Ravi home tutions
12th Standard
## Physics

Total Marks: 875

Q1.What is the current drawn out from the battery?

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

Q2.The temperature coefficient of resistance of a wire is 0.00125 per °C. At 20°C, its resistance is 1 Ω. The resistance of the wire will be 2 Ω at _____.

(a) 800 °C (b) 700 °C (c) 850 °C (d) 820 °C

Q3.The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is _____.

(a) 0.2 Ω (b) 0.5 Ω (c) 0.8 Ω (d) 1.0 Ω

Q4.A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of _____.

(a) each of them increases (b) each of them decreases

(c) copper increases and germanium decreases

(d) copper decreases and germanium increases

Q5.In Joule's heating law, when R and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is _____.

(a) straight line (b) parabola (c) circle (d) ellipse

Q6.The colour code on a carbon resistor is red - red - black. The resistance of the resistor is _____.

(a) 2.2Ω (b) 22Ω (c) 220 2.2Ω (d) $2.2k\Omega$

Q7.The electrical resistivity of a thin copper wire and a thick copper wire are respectively $P_1\Omega$ m and $P_2\Omega$ m Then_____.

(a) $P_1 > P_2$ (b) $P_2 > P_1$ (c) $P_1 = P_2$ (d) $\dfrac{P_1}{P_2}$

Q8.When 'n' resistors of equal resistance (R) are connected in series and in parallel respectively, then the ratio of their effective resistance is

_____

(a) 1: n^2 (b) n^2: 1   (c) n: 1   (d) 1: n

Q9. Which of the following has negative temperature coefficient of resistance?

(a) copper   (b) tungsten   (c) carbon   (d) silver

Q10. The temperature co-efficient of resistance for alloys is _____.

(a) low   (b) very low   (c) high   (d) very high

Q11. Which of the following material has the highest specific resistance?

(a) rubber   (b) silver   (c) germanium   (d) glass

Q12. Temperature co-effieient of resistance for metals is _____.

(a) constant   (b) positive   (c) zero   (d) negative

Q13. An electron gun in a TV shoots out a beam of electrons. The beam current is 10μA. The charge that strikes the screen in 1 minute is

_____.

(a) $+600\mu C$ (b) $-600\mu C$ (c) $+10\mu C$ (d) $-10\mu C$
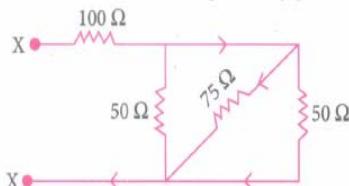
Q14. If the specific resistance of a potentiometer wire is 10^{-7} Om and current flowing through it is 0.1 amp, cross-sectional area of wire is 10^{-6} m^2, then potential gradient will be _____.

(a) 10^{-2} v/m   (b) 10^{-4} v/m   (c) 10^{-6} v/m   (d) 10^{-8}v/m

Q15. A metallic block has no potential difference applied across it, then the mean velocity of free electrons is _____.

(a) proportional to T   (b) proportional for $\sqrt{T}$

(c) finite but independent of temperature   (d) zero

Q16. In an electrical arrangement as shown the equivalent resistance between X and Y will be

(a) 158.75Ω (b) 118.75Ω (c) 218.75Ω (d) 318.75Ω
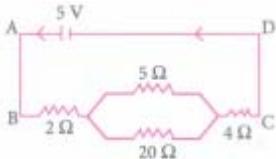
Q17. The emf of a battery is 3 volts and internal resistance 0.125 Ω . The difference of potential at the terminal of battery when connected across an external resistance of 1 Ω is _____.

(a) 1.67 V   (b) 0.67 V   (c) 2.67 V   (d) 3.67 V

Q18. A square aluminum rod is 1 m long and 5 mm on edge. What must be the radius of another aluminum rod whose length is 1 m and which has the same resistance as that of square Aluminum rod?

(a) 1.4 mm   (b) 2.8 mm   (c) 4.2 mm   (d) 5.6 mm

Q19. Four resistances are connected to a 5V battery of negligible internal resistance as shown what is the potential across 2Ω?

(a) 0.5 V   (b) 1:5 V   (c) 1.0 V   (d) 1.0 V

Q20. An unknown resistance is connected in parallel with a 15Ω resistance and a 12V battery. What is the value of the unknown resistance if the current in the circuit is 2A?

(a) 10Ω (b) 20Ω (c) 30Ω (d) 40Ω
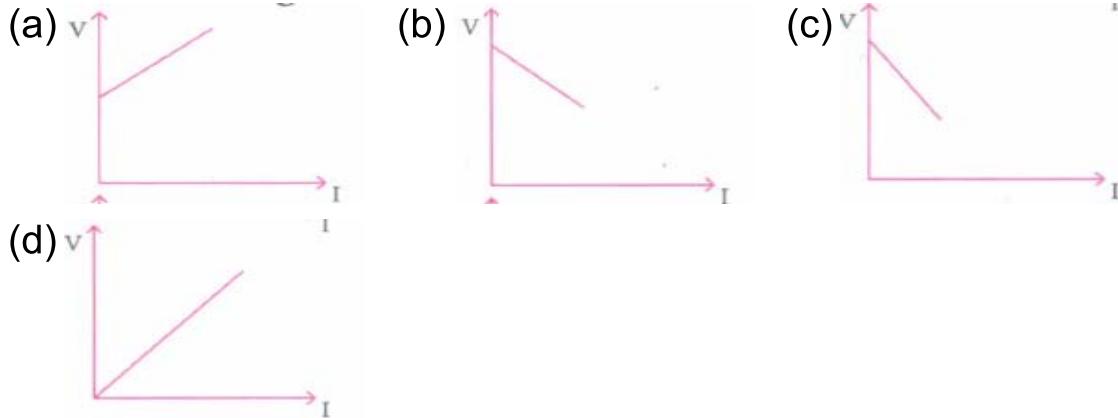
Q21. Five 3 resistances are arranged in a polygon (5 sides). What is the resistance between any two corners?

(a) 2.4Ω (b) 3Ω (c) 9Ω (d) 5Ω

Q22. How many 160 Ω resistor in parallel are required to carry a current of 5 A on a 100 V line?

(a) 2   (b) 4   (c) 6   (d) 8

Q23. The potential difference across the terminals of a cell varies with the current drown from the cell according to the graph.

Q24. In an experiment with potentiometer when the galvanometer deflection is zero, then no current flows in

(a) the wire of potentiometer   (b) the primary circuit
(c) the galvanometer circuit   (d) accumulator cell

Q25. Kirchoff's I law i.e, $\Sigma i = 0$ at a junction, deals with the conservation of _____.
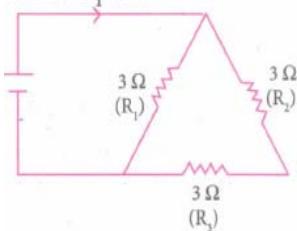
(a) charge   (b) energy   (c) momentum   (d) angular momentum

Q26. The potential gradient of the potentiometer wire depends on _____.

(a) only on the current that flows

(b) only on the resistance per unit length of the wire

(c) both the above mentioned   (d) none of the above

Q27. The current in the given circuit is _____.

(a) $\frac{1}{8}A$ (b) $\frac{2}{9}A$ (c) $\frac{2}{9}A$ (d) $1A$

Q28. A potential difference is applied an the ends of a metallic wire. If the potential difference is doubled, the drift velocity _____.

(a) will be doubled   (b) will be halved   (c) will be quadrupled

(d) will remain unchanged

Q29. Resistance between the points A and B in the given figure is

(a) 9Ω (b) 2Ω (c) 3Ω (d) 6Ω

Q30. Resistance increases with increases in temperature for _____.

(a) conductor   (b) semiconductors   (c) insulators   (d) superconductor

Q31. Which of the following is an identical?

(a) germanium, silicon   (b) silver, wood   (c) aluminum, constantan

(d) bakelite, iron

Q32. A bird sitting on an insulated wire carrying a current feels quite safe because _____.

(a) the bird is a non-conductor of electricity

(b) resistance of the bird is very large

(c) there is a large potential difference between bird and wire

(d) there is no potential difference between bird and wire

Q33. Conductor which obey ohm's law are called _____.

(a) dielectrics   (b) superconductors   (c) ohmic conductors

(d) semiconductors

Q34. The conductivity is the reciprocal of _____.

(a) resistance   (b) specific resistance   (c) conductance

(d) potential difference

Q35. Electrical resistance is given by _____.

