LEVEL # 1

Questions based on Current carrying conductor

Q.1 A current of 5 Amp exist on a 10 ohm resistance for 4 min. How much charge pass through any cross-section of the resistor in this time ?
(A) 12 coulombs (B) 120 coulombs
(C) 1200 coulombs (D) 12000 coulombs

Q.2 Current in a conductor is due to -
(A) motion of free electrons in it
(B) motion of (+) ve ions
(C) free electrons and holes
(D) protons

Q.3 The electric current in a liquid is due to the flow of -
(A) electron only
(B) positive ions only
(C) negative and positive ions both
(D) electrons and positive ions both

Q.4 A steady current is passing through a linear conductor of non-uniform cross-section. The net quantity of charge crossing any cross-section per second is -
(A) independent of area of cross-section
(B) directly proportional to the length of conductor
(C) directly proportional to the area of cross-section
(D) inversely proportional to the lengths of conductor

Q.5 A current (I) flows through a uniform wire of diameter (d) when the mean drift velocity is v. The same current will flow through a wire of diameter d/2 made of the same material if the mean drift velocity of the electron is
(A) v/4 (B) v/2
(C) 4v (D) 2v

Q.6 A wire of non-uniform cross-section is carrying a steady current. Along the wire -
(A) current and current density are constant
(B) only current is constant
(C) only current density is constant
(D) neither current nor current density is a constant

Q.7 When a potential difference (V) is applied across a conductor , the thermal speed of electrons is -
(A) zero
(B) proportional to $\sqrt{T}$
(C) proportional to (T)
(D) proportional to V

Q.8 A steady current is passing through a linear conductor of non-uniform cross-section. The current density in the conductor is -
(A) independent of area of cross-section
(B) directly proportional to area of cross-section
(C) inversely proportional to area of cross-section
(D) inversely proportional to the square root of area of cross-section

Q.9 A metallic block has no potential difference applied across it. Then the mean velocity of free electron is -
(A) proportional to T
(B) proportional to $\sqrt{T}$
(C) zero
(D) finite but independent of temperature

Questions based on Ohm's law & resistance of conductor

Q.10 Specific resistance of a wire depends on the
(A) length of the wire
(B) area of cross–section of the wire
(C) resistance of the wire
(D) material of the wire

Q.11 A cross–sectional area of a copper wire is 3×10^{-6} m^2. The current of 4.2 amp is flowing through it. The current density in amp/m^2 through the wire is –
(A) 1.4×10^3 (B) 1.4×10^4
(C) 1.4×10^5 (D) 1.4×10^6

Q.12 The resistance of some substances become zero at very low temperature , then these substances are called –
(A) good conductors (B) super conductors
(C) bad conductors (D) semi conductors

Q.13 The resistance of wire is 20Ω. The wire is stretched to three times its length. Then the resistance will now be –

(A) 6.67 Ω (B) 60 Ω

(C) 120 Ω (D) 180 Ω

Q.14 The dimensions of a mangnin block are 1 cm × 1 cm × 100 cm. The electrical resistivity of mangnin is 4.4×10^{-7} ohm–meter. The resistance between the opposite rectangular faces is –

(A) 4.4×10^{-7} ohm (B) 4.4×10^{-3} ohm

(C) 4.4×10^{-5} ohm (D) 4.4×10^{-1} ohm

Q.15 If the temperatures of iron and silicon wires are increased from 30ºC to 50ºC, the correct statement is–

(A) resistance of both wires increase

(B) resistance of both wires decrease

(C) resistance of iron wire increases and the resistance of silicon wire decreases

(D) resistance of iron wire decreases and the resistance of silicon wire increases

Q.16 When the resistance of copper wire is 0.1Ω and the radius is 1 mm, then the length of the wire is (specific resistance of copper is 3.14×10^{-8} ohm × m) -

(A) 10 cm (B) 10 m

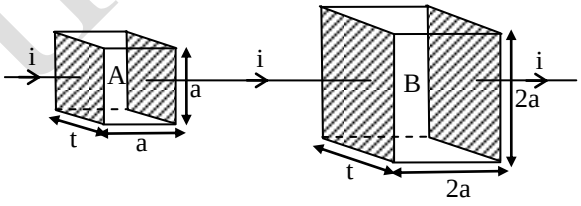
(C) 100 m (D) 100 cm

Q.17 When the resistance wire is passed through a die the cross–section area decreases by 1%, the change in resistance of the wire is -

