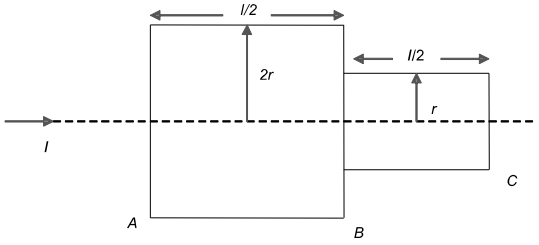
a) E_1/R_1 b) E_2/R_1 c) E_2/R_2 d) $E_1/(R_2 + R_1)$

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



a) P and Q b) Q and R c) P and R d) Any two points

127 Two bars of radius r and $2r$ are kept in contact as shown. An electric current I is passed through the bars.
7. Which one of following is correct?



a) Heat produced in bar BC is 4 times the heat produced in bar AB b) Electric field in both halves is equal

c) Current density across AB is double that of across BC d) Potential difference across AB is 4 times that of across BC

127 If two electric bulbs have 40 W and 60 W rating at 220 V, then the ratio of their resistances will be
8.

a) 9 :4 b) 4 :3 c) 3 :8 d) 3 :2

127 Forty electric bulbs are connected in series across a 220 V supply. After one bulb is fused, the remaining
9. 39 are connected again in series across the same supply. The illumination will be

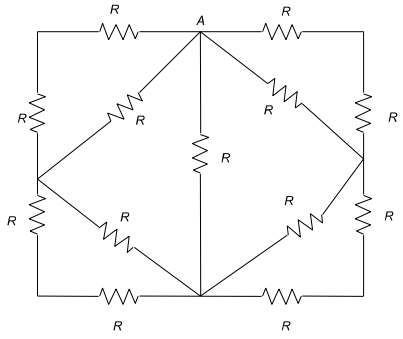
a) More with 40 bulbs than with 39 b) More with 39 bulbs than with 40

c) Equal in both the cases d) In the ratio of $49^2 : 39^2$

128 A heater draws a current of $2A$ when connected to a 250 V source. The rate of energy dissipation is
0.

a) 500 W b) 1000 W c) 250 W d) 125 W

128 Thirteen resistances each of resistance RΩ are connected in the circuit as shown in the figure. The effective
1. resistance between points A and B is



a) $\frac{4R}{3}\Omega$ b) 2RΩ c) RΩ d) $\frac{2}{3}R\Omega$

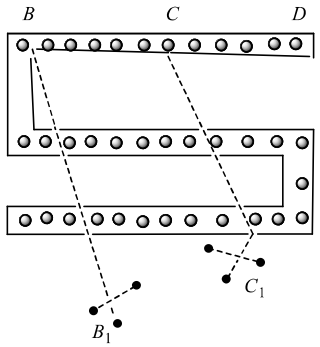
128 When a current I flows through a wire, the drift velocity of the electrons is v. When current $2I$ flows
2. through another wire of the same material having double the length and double the area of cross-section, the drift velocity of the electrons will be

a) $\frac{v}{8}$ b) $\frac{v}{4}$ c) $\frac{v}{2}$ d) v

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

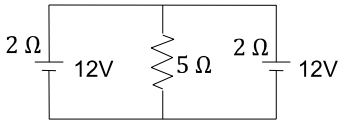
a) $\sqrt{1/\rho}$ b) $3/\sqrt{\rho}$ c) $\sqrt{3}/\rho$ d) $\rho/\sqrt{3}$

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



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

128 5. In the arrangement shown in figure, the current through 5Ω resistor is

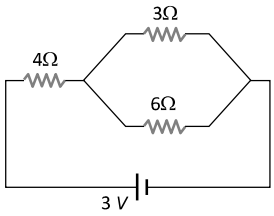


a) 2A b) Zero c) $\frac{12}{7}$ A d) 1A

128 6. A cell of e. m. f. E 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) $\frac{(V-E)R}{E}$