(a) $R = \frac{Al}{\sigma}$ (b) $R = \frac{l}{\sigma A}$ (c) $R = \frac{\sigma A}{l}$ (d) $R = \frac{\sigma}{Al}$
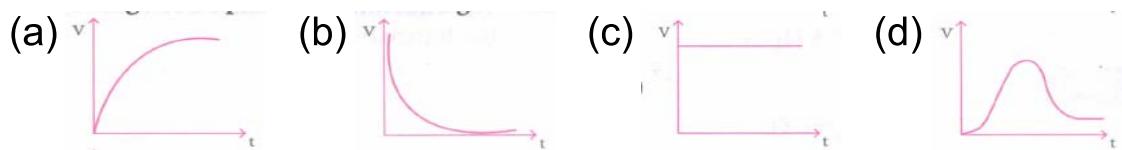
Q36. Peltier effect is the converse of _____.
   (a) Joule effect   (b) Raman effect   (c) Thomson effect
   (d) Seebeck effect
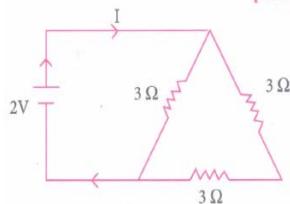
Q37. Nichrome wire is used as the heating element because it has _____.
   (a) low specific resistance   (b) low melting point
   (c) high specific resistance   (d) high specific resistance

Q38. An ideal cell is connected to a capacitor through a voltmeter. The reading V of the voltmeter is plotted against time. Which of the following best represents the resulting curve?
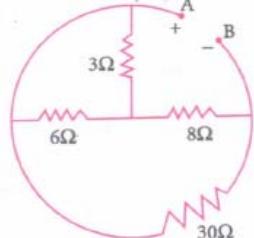

Q39. The value of current I in the network as shown is

   (a) $\frac{1}{9}A$ (b) $\frac{2}{9}A$ (c) $\frac{3}{9}A$ (d) 1A

Q40. The equivalent resistance between A and B in the figure is

   (a) 15Ω   (b) 7.5Ω   (c) 25Ω   (d) 30Ω

Q41. The heating element that does not oxidize readily is an alloy of metals made of _____.
   (a) Nickel and Iron   (b) Nickel and Chromium   (c) copper and Manganin
   (d) Nickel and Copper

Q42. Which of the following is not related to joule's law of heating?
   (a) $H = VIt$ (b) $H = I^2 Rt$ (c) $H = \frac{V^2 t}{R}$ (d) $H = \frac{I^2 R}{t}$

Q43. Fuse wire is an alloy of
   (a) 37 % lead and 63 % tin   (b) 63 % lead and 37 % tin

(c) 37 % copper and 63 % tin   (d) 63 % copper and 37 % tin

Q44. In an electric circuit fuse wire is connected in _____.
(a) parallel   (b) star connection   (c) delta connection   (d) series

Q45. Joules's heating effect is desirable in _____.
(a) AC dynamo   (b) DC dynamo   (c) water heater   (d) transformer

Q46. The sensitivity of a potentiometer can be increased by
_____.
(a) decreasing the length of potentiometer wire
(b) increasing the length of potentiometer wire
(c) increasing the emf of the cell used in primary circuit   (d) all the above

Q47. Two identical resistors are connected in parallel then connected in
series. The effective resistance are in the ratio _____.
(a) 1:2   (b) 2:1   (c) 1:4   (d) 4:1

Q48. The resistance of the wire varies inversely as _____.
(a) area of cross section   (b) resistivity   (c) length   (d) temperature

Q49. The ratio of voltage and current in a dosed circuit is _____.
(a) decreases   (b) increases   (c) remains constant   (d) varies

Q50. The curve representing Ohm's law is a _____.
(a) linear   (b) parabola   (c) hyperbola   (d) none of the above

Q51. By increasing the temperature, the specific resistance of a conductor
and a semiconductor _____.
(a) increases for both   (b) increases, decreases respectively
(c) decreases for both   (d) decreases, increases respectively

Q52. 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) semi conducting materials with low temperature coefficient of
resistivity

Q53. The resistivity of a wire depends on _____.
(a) length   (b) material   (c) area of cross section   (d) all the above

Q54. For which of the following substances, resistance decreases with
temperature?
(a) copper   (b) platinum   (c) mercury   (d) carbon

Q55. Which material is having a small value of temperature coefficient of resistance?

(a) copper   (b) constantan or manganin   (c) nichrome   (d) both b & c

Q56. If the potential difference V applied across a conductor increased to 2V, the drift velocity of the electron be _____.

(a) doubled   (b) halved   (c) tripled   (d) no change

Q57. Which energy is used to liberate the outer electron from the individual atoms?

(a) Thermostatic external energy   (b) Thermodynamic internal energy

(c) Thermodynamic external energy   (d) Thermostatic internal energy

Q58. When the free electrons are moving in all possible directions, the value of the current produced is_____

(a) IA   (b) 2A   (c) 0 A   (d) 1.2A

Q59. The unit of electromotive force is_____

(a) joule   (b) newton   (c) coulomb   (d) volt

Q60. Generally the instantaneous current is represented by_____

(a) i   (b) I   (c) dI   (d) di

Q61. The direction of conventional current is taken as the direction of flow of

(a) positive charges   (b) same direction of flow of electron

(c) opposite to positive charges   (d) all of these

Q62. Current is a _____quantity.

(a) vector   (b) scalar   (c) physical   (d) not measurable

Q63. The drift velocity is equal to mobility when_____

(a) the electric field is parallel to the motion of electrons

(b) the electric field is unity   (c) the absence of electric field

(d) either (a) or (b)

Q64. Calculate the mobility of a free electron in an electric field of 10^{+2}N/C.

(a) $10^{-4} m^2 V^{-1} s^{-1}$ (b) $10^{-5} m^2 V^{-1} s^{-1}$ (c) $10^{-3} m^2 V^{-1} s^{-1}$ (d) $10^5 m^2 V^{-1} s^{-1}$

Q65. A resistance of a metal wire of length AB is 2Ω. Another wire of length PQ of the same metal with twice the diameter of the wire AB is found to have the same resistance of 2Ω. What is the length of PQ?

(a) 4 AB   (b) 2 AB   (c) 1AB   (d) 6 AB

Q66. The resistance of mercury is "0" when its temperature is reduced to_____

(a) 4.2°C   (b) 2.4°K   (c) 4.2 K   (d) -268.8 K

Q67. When three resistors are connected in series then the value of the effective resistance is _____.

(a) less than the individual resistance

(b) greater than the individual resistance

(c) greater than or equal to individual resistance

(d) less than or equal to individual resistance

Q68. These are behaving like thermistor _____.

(a) Insulators and conductors   (b) Semiconductors and conductors

(c) Conductors and alloys   (d) Insulators and semiconductors

Q69. Copper Wire metals and burns out when the current increases above_____

(a) 5 A   (b) 10 A   (c) 25 A   (d) 25 A

Q70. Carbon are furnaces produce temperature upto_____

(a) 1500°C   (b) 2000° C   (c) 2500°C   (d) 3000°C

Q71. Melting point of a tungsten filament inside a glass bulb is_____

(a) 3360° C   (b) 3340°C   (c) 3380°C   (d) 3370°C

Q72. Thermo electric generators are used in power plants to convert_____ into electricity.

(a) light energy   (b) waste heat   (c) sound energy   (d) hydro energy

Q73. The heat developed in half a minute resistor of resistance 5Ω is 15,000 joule. The current through the resistor is_____

(a) 5 A   (b) 100 A   (c) 40A   (d) 10A

Q74. 2A and 3A currents are passed through the heating element of an electrical iron box. The ratio of quantity of heat evolved is_____

(a) 2:3   (b) 3:2   (c) 4:9   (d) 9:4

Q75. 5A of current flowing through a resistor for 2 minute produces 3000 j of heat. The value of the resistance is _____.

(a) 1Ω (b) 2Ω (c) 4Ω (d) 5Ω

Q76. In a potentiometer, a cell of emf 1.5 V balances at a length of 270 cm. If another cell balances at 360 cm for the same current its emf will be _____.

(a) 1 V   (b) 2 V   (c) 3 V   (d) 0.75 V

Q77. When a current of 5 A flows through a conductor of resistance 3 Ω the loss of power due to joule heating effect is_____

    (a) 75 W (b) 25 W (c) 70.7 W (d) 45 W

Q78. The potentiometer wire is made of_____

    (a) Manganin (b) Copper (c) Aluminium (d) Nichrome

Q79. Kirchoff's II law isa consequence of conservation of_____

    (a) charges (b) momentum (c) energy (d) power

Q80. The tolerance of sliver ring in resistors is_____

    (a) 5% (b) 10% (c) 20 % (d) 2 %

Q81. Relation between current density and drift velocity is_____

    (a) en V_d (b) nAeV$_d$ (c) $\frac{n}{eV_d}$ (d) $\frac{V_d}{ne}$

Q82. The average time between two successive collision of an electron is 3.64 x 10^{-8} s. Its mobility is _____.

    (a) 6.4 x 10^3 m^2 V^{-l} S^{-l} (b) 640 m^2 m V S^{-1} (c) 6.4 x 10^3 m V^{-1}S^{-1}

    (d) 6.4 x 10^3 m^2 V S^{-1}

Q83. A metal wire of current density is 3.2 x 10^7 Am^{-2} has 10^{28} electron/m^3. The average drift velocity is_____

    (a) 0.02 m.s $^{-1}$ (b) 200 m s^{-1} (c) 1.6 x 10^{-2} m s^{-1} (d) 3 x 10^{-2} m s $^{-1}$

Q84. How many electrons constitute current of one ampere?

    (a) 6.35 x 10^{-19} (b) 6.28 x 10^{18} (c) 6.28 x 10^{20} (d) 6.25 x 10^{18}

Q85. The motion of electric charges is called_____

    (a) static electricity (b) dynamic electricity (c) charge electricity

    (d) current electricity

Q86. The mobility of an electron is one million times less than that of its specific charge, the mean time taken between two successive collisions is_____

    (a) 1ms (b) $1\mu s$ (c) 1nano sec (d) 1giga sec

Q87. A potential of 1 kV is applied between the ends of conductor of length 20 cm. The drift velocity of electron in this field is 3.52 x 10^6 m/s. The relaxation time for the free electrons is

    (a) 2 nano sec (b) 4 nano sec. (c) 6 nano sec (d) 8 nano sec.