(A) 1% decrease (B) 1% increase

(C) 2% decrease (D) 2% increase

Q.18 In the following diagram two parallelopiped A and B are of the same thickness. The arm of B is double that of A. Compare these resistances and find out the value of R_A/R_B is –



(A) 1 (B) 2

(C) $\frac{1}{2}$ (D) 4

Q.19 When the temperature of a metallic conductor is increased its resistance -

(A) always decreases

(B) always increases

(C) may increase or decrease

(D) remains the same

Q.20 In which one of the following substances the resistance decreases with increases of temperature -

(A) carbon (B) constantan

(C) copper (D) silver

Q.21 The resistance of a semi-conductors -

(A) increases with increase of temperature

(B) decreases with increase of temperature

(C) does not change with change of temperature

(D) first decreases and then increases with increase of temperature

Q.22 Specific resistance of a wire depends upon -

(A) it's length

(B) it's cross-sectional area

(C) it's dimensions

(D) it's material

Q.23 Ohm's law deals with the relation between -

(A) current and potential difference

(B) capacity and charge

(C) capacity and potential

(D) all are true

Q.24 Ohm's law is valid when the temperature of the conductor is -

(A) constant (B) very high

(C) very low (D) varying

Q.25 A certain piece of copper is to be shared into a conductor of minimum resistance . Its length and diameter should be respectively -

(A) ℓ , d (B) 2ℓ , d

(C) $\ell/2$, 2d (D) 2ℓ , d/2

Q.26 A wire has a resistance of 10Ω . A second wire of the same material is having length double and radius of cross-section half that of the wire. The resistance of the second wire is -

(A) 20Ω (B) 40Ω

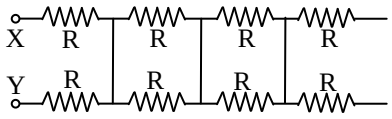
(C) 80Ω (D) 10Ω

Q.27 A cylindrical copper rod is reformed to twice its original length with no change in volume. The resistance between its ends before the change was (R). Now its resistance -
(A) 8R (B) 6R (C) 4R (D) 2R

Q.28 The length of a conductor is halved. Its conductance will be -
(A) halved (B) unchanged
(C) doubled (D) quadrupled

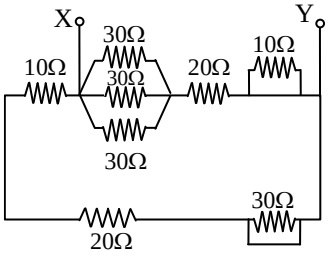
Questions based on Combination of resistors

Q.29 Net resistance between X and Y is –



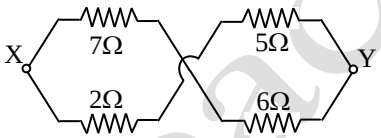
(A) R (B) 2R (C) $\frac{R}{2}$ (D) 4R

Q.30 Net resistance between X and Y is -



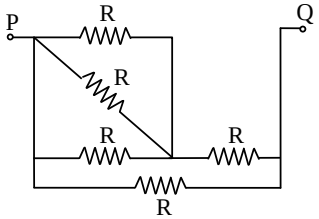
(A) 5 Ω (B) 10 Ω (C) 15 Ω (D) 60 Ω

Q.31 Net resistance between X and Y is -



(A) 4 Ω (B) 4.55 Ω
(C) 2 Ω (D) 20 Ω

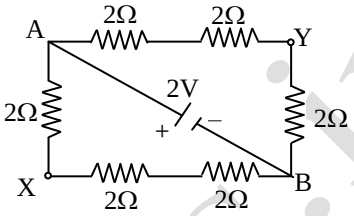
Q.32 The equivalent resistance between the terminal point P and Q is 4Ω in the given circuit, then find out the resistance of R in ohms -



(A) 7 (B) 4 (C) 2 (D) 5

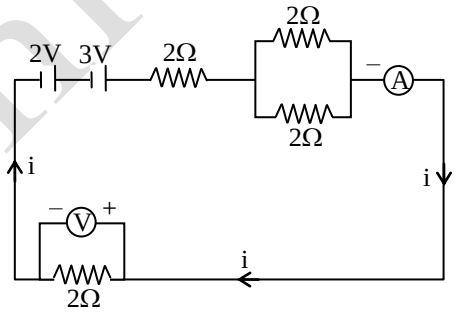
Q.33 At a point Σi = 0 in a circuit with one emf source, then-
(A) the resistance of the circuit is zero
(B) the point is the junction point
(C) the emf of the source is infinity
(D) this is not possible

Q.34 For the following circuits, the potential difference between X and Y in volt is –