128 7. The potential drop across the 3Ω resistor is

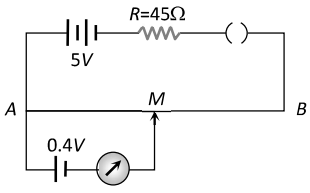


a) 1 V b) 1.5 V c) 2 V d) 3 V

128 8. An external resistance R is connected to a battery of e. m. f. V and internal resistance r. The joule heat produced in resistor R is maximum when R is equal to

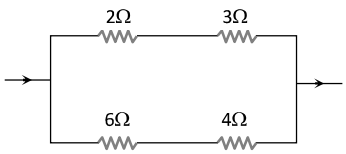
a) r b) $\frac{r}{2}$ c) $2r$ d) Infinitely large

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



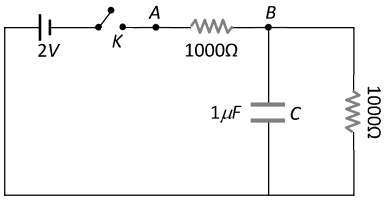
a) 0.4 m b) 4 m c) 0.8 m d) 8 m

129 0. In the circuit as shown in the figure, the heat produced by 6 ohm resistance due to current flowing in it is 60 $calorie$ per $second$. The heat generated across 3 ohm resistance per second will be



a) 30 *calorie* b) 60 *calorie* c) 100 *calorie* d) 120 *calorie*

129 1. 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



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

129 2. The mass of a substance liberated when a charge $'q'$ flows through an electrolyte is proportional to

a) q b) $1/q$ c) q^2 d) $1/q^2$

129 3. The temperature of cold, hot junction of a thermocouple is 0°C and T°C respectively. The thermo-emf produced is $E = AT - \frac{1}{2}BT^2$. If $A = 16, B = 0.080$, the temperature of inversion will be

a) 100°C b) 300°C c) 400°C d) 500°C

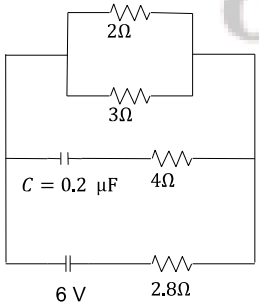
129 4. A Daniel cell is balanced on $125cm$ length of a potentiometer wire. Now the cell is short-circuited by a resistance 2 ohm and the balance is obtained at 100 cm. The internal resistance of the Daniel cell is

a) 0.5 ohm b) 1.5 ohm c) 1.25 ohm d) 4/5 ohm

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

a) 1.5Ω b) 10Ω c) 15Ω d) 1Ω

129 6. In the given figure the steady state current in the circuit is

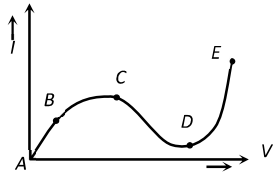


a) Zero b) 0.6A c) 0.9A d) 1.5A

129 7. What must be the efficiency of an electric kettle marked 500 W, 230 V, if it was found to bring 1 kg of water at 15°C to boiling point in 15 min? (Given specific heat capacity of water = 420 J/kg°C)

a) 79% b) 81% c) 72% d) 69%

129 8. From the graph between current I and voltage V shown below, identify the portion corresponding to negative resistance



a) AB b) BC c) CD d) DE

129 Current provided by a battery is maximum when
9.

a) Internal resistance equal to external resistance
b) Internal resistance is greater than external resistance
c) Internal resistance is less than external resistance
d) None of these

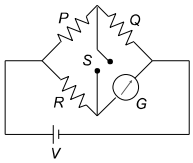
130 An electric wire is connected across a cell of e.m.f. E. The current I is measured by an ammeter of
0. resistance R. According to $ohm's$ law

a) $E = I^2R$ b) $E = IR$ c) $E = R/I$ d) $E = I/R$

130 A brass rectangular plate 12cm × 3cm is to be electroplated with copper. If we wish to coat it with a layer
1. of 0.02 mm thick both sides, how much time will it take with a constant current of 5A? Given ECE of copper is 33×10^{-5}g C^{-1} and density of copper is 8.9 g cm^{-3}.