Q88. The unit of current density is_____

    (a) Am^{-2} (b) Am^2 (c) A^{2}m-^{2} (d) A^{-2}m^{-2}

Q89. The current is directly proportional to_____

(a) mobility   (b) number of electrons   (c) electric field   (d) all the above

Q90. The reciprocal of the resistance is_____
   (a) conductance   (b) conductivity   (c) resistivity   (d) specific resistance

Q91. Resistance of a metal wire of length 10 cm is 2. If the wire is stretched uniformly to 50 cm the resistance is_____
   (a) 25Ω (b) 10Ω (c) 5Ω (d) 50Ω

Q92. When the diameter of a conductor is doubled its resistance_____
   (a) decreases twice   (b) decreases four times
   (c) decreases sixteen times   (d) increases four times

Q93. The unit of conductivity is_____
   (a) mho   (b) ohm   (c) ohm-rn   (d) mho-m-l

Q94. The reciprocal of conductivity is_____
   (a) specific conductance   (b) specific resistance   (c) resistance
   (d) conductance

Q95. The specific resistance for the insulators is in the range of_____
   (a) $10^{-6}10^{-8}\Omega m$ (b) $10^8 - 10^{14}\Omega m$ (c) $10^{-8} - 10^{-14}\Omega m$ (d) $10^{-8} - 10^{14}\Omega m$

Q96. The specific resistance of silver is_____
   (a) $1.7 \times 10^{-8}\Omega m$ (b) $1.8 \times 10^{-7}\Omega m$ (c) $1.6 \times 10^8\Omega m$ (d) $16 \times 10^{-9}\Omega m$

Q97. The specific resistance of silicon is_____
   (a) 0.46   (b) 10×10^{-8} (c) 3200   (d) 2300

Q98. Germanium and silicon are the examples of_____
   (a) insulators   (b) conductors   (c) semi insulators   (d) semiconductors

Q99. The electrical resistivity drops to zero for_____
   (a) conductors   (b) insulators   (c) super conductors   (d) semiconductors

Q100. The transition temperature of mercury is_____
   (a) 4.2°C   (b) 4.2 K   (c) 2.4°C   (d) 2.4K

Q101. The phenomenon of superconductivity was first observed by_____
   (a) George Simon Ohm   (b) Volta   (c) Faraday Onnes
   (d) Kammerlingh Onnes

Q102. The temperature at which normal conductor is converted into super conductor is_____

(a) neutral temperature   (b) transition temperature
(c) critical temperature   (d) both (b) and (c)

Q103.The first theoretical explanation superconductivity was given by_____
(a) BSC theory   (b) BCS theory   (c) SBC theory   (d) None

Q104.For super conductors, the magnetic flux lines are_____
(a) included   (b) excluded   (c) 0   (d) maximum

Q105.Super conductors can be used as storage elements in_____
(a) TV   (b) camera   (c) computers   (d) computers

Q106.In a carbon resistor, the third ring represents_____
(a) powers of zeros   (b) powers of ten   (c) ten   (d) infinity

Q107.If there is no coloured ring in the right hand side of the carbon resistor, then the resistor has_____
(a) 18% tolerance   (b) 20% tolerance   (c) 22% tolerance
(d) 24% tolerance

Q108.The tolerance of the resistors are represented by_____
(a) Silver - 10%, Gold - 5%, Red - 2%, Brown - 1%
(b) Silver - 1%, Gold - 2%, Red - 5%, Brown - 10%
(c) Silver - 1%, Gold - 10%, Red - 5%, Brown - 2%   (d) Both (a) and (c)

Q109.The brown ring at one end of a carbon resistor indicates a tolerance of_____
(a) $\pm$ 1%   (b) $\pm$ 2%   (c) $\pm$ 5%   (d) $\pm$ 10%

Q110.When three resistors are connected in parallel then the value of the effective resistance is_____
(a) less than or equal to individual resistance
(b) greater than or equal to individual resistance
(c) less than the individual resistance
(d) greater than the individual resistance

Q111.The temperature coefficient of resistance is positive_____.
(a) for metals   (b) for insulators   (c) (a) and (b)   (d) all the above

Q112.The temperature coefficient of resistance is negative for_____
(a) for metals   (b) ebonite   (c) (a) and (b)   (d) none

Q113.The temperature coefficient of resistance increases for the metals when_____

(a) the temperature increases   (b) the temperature decreases

(c) does not depend upon the temperature   (d) either (a) or (b)

Q114. The unit of temperature coefficient of resistance is_____.

(a) $°C$ (b) $°C^{-1}$ (c) $-C^{-2}$ (d) $°C^2$

Q115. A cell of emf 2.2V sends a current of 0.2A through a resistance of 10 n. The internal resistance of the cell is_____

(a) 0.1Ω (b) 1Ω (c) 2Ω (d) 1.33Ω

Q116. Ohm's law is applicable only for_____

(a) complicated circuits   (b) primary circuits   (c) simple circuits

(d) secondary circuits

Q117. The algebraic sum of the currents meeting at any junction in the circuit is_____

(a) infinity   (b) negative value   (c) 2A   (d) zero

Q118. Kirchhoff's law is applicable only for_____

(a) simple circuits   (b) primary circuits   (c) complicated circuits

(d) secondary circuits

Q119. Kirchhoff's I law is named as_____

(a) ohm's law   (b) voltage law   (c) resistance law   (d) current law

Q120. Kirchhoff's II law is named as_____

(a) voltage law   (b) resistance in series   (c) resistance in parallel

(d) current law

Q121. Kirchhoff's I law is a consequence of_____

(a) law of conservation of energy   (b) law of conservation of charges

(c) law of conservation of currents   (d) law of conservation of voltages

Q122. In Kirchhoff's II law the current in clockwise direction is taken as_____

(a) positive   (b) negative   (c) neutral   (d) no direction

Q123. In the case of Wheatstone's Bridge the bridge balance condition will be obtained only when_____

(a) the current through the galvanometer is maximum

(b) the current through the galvanometer is minimum

(c) the current through the galvanometer is zero

(d) the current through the galvanometer is infinity

Q124.In the case of meter bridge manganin wire is used because it has_____

    (a) low temperature coefficient of resistance

    (b) high temperature coefficient of resistance

    (c) temperature coefficient of resistance is zero

    (d) temperature coefficient of resistance is maximum

Q125.The small error in Meter Bridge experiment due to end resistance will be eliminated by_____

    (a) by interchanging the resistances

    (b) by interchanging the galvanometer and jockey

    (c) by interchanging the battery and the jockey

    (d) without changing the resistances

Q126.Potentiometer is an instrument used for the measurement of_____

    (a) current   (b) resistance   (c) capacitance   (d) potential difference

Q127.The temperature Coetti unit of tungsten is_____$(oC)^{-1}$

    (a) 3.9×10^{-3} (b) 4.9×10^{-3} (c) 5.0×10^{-3} (d) 4×10^{-3}

Q128.If charge of 60 C passes through a bulb for 4 minutes then the current flows through it is _____.

    (a) 1 A   (b) 0.5 A   (c) 0.25 A   (d) 0.75 A

Q129.Two wires of equal lengths equal diameters having resistivities p_1, and p_2, are connected in series. The effective resistivity of the combination is _____.

    (a) $p_1 - p_2$ (b) $p_1 + p_2$ (c) $\sqrt{\rho_1 \rho_2}$ (d) $\frac{1}{2}(\rho_1 + \rho_2)$

Q130.Which of the following statements are correct in the form of a wire the resistively of conductor
(i) depends on material
(ii) depends on length
(iii) depends on temperature
(iv) depends on diameter

    (a) i & ii   (b) ii & iii   (c) i & iii   (d) i & iv

Q131.The equivalent resistance in series combination is _____.

    (a) Larger than the smallest resistance

    (b) Larger than the largest resistance

    (c) Smaller than the largest resistance

    (d) Smaller than the smallest resistance
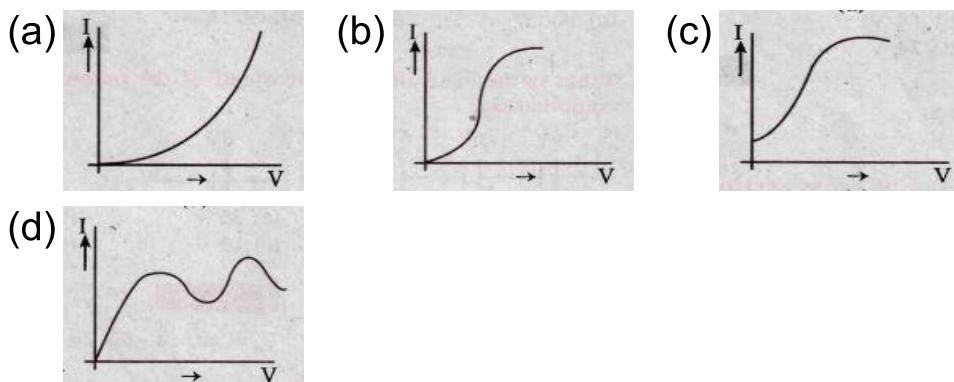
Q132.If n cells of each of emf $\boldsymbol{\xi}$ are connected in parallel, then the effective emf of the combination is _____.

(a) $n\varepsilon$ (b) $n^2\varepsilon$ (c) $\frac{\varepsilon}{n}$ (d) None of the above

Q133.The terminal voltage of battery is _____.
   (a) always less than its emf (b) always greater than its emf
   (c) always equal to its emf
   (d) always greater than its emf depending on the direction of current through the battery

Q134.Which one of the following I - V graph for diode value?

(a)

(b)

(c)

(d)

Q135.If the length of conductor is haled, then its conductivity would be _____.
   (a) quadrupled (b) haled (c) double (d) unchanged

Q136.For the fuse wire which of the following characteristic is in material?
   (a) Radius (b) Resistivity (c) length (d) none of these

Q137.If the resistance of a coil is 3 ohm at 20 °C and α = 0.004/ °C then its resistance at 100 °C is _____.
   (a) 1.98Ω (b) 3.96Ω (c) 7.92Ω (d) 39.6Ω
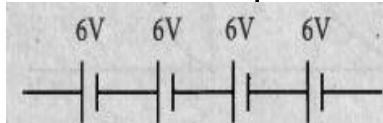
Q138.A semiconductor with a negative coefficient of resistance is called _____.
   (a) thyristor (b) insulator (c) dielectric (d) thermistor

Q139.The resistance of the dry skin of a human body is around _____.
   (a) 1000Ω (b) 100Ω (c) 500Ω (d) 50Ω

Q140.What is the equivalent emf of the following combination?

   (a) 36 V (b) 18 V (c) 12 V (d) 24 V

Q141.If the length and area of cross-section of a conductor is doubled then its resistance will be _____.
   (a) doubled (b) quadrupled (c) unchanged (d) halved

Q142. Which one of the following does not possess negative temperature coefficient of resistance?

(a) Gutta Parcha   (b) Rubber   (c) Nichrome   (d) Papper

Q143. Two wires have the some length. But, area of cross-section of one is 9 times that of the other. If the resistance of thinner wire 300Ω, then resistance of the thicker wire is _____.

(a) 66.6Ω (b) $33.3\ \Omega$ (c) 100Ω (d) 600Ω

Q144. The Wheatstone bridge is more accurate than the other instruments since it _____.

(a) is based on Kirchoff's rules.   (b) is a null method   (c) it four resistors

(d) is not based on Ohm's law
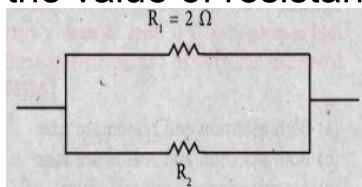
Q145. The conductors that do not follow ohm's law are called _____.

(a) super conductors   (b) ohmic conductors   (c) non-ohmic conductors

(d) none of the above

Q146. When three conductors having conductance about p_1, p_2, and p_3 are connected in series their equivalent conductance is _____.
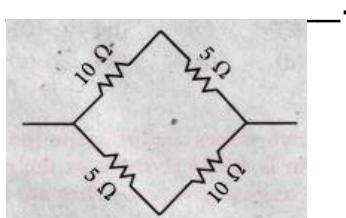
(a) $p_1 + p_2 + p_3$ (b) $\frac{\rho_1\rho_2\rho_3}{\rho_1+\rho_2+\rho_3}$ (c) $\frac{\rho_1\rho_2+\rho_3\rho_1+\rho_2\rho_3}{\rho_1\rho_2\rho_5}$ (d) $\frac{\rho_1\rho_2\rho_3}{\rho_1\rho_2+\rho_2\rho_3+\rho_3\rho_1}$

Q147. The equivalent resistance of the following combination is $\frac{6}{5}$ ohm then the value of resistance R_2 is _____.

(a) 3Ω (b) 6Ω (c) $\frac{5}{6}\Omega$ (d) 1.5Ω

Q148. The effective resistance of the following combination is ___.

(a) $2/15\Omega$ (b) 3.75Ω (c) 15Ω (d) 7.5Ω

Q149. When n resistor of equal resistors are connected in series, the effective resistance is _____.

(a) $\frac{R}{n}$ (b) nR   (c) $\frac{1}{nR}$ (d) $\frac{n}{R}$

Q150. The unit of mobility of free electron is _____.

(a) $Vm^{-1} s^{-2}$ (b) $m^2 Vs^{-1}$ (c) $m^2 V^{-1}s^{-1}$ (d) $m^2 V^{-1}s$

Q151. If the temperature of a wire increase, then its resistance will be
_____.
   (a) decreased (b) increased (c) constant
   (d) neither increased nor decreased

Q152. Which of the following has maximum electrical resistivity?
   (a) Copper (b) Aluminium (c) Iron (d) Silver

Q153. If the length of the conductor is doubted and its area, is reduced to half of its value, then its resistance would be _____.
   (a) increased by two times (b) increased by four times
   (c) decreased by four times (d) decreased by two times

Q154. Which colour of the ring indicates 10% tolerance of a resistor?
   (a) silver (b) grey (c) gold (d) None of these

Q155. If a cell of emf of 2 V sends a current of 0.5A though a resistor of 3 ohms then the internal resistance of the cell is _____.
   (a) 4Ω (b) 3Ω (c) 2Ω (d) 1Ω

Q156. In superconductors _____.
   (a) resistance is zero (b) current is large (c) no thermal loss
   (d) All the above

Q157. If the colour code of a resistor is red-red-black then its resistance would be _____.
   (a) 44Ω (b) 11Ω (c) 22Ω (d) 66Ω

Q158. If the resistance of a coil is 2Ω at 0°C and $\alpha = 0.004/°C$ then its resistance at 100°C is _____.
   (a) 1.4Ω (b) 5.6Ω (c) 2.8Ω (d) 4Ω

Q159. The temperature about which the resistance of mercury becomes zero is?
   (a) 0°C (b) -4.2 K (c) 0 K (d) 4.2 K

Q160. Charging current for a capacitor is 0.2 A, find the displacement current.
   (a) zero (b) 0.2 A (c) 0.4 A (d) 0.1 A

Q161. An electric bulb is marked as 100 W - 220 V. Then its resistance is
_____.
   (a) 282Ω (b) 968Ω (c) 484Ω (d) $0\,\Omega$

Q162. Match the following:

Column I	Column II
(a) Current	(i) Volt
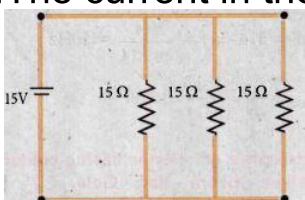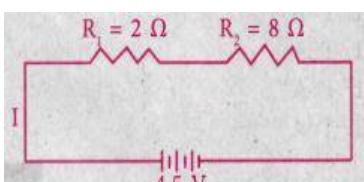
Q163. If two wires are of same length one of them is twice as thick as the other. Then the resistance of two wires are in the ratio _____.

(a) 1 : 2 (b) 1 : 4 (c) 1 : 8 (d) 1 : 16

Q164. The current in the circuit is:

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

Q165.
  In the above mentioned circuit the value of current I and voltage across $8\Omega\ (R_2)$ resistance is _____.

(a) 0.45 A, 18 V (b) 0.45 A, 36 V (c) 0.9 A, 72 V (d) 0.225 A, 9 V

Q166. A cell of an EMF and internal resistance r is connected in series with an external resistance nr. The ratio of the terminal potential difference will be ____.

(a) $\frac{1}{n+1}$ (b) $\frac{1}{n}$ (c) $\frac{n+1}{n}$ (d) $\frac{n}{n+1}$
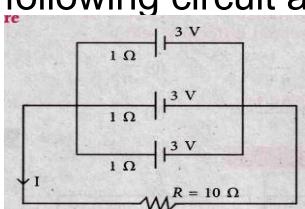
Q167. An electric source will supply a constant current into the load resistor if its internal resistance would be _____.

(a) nonzero (b) infinite (c) zero (d) equal to load resistance

Q168. Resistance of a metal wire of length 10 cm is 2Ω. If the wire is stretched uniformly to 50 cm the resistance is_____.

(a) 10Ω (b) 50Ω (c) 5Ω (d) 25Ω

Q169. The equivalent emf ε_{cq} and the equivalent internal resistance of the following circuit are _____.

(a) 9 V and 3Ω   (b) 3 V and 0.33Ω   (c) 6 V and 0.3Ω   (d) 1 V and 3Ω

Q170.According to Joule's law of heating, heat is given by
_____.
(a) H = VIt   (b) H = I² Rt   (c) both a & b   (d) None of the above

Q171.RMS voltage and frequency of v = 230 sin (314 t) A.C. source.
(a) 162.6V, 50Hz   (b) 230V, 50Hz   (c) 230V, 60Hz   (d) 162.6V, 25Hz

Q172.Resistance of resistor having colour code Yellow - Green - Red - Gold.
(a) $(4700 \pm 5\%)\Omega$ (b) $(4500 \pm 5\%)\Omega$ (c) $(4700 \pm 10\%)\Omega$ (d) $(4500 \pm 10\%)\Omega$

Q173.Dimension of Resistance is _____.
(a) $ML^2 T^{-3} A^{-2}$ (b) $ML^2 T^{-1} A^{-1}$ (c) $ML^2 T^{-2}A^{-3}$ (d) $ML^2 T^{-1}A^{-2}$
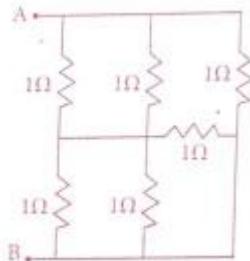
Q174.Kirchoff's I and II laws are based on conservation of _____.
(a) charge and energy   (b) energy and charge   (c) energy and voltage
(d) energy and current
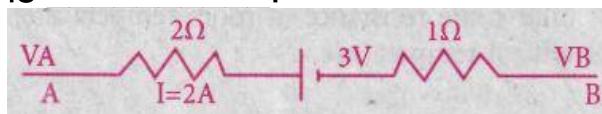
Q175.The resistors each of resistance 1Ω is connected as shown in the figure. The resultant resistance between A and B is
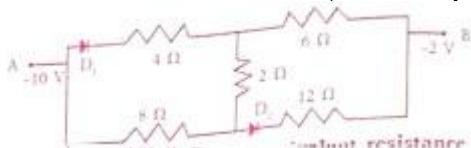
(a) $\frac{11}{5}\Omega$ (b) $\frac{5}{11}\Omega$ (c) $\frac{6}{5}\Omega$ (d) $\frac{6}{5}\Omega$

Q176.The potential difference between the points A and B in the given figure is _____ .

(a) 3V   (b) +3V   (c) +6V   (d) +9 V

Q177.In the above circuit, the equivalent resistance between A and B is

(a) $\frac{20}{3}\Omega$ (b) 10Ω   (c) 16Ω   (d) 20Ω
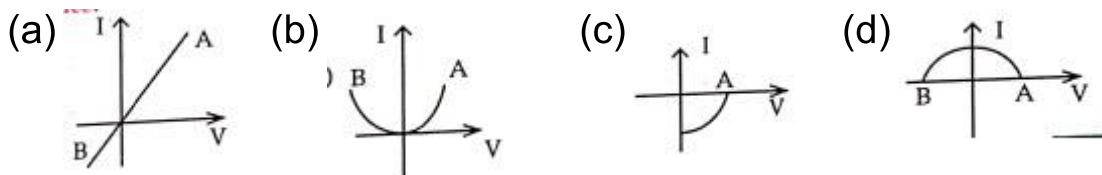
Q178.As the temperature increases, the electrical resistance
(a) Increases for both conductors and semiconductors
(b) Decreases for both conductors and semiconductors

(c) Increases for conductors but decreases for semiconductors

(d) Decreases for conductors but increases for semiconductors

Q179.Which one of the following I - V graph represents the action of semiconductor device?