a) 388 s b) 776 s c) 400 s d) 800 s

130 In the circuit shown as $P \neq R$ and the reading of the galvanometer G is same with switch open or closed.
2. Then



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

130 The internal resistance of a cell is the resistance of
3.

a) Electrodes of the cell b) Vessel of the cell
c) Electrolyte used in the cell d) Material used in the cell

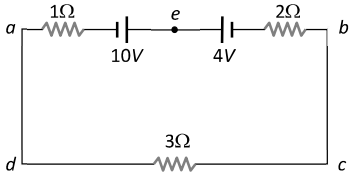
130 The amount of charge required to liberate 9 gm of aluminium (atomic weight =27 and valency = 3) in the
4. process of electrolysis is (Faraday's number =96500 $coulombs/gm$ equivalent)

a) 321660 $coulombs$ b) 69500 $coulombs$ c) 289500 $coulomb$ d) 96500 $coulomb$

130 In a potentiometer, the null points are received at 7th wire. If now we have to change the null points at 9th
5. wire, what should we do?

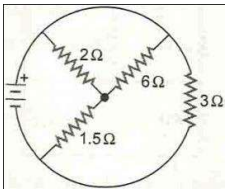
a) Attach resistance in series with battery b) Increase resistance in main circuit
c) Decrease resistant in main circuit d) Decrease applied emf

130 The magnitude and direction of the current in the circuit shown will be
6.



a) $7/3A$ from a to b through e b) $7/3A$ from b to a through e
c) $1A$ from b to a through e d) $1A$ from a to b through e

130 The total current supplied to the circuit by the battery as shown figure is
7.



a) 1A b) 6A c) 4A d) 2A

130 In cosmic rays 0.15 protons cm^{-2} sec^{-1} are entering the earth's atmosphere. If the radius of the earth is
8. 6400 km, the current received by the earth in the form of cosmic rays is nearly.

a) 0.12 A b) 1.2 A c) 12 A d) 120 A

130 An electric bulb is designed to draw power P_0 at voltage V_0. If the voltage is V it draws a power P. Then
9.

a) $P = \left(\frac{V_0}{V}\right)^2 P_0$ b) $P = \left(\frac{V}{V_0}\right)^2 P_0$ c) $P = \left(\frac{V}{V_0}\right) P_0$ d) $P = \left(\frac{V_0}{V}\right) P_0$

131 The temperature at which thermal electric power of a thermo couple becomes zero is called
0.

a) Inversion temperature b) Neutral temperature
c) Junction temperature d) Null temperature

131 A thermister is dipped in a bath whose temperature is to be measured. When the temperature increase the
1. current also increase, because of decreases in

a) Capacitance b) Reactance c) Resistance d) Resistivity

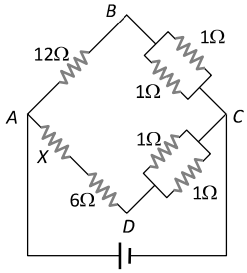
131 If the ratio of the concentration of electron to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of current
2. is $\frac{7}{4}$, then what is the ratio of their drift velocities

a) $\frac{4}{5}$ b) $\frac{5}{4}$ c) $\frac{4}{7}$ d) $\frac{5}{8}$

131 Two wires having resistance of 2Ω and 4Ω are connected to same voltage. Ratio of heat dissipated at
3. resistance is

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

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

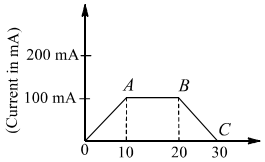


a) 4 Ω b) 6 Ω c) 2 Ω d) 5 Ω

131 If two identical heaters each rated as (1000 W-220 V) are connected in parallel to 220 V, then the total
5. power consumed is

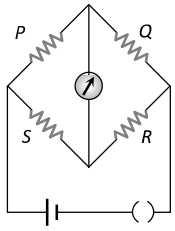
a) 200 W b) 2500 W c) 250 W d) 2000 W

131 In copper voltameter, mass deposited in 30 s is m gram. If the time current is as shown in figure, ECE of
6. copper is