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

Q180.If a current of 7.5 A is maintained in a wire for 45 s then the charge flowing through the wire is :

(a) 6 C   (b) 365.5 C   (c) 3 C   (d) 337.5 C

Q181.For the fuse wire, which of the following characteristic is immaterial?

(a) Radius   (b) Resistivity   (c) Length   (d) None of these

Q182.The resistance of a uniform wire of length I and cross-sectional area A is R. The resistance of wire of the same material having length 2I and cross sectional area 2A is:

(a) R   (b) 2R   (c) R/2   (d) R/4

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2 Marks   117 x 2 = 234

Q183.Compute the current in the wire if a charge of 120 C is flowing through a copper wire in 1 minute.

Q184.Why current is a scalar?

Q185.Distinguish between drift velocity and mobility.

Q186.State microscopic form of Ohm's law.

Q187.State macroscopic form of Ohm's law.

Q188.What are ohmic and non ohmic devices?

Q189.Define electrical resistivity.

Q190.Define temperature coefficient of resistance.

Q191.Write a short note on superconductors?

Q192.What is electric power and electric energy?

Q193. Define current density.

Q194. If an electric field of magnitude 570 N C^{-1}, is applied in the copper wire, find the acceleration experienced by the electron.

Q195. A copper wire of cross-sectional area 0.5 mm^2 carries a current of 0.2 A. If the free electron density of copper is 8.4 x 10^{28} m^{-3} then compute the drift velocity of free electrons.

Q196. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it.

Q197. A potential difference across 24 Ω resistor is 12 V. What is the current through the resistor?
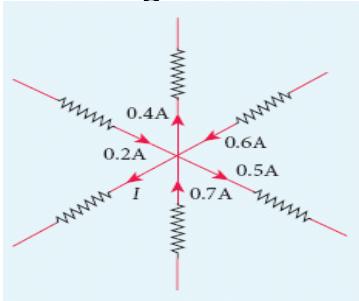
Q198. If the resistance of coil is 3 Ω at 20°C and α = 0.004/°C then determine its resistance at 100°C.

Q199. Resistance of a material at 20°C and 40°C are 45 Ω and 85 Ω respectively. Find its temperature coefficient of resistivity.

Q200. A battery has an emf of 12 V and connected to a resistor of 3 Ω. The current in the circuit is 3.93 A. Calculate
(a) terminal voltage and the internal resistance of the battery
(b) power delivered by the battery and power delivered to the resistor

Q201. For the given circuit find the value of I.

Q202. In a meter bridge experiment with a standard resistance of 15 Ω in the right gap, the ratio of balancing length is 3:2. Find the value of the other resistance.

Q203. In a meter bridge experiment, the value of resistance in the resistance box connected in the right gap is 10 Ω. The balancing length is l_1 = 55 cm. Find the value of unknown resistance.

Q204. Find the heat energy produced in a resistance of 10 Ω when 5 A current flows through it for 5 minutes.

Q205. Derive the expression for power P=VI in electrical circuit.

Q206.Write down the various forms of expression for power in electrical circuit.

Q207.State Kirchhoff 's current rule.

Q208.State Kirchhoff 's voltage rule.

Q209.State the principle of potentiometer.

Q210.What do you mean by internal resistance of a cell?

Q211.State Joule's law of heating.
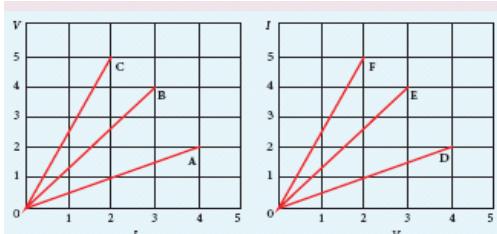
Q212.What is Seebeck effect?

Q213.What is Thomson effect?

Q214.What is Peltier effect?

Q215.State the applications of Seebeck effect.

Q216.The following graphs represent the current versus voltage and voltage versus current for the six conductors A, B, C, D, E, and F. Which conductor has least resistance and which has maximum resistance?

Q217.Lightning is very good example of natural current. In typical lightning, there is 10^9 J energy transfer across the potential difference of 5 x 10^7 V during a time interval of 0.2 s.
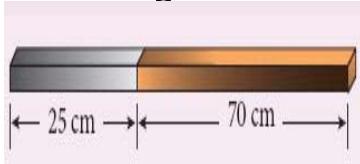
Using this information, estimate the following quantities.
(a) total amount of charge transferred between cloud and ground
(b) the current in the lightning bolt
(c) the power delivered in 0.2 s.

Q218. A copper wire of 10^{-6} m^2 area of cross section, carries a current of 2 A. If the number of free electrons per cubic meter in the wire is 8×10^{28}, Calculate the current density and average drift velocity of electrons.

Q219. The resistance of a nichrome wire at 20°C is 10 Ω. If its temperature coefficient of resistanc is 0.004°C, find its resistance of the wire at boiling point of water. Comment on the result.

Q220. The rod given in the figure is made up of two different materials.

|← 25 cm →|← 70 cm →|
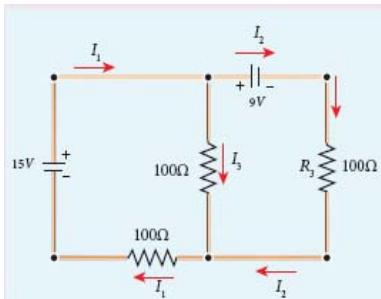
Both have square cross sections of 3 mm side. The resistivity of the first material is 4 x 10^{-3} Ωm and that of second material has resistivity of 5 x 10^{-3} Ωm. What is the resistance of rod between its ends?

Q221. An electronics hobbyist is building a radio which requires 150 Ω in her circuit. But she has only 220 Ω, 79 Ω and 92 Ω resistors available. How can she connect the available resistors to get desired value of resistance?
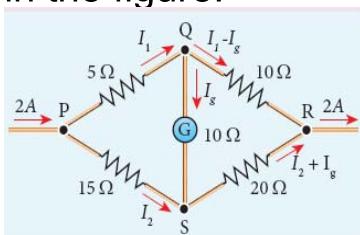
Q222. A cell supplies a current of 0.9 A through a 2 Ω resistor and a current of 0.3 A through a 7 Ω resistor. Calculate the internal resistance of the cell.

Q223. Calculate the currents in the following circuit.

Q224. A potentiometer wire has a length of 4 m and resistance of 20 Ω. It is connected in series with resistance of 2980 Ω and a cell of emf 4 V. Calculate the potential gradient along the wire.

Q225. Determine the current flowing through the galvanometer (G) as shown in the figure.

Q226. Two cells each of 5V are connected in series with a 8 Ω resistor and three parallel resistors of 4 Ω, 6 Ω, and 12 Ω. Draw a circuit diagram for the above arrangement. Calculate
(i) the current drawn from the cells
(ii) current through each resistor

Q227. Four bulbs P, Q, R, S are connected in a circuit of unknown arrangement. When each bulb is removed one at a time and replaced, the following behavior is observed.

	P	Q	R	S
P removed	*	on	on	on
Q removed	on	*	on	off
R removed	off	off	*	off
S removed	on	off	on	*

Draw the circuit diagram for these bulbs.

Q228. In a potentiometer arrangement, a cell of emf 1.25 V gives a balance point at 35 cm length of the wire. If the cell is replaced by another cell and the balance point shifts to 63 cm, what is the emf of the second cell?

Q229. Define current.

Q230. Define instantaneous current.

Q231. Define Ampere.

Q232. Define mean free time τ.

Q233. Why are household appliances connected in parallel?

Q234. What is the function of Electric fuses?

Q235. What are free electrons?

Q236. What is conductor?

Q237. What is meant by conventional current?

Q238. Define resistance.

Q239. Distinguish between ohmic & non-ohmic device.

Q240. What is the effective resistance of resistors connected in series?

Q241.The resistivity of materials depends upon what parameters?

Q242.Define the term electric power and circuit its SI unit.

Q243.What does the voltage rating refers? What is use?

Q244.Define electric energy state its commercial units.

Q245.What is an internal resistance of cell?

Q246.What do you mean by a series combination of cells?

Q247.What do you mean by parallel combination of cells?

Q248.How is sign convention followed while applying Kirchhoff's first rule?

Q249.Explain sign convention for applying Kirchhoff's second rule.

Q250.What do you mean by end resistance? How can it be rectified?

Q251.What is meant by Heating effect of electric current?

Q252.What is thermoelectric effect?

Q253.Discuss some appliances of Joule's heating effect. Name few electric heating devices & state on what principle do they work.

Q254.Why nickel is used as heating element?

Q255.What is electric fuse?

Q256.What is the disadvantage of electric fuse?

Q257.What is the use of electric furnace?

Q258.How heating effect is used in electrical lamps? Name other lamps which use the heating effected.

Q259.What is seeback effect?

Q260.What is (i) thermoelectric current?
       (ii) thermocouple?

Q261. Define draft velocity and write its relationship with the current flowing through it.

Q262. Draw I - V graph for a conductor. What does the slope represent?

Q263. The current-voltage graphs for a given metallic at two different temperatures T_1 & T_2 are shown in figure. The temperature. T_2 is greater than temperature T_1. State whether statement is true or false. Given reason.

Q264. Why the resistance of the conductor increases with rise in temperature.

Q265. What happens to the drift velocity of electron and to the resistance if length of conductor and to the resistance if length of conductor unchanged?

Q266. How does the conductivity of a semiconductor change with rise in temperature? Explain.

Q267. Draw V - I graph for ohmic & non -ohmic materials. Give example.

Q268. How does a thermistor differ from ordinary resistor?

Q269. Mention are limitation of carbon resistors.

Q270. Show on graph. the variation of resistivity with for a typical semiconductor. What is the order resistivity of an insulator? Conductor and semiconductor.

Q271. Two wires A & B are of the same metal of the same length have area of the cross-section in the ratio of 2: 1. If the same potential difference is applied across each wire. What will be the retro of the circuit flowing in A & B?

Q272. Why connecting wires are made of copper?

Q273. Show variation of resistivity of
    (i) conductor (i.e. copper)
    (ii) semiconductor
    (ii) with temperature in a graph. Give reason.

Q274. Why are resistors connected in series and in parallel
    (i) To increase the resistor of the circuit
    (ii) The resistors are connected in series.

Q275.Explain with the help of graph the variation of conductivity with temperate for a metallic conductor?

Q276.When resistors are connected in series the effective resistance is increased. Why?

Q277.When resistors are connected in parallel the effective resistance is reduced. Why?

Q278.Define electrical conductivity of a conductor. On what factor does it depend?

Q279.Why is terminal voltage of a cell less than its emf?

Q280.Plot a graph showing the variation of circuit I various resistance R connected to a cell of emf E and internal resistance r.

Q281.Of which material is a potential wire normally made and why?

Q282.Why are connecting resistors in a metre bridge made of thick copper strips?

Q283.Nichrome and copper wire of same length and same radius are connected in series circuit I is passed through them. Which wire gets heated up more? Give reason.

Q284.Two 120 V light bulbs, one 25W and other of 100 W were connected in series across a 220 V line. One bulb burnt out instantaneously. which one was burnt and Why?

Q285.What are conductors?

Q286.What are positive ions?

Q287.The positive ions will not give rise to current. Why?

Q288.Mention the relation between current density and drift velocity. (or) Obtain a relation between current and drift velocity

Q289.State the relation between resistivity, conductivity and relaxation time of free electrons.

Q290.What are carbon resistors?

Q291.Define resistance of a conductor.

Q292.What is the significance of a superconductor?

Q293.Which metal is preferred to be used in (i) Electric heater and (ii) Electrical lamp.

Q294.Which material is used for the meter bridge wire and why?

Q295.Under What condition, is the heat produced in an electric circuit, (i) directly proportional and (ii) inversely proportional to the resistance of, the circuit?

Q296.Why is potentiometer preferred over a voltmeter for comparison of emfs of cells?

Q297.What is meant by transition temperature?

Q298.Obtain an expression for electrical conductor.
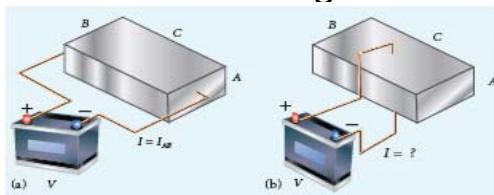
Q299.What is Electricity?

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3 Marks   67 x 3 = 201
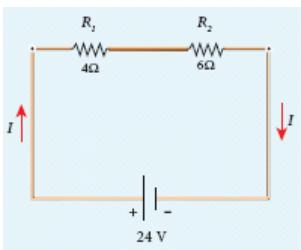
Q300.The resistance of a wire is 20 Ω. What will be new resistance, if it is stretched uniformly 8 times its original length?

Q301.Consider a rectangular block of metal of height A, width B and length C as shown in the figure.
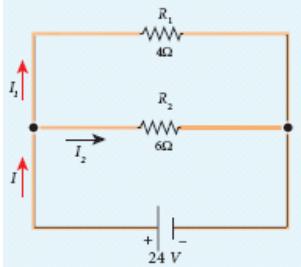
If a potential difference of V is applied between the two faces A and B of the block (figure (a)), the current I_{AB} is observed. Find the current that flows if the same potential difference V is applied between the two faces B and C of the block (figure (b)). Give your answers in terms of I_{AB}.

Q302.Calculate the equivalent resistance for the circuit which is connected to 24 V battery and also find the potential difference across each resistors in the circuit.
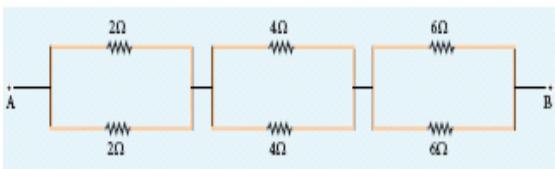
Q303. Calculate the equivalent resistance in the following circuit and also find the values of current I, I_1 and I_2 in the given circuit.
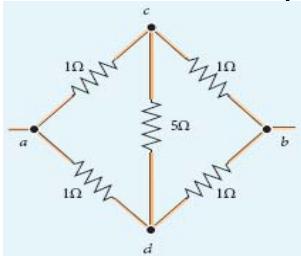
Q304. Two resistors when connected in series and parallel, their equivalent resistances are 15 Ω and $\frac{56}{15}$ Ω respectively. Find the individual resistances.

Q305. Calculate the equivalent resistance between A and B in the given circuit.
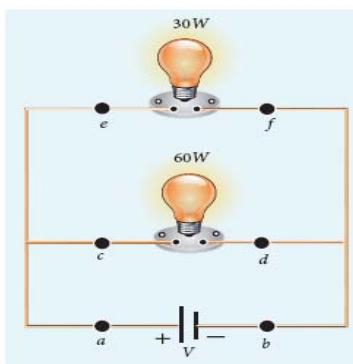
Q306. Five resistors are connected in the configuration as shown in the figure. Calculate the equivalent resistance between the points a and b.
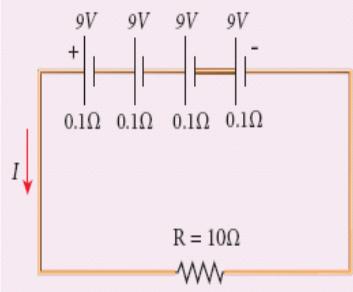
Q307. A battery of voltage V is connected to 30 W bulb and 60 W bulb as shown in the figure.
(a) Identify brightest bulb
(b) which bulb has greater resistance?
(c) Suppose the two bulbs are connected in series, which bulb will glow brighter?

Q308.Two electric bulbs marked 20 W – 220 V and 100 W – 220 V are connected in series to 440 V supply. Which bulb will get fused?
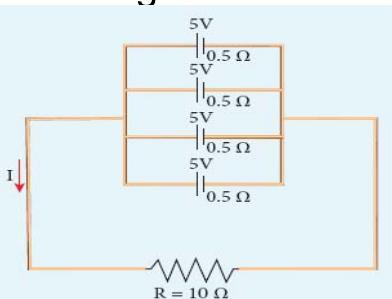
Q309.From the given circuit,

Find
i) Equivalent emf of the combination
ii) Equivalent internal resistance
iii) Total current
iv) Potential difference across external resistance
v) Potential difference across each cell
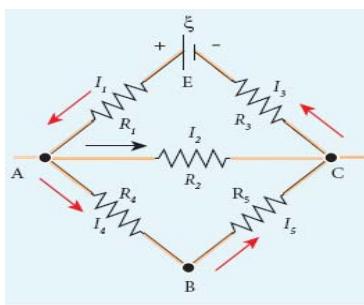
Q310.For the given circuit
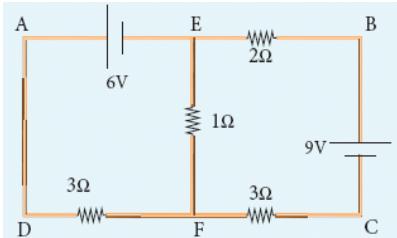
Find
i) Equivalent emf
ii) Equivalent internal resistance
iii) Total current (I)
iv) Potential difference across each cell
v) Current from each cell

Q311.The following figure shows a complex network of conductors which can be divided into two closed loops like EACE and ABCA. Apply Kirchoff's voltage rule(KVR)
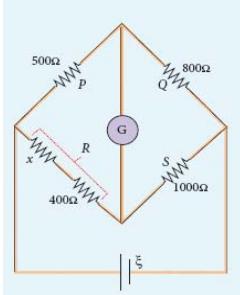
Q312. Calculate the current that flows in the 1 Ω resistor in the following circuit.

Q313. In a Wheatstone's bridge P = 100 Ω, Q = 1000 Ω and R = 40 Ω. If the galvanometer shows zero deflection, determine the value of S.
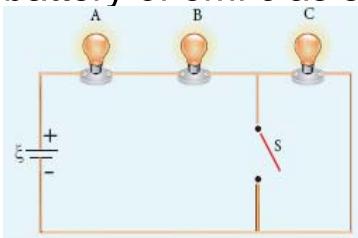
Q314. What is the value of x when the Wheatstone's network is balanced?
P = 500 Ω, Q = 800 Ω, R = x + 400, S = 1000 Ω

Q315. An electric heater of resistance 10 Ω connected to 220 V power supply is immersed in the water of 1 kg. How long the electrical heater has to be switched on to increase its temperature from 30°C to 60°C. (Specific heat capacity of water is s = 4200 J kg^{-1} K^{-1})

Q316. State and explain Kirchhoff 's rules

Q317. Three identical lamps each having a resistance R are connected to the battery of emf ε as shown in the figure.

Suddenly the switch S is closed.
(a) Calculate the current in the circuit when S is open and closed
(b) What happens to the intensities of the bulbs A, B, and C.
(c) Calculate the voltage across the three bulbs when S is open and

closed
(d) Calculate the power delivered to the circuit when S is opened and closed
(e) Does the power delivered to the circuit decrease, increase or remain same?

Q318.What are carbon resistors? What does the colour indicates?