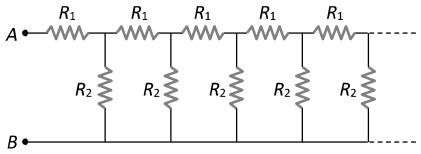
a) m b) $m/2$ c) $0.6\,m$ d) $0.1\,m$

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



a) 2 Ω b) 3 Ω c) 6 Ω d) 8 Ω

131 8. 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 $R_2 = 2\ ohm$

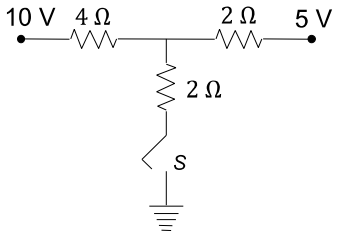


a) Infinity b) 1 Ω c) 2 Ω d) 1.5 Ω

131 9. 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

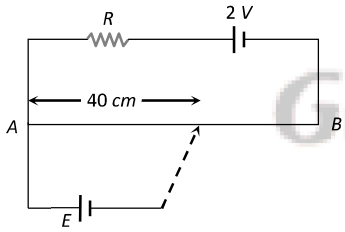
a) 5 V b) 14 V c) 15 V d) 16 V

132 0. As the switch S is closed in the circuit shown in figure, current passed through it is



a) Zero b) 1 A c) 2 A d) 1.6 A

132 1. AB is a potentiometer wire of length 100 cm and its resistance is 10 ohm. It is connected in series with a resistance $R = 40\ ohm$ and a battery of e.m.f. 2 V and negligible internal resistance. If a source of unknown e.m.f. E is balanced by 40 cm length of the potentiometer wire, the value of E is

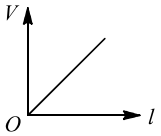


a) 0.8 V b) 1.6 V c) 0.08 V d) 0.16 V

132 2. The resistance of the filament of a lamp increases with the increase in temperature. A lamp rated 100 W and 200 V is connected across 220 V power supply. If the voltage drops by 10%, then the power of the lamp will be

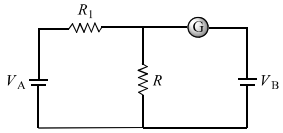
a) 90 W b) 81 W
c) Between 90 and 100 W d) Between 81 and 90 W

132 3. The $V - I$ graph for a wire of copper of length L and cross-section ares A is shown in adjoining figure. The slope of the graph will be



a) Less if the experiment is repeated at a higher temperature b) More if a wire of silver having the same dimension is used
c) Doubled if the length of the wire is doubled d) Halved if length of the wire is halved

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



a) $4V$ b) $2V$ c) $12V$ d) $6V$

132 5. When a current is passed in a conductor, 3°C rise in temperature is observed. If the strength of current is increased by two times, then rise in temperature will approximately be

a) 36°C b) 27°C c) 18°C d) 9°C

132 6. Time taken by a 836 W heater to heat one litre of water from 10°C to 40°C is

a) 50 s b) 100 s c) 150 s d) 200 s

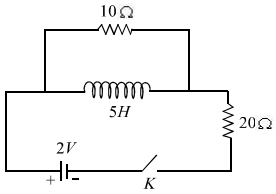
132 7. A storage battery has e.m.f. 15 $volt$ and internal resistance 0.05 ohm. Its terminal voltage when it is delivering 10 $ampere$ is

a) 30 $volt$ b) 1.00 $volt$ c) 14.5 $volt$ d) 15.5 $volt$

132 8. If 10 A deposits 10.8 g of silver in 25 min, how much copper would deposit when 9 A current flows for 20 min.?

a) 3.81 g b) 6.35 g c) 10.1 g d) 12.7 g

132 9. Two resistance of 10 Ω and 20 Ω and an inductor of inductance 5 H are connected to a battery of 2 V through a key k as shown in the figure. At time $t = 0$, when the key k is closed the initial current through the battery is



a) 0.2 A b) $\frac{2}{15}A$ c) $\frac{1}{15}A$ d) 0