Q319.Derive an expression of drift velocity and write the relation between drift velocity and mobility.

Q320.How does one can understand the temperature dependence of resistivity of a conductor?

Q321.(a) Distinguish between electric cells and batteries.
(b) Explain its function.

Q322.What is meant by electromotive force?

Q323.Derive a relation between internal resisance and emf of a cell.

Q324.In a circuit containing internal resistance r. Find the power delivered.

Q325.Find the expression for the equivalent emf & internal resistance of the series combination of cells.

Q326.State Joule's law.

Q327.Explain Peltier effect.

Q328.What is superconductivity?

Q329.Draw the variation between voltage and current for
(a) an Ohmic conductor and
(b) a Non - Ohmic conductor

Q330.Repairing the electrical connection with the wet skin is always dangerous. Give reason.

Q331.What do you know from coloured rings found on the resistor?

Q332.Distinguish electromotive force from potential difference.

Q333.Deduce an expression for the power delivered by a battery with an internal resistance r.

Q334.How is sign convention followed while applying Kirchhoff's second rule.

Q335.What is a galvanometer? State its application.

Q336.What is the application of potentiometer?

Q337.What is meant by Joule's heating effect?

Q338.Which material is used in electric heaters? Why?

Q339.What is a fuse wire? What is its function?

Q340.Mention the devices that utilize the heating effect of current.
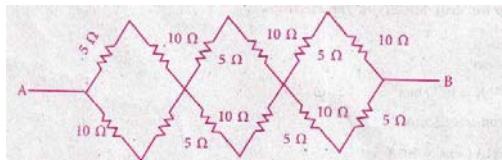
Q341.What is meant by thermoelectric effect?

Q342.State the metals where (i) positive and (ii) negative. Thomson effects are observed.
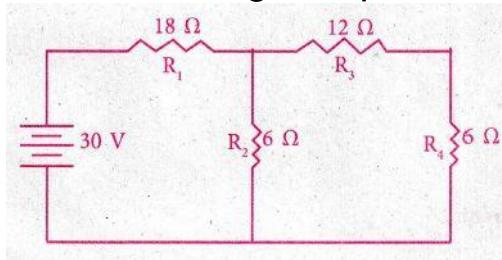
Q343.A copper wire consists of 10^{28} free electrons per mm^3 and its current density is of the order of 1 A/mm^2. Calculate the drift velocity of the electrons.

Q344.Two aluminum wire of same length have resistance 5Ω and 10Ω and 10 respectively Find the ratio of radii of two wires.
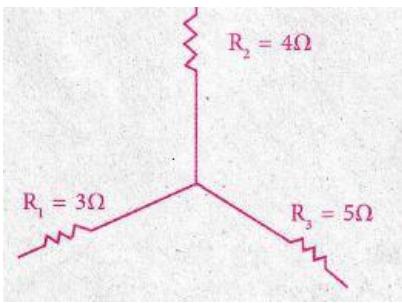
Q345.Determine the effective resistance of the given circuit between points A and B.
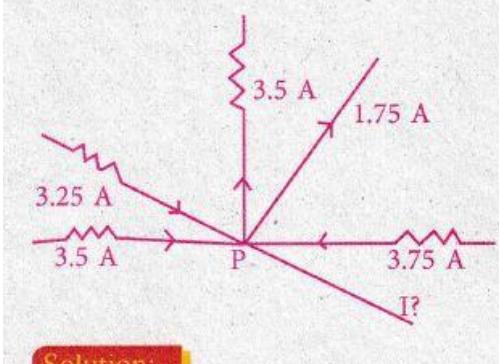
Q346.Find the voltage drop across 18Ω resistor in the given network.
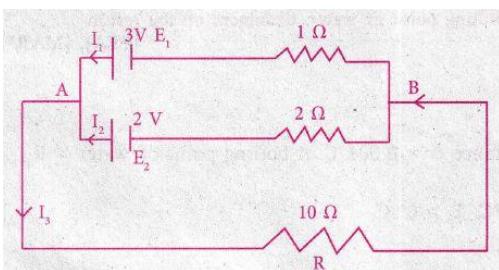

Q347.Find the effective resistance of the given circuit.

$R_2 = 4\Omega$

$R_1 = 3\Omega$

$R_3 = 5\Omega$

Q348. Find the value of current in the following function.

3.5 A

1.75 A

3.25 A

3.5 A   P

3.75 A

I?
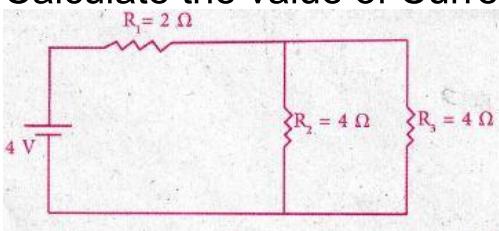
Solution:

Q349.
Calculate the value of the currents I_1, I_2 and I_3 in the above mentioned electric circuit.

Q350. Calculate the value of Current in the following circuit
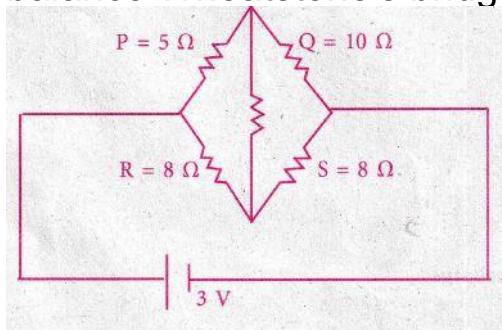
Q351. The internal resistance of battery of emf 10V is 3 ohm. If a current of 0.5A is following through the battery then what is its terminal voltage when the circuit is closed?

Q352. A series battery having six lead accumulators each of emf 2.2V and internal resistance 0.5Ω is charged by a 100V dc supply. Calculate
(a) The series resistance should be used in the charging circuit in order to limit the current its 7.8A?
(b) Power supply by the dc source
(c) The power dissipated

Q353. It is required to send a current of 10 A through h resistance R = 3Ω. Calculate the number of cells of required so that the emf of each cell is 10V and its internal resistance is 1Ω.

Q354. Determine the additional resistance that has to be connected with resistor of 32Ω in the following Wheatstone's bridge circuit in order to balance Wheatstone's bridge.

Q355. Two metal wires having identical dimensions are connected in series. If σ_1 and σ_2 are the conductances of the wires respectively then calculate the effective conductivity of the combination.

Q356. A wire of resistance 10Ω is stretched uniformly to thrice its original length. Calculate the resistance of the stretched wire.

Q357. A copper wire of 10^{-6} m^2 area of cross section, carries a current of 2 A. If the number of electrons per cubic meter is 8 x 10^{28}, calculate the current density.

Q358. Find the heat energy produced in a resistance of 10Ω when 5A current flows through it for 5 minutes.

Q359. State seebeck effect and give two applications.

Q360. State Kirchhoff's current rule and voltage rule.

Q361. State Kirchhoff's current rule and voltage rule

Q362. 32 cells, each of emf 3 V are connected in Scrics and kept in a box. If externally the combination shows an emf of 84 V, then how many number of cells reversed in the combination?+

Q363. Explain the equivalent resistance of a series network.

Q364. Explain the equivalent resistance of a parallel resistor network.

Q365. State and explain Kirchhoff 's II rule

Q366. State and explain Kirchhoff 's I rule

Q367. Describe the microscopic model of current and obtain general form of Ohm's law.

Q368. Obtain the macroscopic form of Ohm's law from its microscopic form and discuss its limitation.

Q369. Explain the equivalent resistance of a series and parallel resistor network.
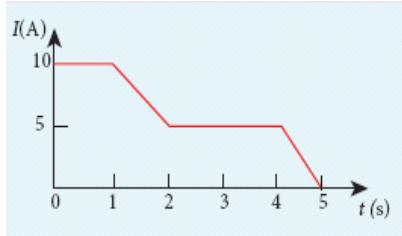
Q370. Explain the determination of the internal resistance of a cell using voltmeter.

Q371. Obtain the condition for bridge balance in Wheatstone's bridge.

Q372. Explain the determination of unknown resistance using meter bridge.

Q373. How the emf of two cells are compared using potentiometer?

Q374. The current through an element is shown in the figure. Determine the total charge that pass through the element at a) t = 0 s, b) t = 2 s, c) t = 5s

Q375. Calculate the effect internal resistance in series and parallel.

Q376. Explain the variation of resistivity of conductor and semiconductor with change in temperature.

Q377. What is potentiometer? Give its constant and 5 principles.

Q378. Explain what is
(i) Thomson effect,
(ii) Positive Thomson effect,
(iii) Negative effect.

Q379. A carbon resistor has coloured strips. What is its resistors?

Q380. How will you represent a resistor of 3700Ω ± 10 by colour code?

Q381. Two students A & B were asked to pick a resistor of 25 k from a collection of carbon resistors. A picked a resistors with bands of colours of red, green, orange, white. B picked a resistor with bands of colours: black, green, red who picked the correct resistor?
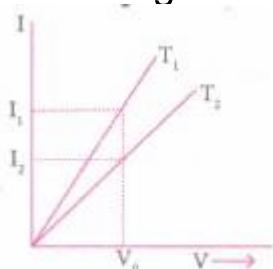
Q382. A conductor of length l is connected to d.c. source of potential V. If the length of the conductor is doubled by treating it, keeping V constant, explain how do the following factors vary in the conductor
(i) Drift velocity.
(ii) Resistor
(iii) Resistivity.

Q383. Write mathematical relation between
(i) mobility & drift velocity of charge carriers in a conductor
(ii) mobility & relaxation time (or) mean free time.
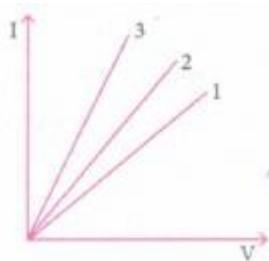
Q384. I - V graph for a metallic wire at two different temperatures T_1 & T_2 as shown in figure. Which of the two temperature is lower. Why?
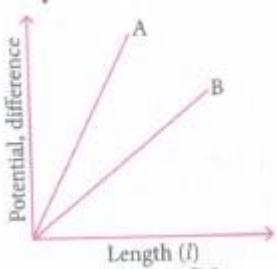

Q385. Using the concept of drift velocity of charge carries in a conductor, deduce the relationship between circuit density and resistivity of the conductor?

Q386. The V - I graphs of two resistors and their series combination are shown in the figure. Which one of these graph represents the series combination of the other two? Given reason.
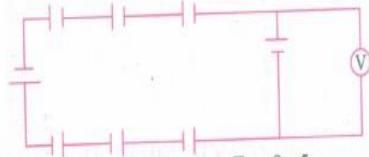
Q387. The variation of potential difference V with length l in the case of two potentiometer A & B is shown. Which of these two will you prefer for finding the emf of a cell or for comparing emfs of two primary cells?

Q388. Two metallic wires P_1 & P_2 of the same material & same length but different cross sectional areas A_1 & A_2 are joined together & connected to a source of emf. Find the ratio of the drift velocities of free electrons in the two wires when they are connected
(i) in series &
(ii) in parallel.
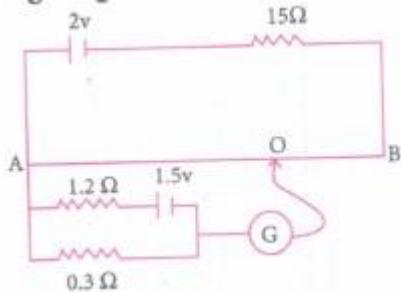
Q389. The lengths & radii of three wires of the same metal in the radio 2: 3 : 4 & 3 : 4: 5 respectively. They are joined in parallel & included in a circuit having a 5 A current. Find current in each wire.

Q390. In the circuit shown in figure each battery is of 5V and has an internal resistor of 0.2Ω. What will be the reading of an ideal voltmeter connected across a battery?
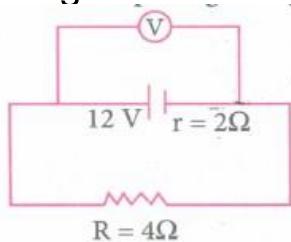

Q391. In the following potentiometer circuit, AB is a uniform wire of length 1m & resistor 10Ω.
Calculate the potential gradient along the wire & balancing length to.
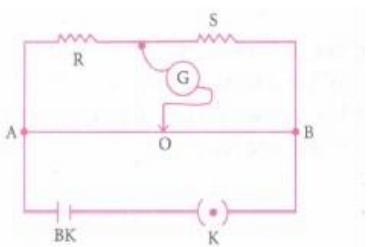
Q392. Calculate the voltmeter reading and the amount of current passing through a circuit.

Q393. In a meter bridge, the balancing length is found to be 40 cm from end A. If the resistance of 10 Ω is connected in series with R, balancing length is obtained 60 em from A. calculate the value R & S.

Q394. An aluminium wire of diameter 0.24 cm is connected in series to a copper wire of diameter 0.16 cm. The wires carry an electric current of 10 A. Determine the current density in aluminium wire.

Q395. A potential difference of 3 V is applied across a conductor through which the 5 A of current is flowing. Determine the resistance of the conductor.

Q396. A negligible small current is passed through a wire of length 15 m and uniform cross-section 6 x 10^{-1} m and its resistance is measured to be 5 Ω. What is the resistivity of the material at the temperature of the experiment?
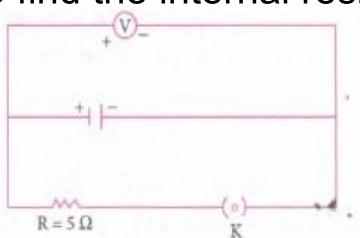
Q397. A silver wire has a resistance of 2.1 Ω 27.5°C and a resistance of 2.70 at 100°C. Determine the temperature coefficient of resistance of the silver.

Q398. Estimate the average different speed of conduction electrons in a copper wire of crosssectional area 1.0 x 10^{-7} m^2 carrying a current of 1.5 A. Assume the density of conduction electrons to be 9 x 10^{28} m^{-3}.

Q399. How will you represent a resistance of 3700 Ω ± 10% by colour code?
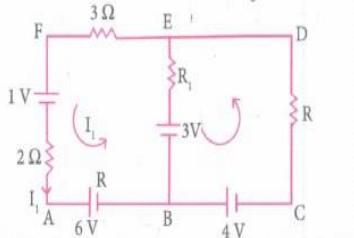
Q400. A cell of emf E and internal resistance 'r' gives a current of 0.5 A with an external resistance of 12 Ω and a current of 0.25 A with an external resistance of 25. Calculate
(i) internal resistance of the cell
(ii) emf of the cell.

Q401. The reading on a high resistance volt. When a cell is connected across it is 2.2 V when the terminal of the cell is connected to a resistance of 5 as shown in the figure given below, the voltmeter reading drops to 1.8 V to find the internal resistance of the cell.

Q402. Use Kirchhoff's laws (rules) to determine the potential difference between points A and D when no current flows in the arm BE of the
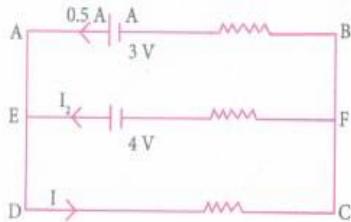
electric network shown in the figure below.
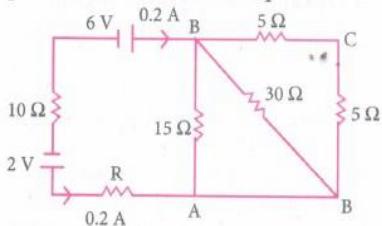
Q403. In a wheat stone bridge circuit P = 7, Q = 8 , R = 12 & s = 7. Find the additional resistance to be used in series with S, so that the bridge is balanced.

Q404. Using Kirchhoff's laws in the given circuit determine
(i) the voltage drop across the unknown resistor 'R'
(ii) the current 'I' in the ohm EF.

Q405. Calculate the value of the resistance 'R' in the circuit shown in the figure so that the current in the circuit is 0.2 A. What would be the potential difference between points A and B?

Q406. Derive an expression for the current flowing in a circuit in which cells are connected in series.

Q407. Obtain an expression for the strength of current without flowing through a circuit in which cells are connected in parallel.

Q408. Explain the method of measuring internal resistance of a cell using potentiometer.

Q409. (a) Explain Seebeck effect with a charging
(b) Explain the applications of Seebeck effect

Q410. Describe Peltier effect.

Q411. Explain Thomson effect.

Q412.A parallel combination of two cells of emf's E_1 and E_2 internal resistances r_1 and r_2 is used to supply current to a load of resistance. Write the expression for the current through the load in terms of E_1, E_2, r_1 and r_2

Q413.When two resistors connected in series and parallel their equivalent resistances are 15 Ω and 56/15 Ω respectively. Find the two resistances.

Match the following   8 x 1 = 8

Q414.Electric Heaters

Q415.Electric Fuses

Q416.Electric furnace

Q417.Electrical Lamp

Q418.Current

Q419.Resistance

Q420.Power

Q421.Energy
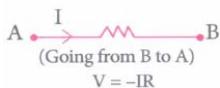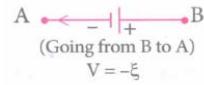

Assertion and reason   3 x 2 = 6

Q422.**Assertion**: Kirchoff's voltage rule can be expressed as

$\varepsilon_1 + \varepsilon_2 + \varepsilon_3 + \ldots \varepsilon_n = I_1 R_1 + I_2 R_2 + \ldots I_n R_n$

Reason: For the given diagrams

Codes:
(a) Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Assertion and Reason are true but Reason is the false explanation of the Assertion.
(c) Assertion is true but Reason is False.
(d) Assertion is false but Reason is True

Q423. **Assertion:** When the car engine is started with headlights turned on, they sometimes become bright
Reason : A galvanometer is extensively useful to compare the potential difference between various parts of the circuit
Codes:
(a) Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Assertion and Reason are true but Reason is the false explanation of the Assertion.
(c) Assertion is true but Reason is False.
(d) Assertion is false but Reason is True

Q424. **Assertion:** In a simple battery circuit, the point of the lowest potential is positive terminal of the battery.
Reason: The current flows the point of higher potential as it does in such a circuit from the negative to the positive potential.
Codes:
(a) Both assertion and reason are true
(b) Both assertion and reason are false
(c) Assertion is true, reason is false
(d) Assertion is false, reason is true

Odd one out   2 x 2 = 4

Q425. (a) Copper
(b) Iron
(c) Manganin
(d) Aluminum

Q426. (a) Seebeck effect
(b) Joule's effect
(c) Thomson effect
(d) Peltier effect

Find out the wrong pair   1 x 2 = 2

Q427. a. **Kirchhoff's I law** - **conservation of energy**
b. Ohm's law   - resistance
c. Kirchhoff's IIlaw - voltage law
d. Joule's law   heating effect current
Which one is incorrect pair?

Choose the correct pair   1 x 1 = 1

Q428. a. Tolerance of gold   - 10%
b. Potentio meter wire - Constantine
c. Filament bulb   - Nichro
d. Positive electrode   - cathode

Which one is incorrect pair?

___

Q429.(I) Meter bridge is another from of wheatstone's bridge.
(II) Seebeck effect is used in thermoelectric generators. Which one is correct statement?
(a) I only
(b) II only
(c) both are correct
(d) None

Q430.(I) The total resistance in the circuit of cells in series is nr + R
(II) The internal resistance of a cell is
$$r = \frac{(V - \xi)R}{V}$$
Which one is incorrect statement?
(a) I only
(c) both are correct
(b) II only
(d) None

___