(A) $\frac{2}{3}$ (B) $\frac{4}{3}$ (C) $\frac{8}{9}$ (D) $\frac{5}{3}$

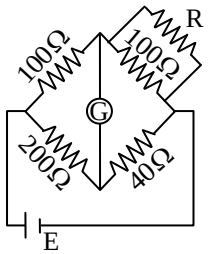
Q.35 Reading of ideal .ammeter in ampere for the following circuit is –



(A) 1 (B) 2 (C) 3 (D) 4

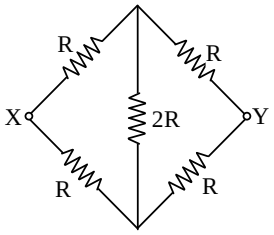
Q.36 In a closed circuit the sum of total emf is equal to the sum of the –
(A) currents
(B) resistances
(C) products of current and the resistances
(D) none of the above

Q.37 For following diagram the galvanometer shows zero deflection, then the value of R is -



(A) 52 Ω (B) 50 Ω
(C) 100 Ω (D) 25 Ω

Q.38 For following circuit the value of total resistance between X and Y in ohm is -



(A) R (B) 4 R (C) 5 R (D) 6 R

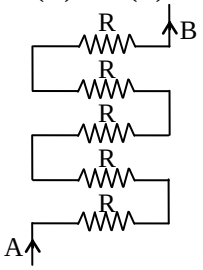
Q.39 The equivalent resistance in series combination is -
(A) smaller than the largest resistance
(B) larger than the largest resistance
(C) smaller than the smallest resistance
(D) larger than the smallest resistance

Q.40 The equivalent resistance of resistors in parallel is always -
(A) higher than the highest of component resistor
(B) less than the lowest of component resistors
(C) in between the lowest and the highest of component resistors
(D) equal to the sum of the component resistors

Q.41 When n identical resistances of value 'r' each are connected in parallel, the equivalent resistance is x. The resultant resistance when they are connected in series is-
(A) nx (B) n^2x
(C) r.n.x (D) r^2 x/n

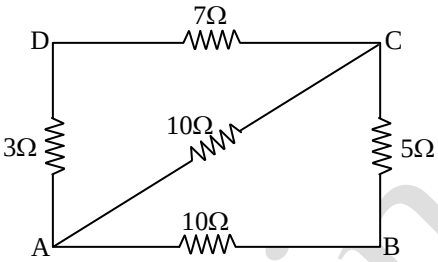
Q.42 Two resistance $r_1\Omega$ and $r_2\Omega$ are connected in parallel. The equivalent resistance of the combination is equal to -
(A) $r_1 + r_2$ (B) $[r_1.r_2/(r_1+r_2)]$
(C) $[(r_1 + r_2)/r_1 . r_2]$ (D) $r_1 – r_2$

Q.43 Five identical resistance are connected as shown in fig. The equivalent resistance between point (A) and (B) is -



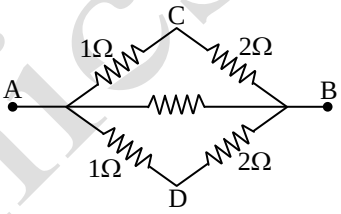
(A) R (B) 5R (C) R/5 (D) 2R/5

Q.44 Five resistance are connected as shown in the adjoining figure. The equivalent resistance between A and B is -



(A) 35Ω (B) 5Ω (C) 15/4Ω (D) 25Ω

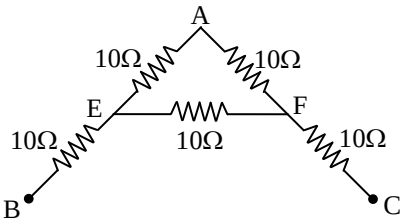
Q.45 The equivalent resistance between points (A) and (B) in the adjoining fig. is one ohm. What is the value of middle resistance -



(A) 9Ω (B) 1Ω (C) 6Ω (D) 3Ω

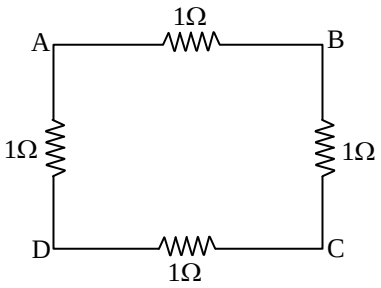
Q.46 Four wires of equal length and of resistance 5 ohm each are connected in the form of a square. The equivalent resistance between the diagonally opposite corners of the square is-
(A) 5 ohm (B) 10 ohm
(C) 20 ohm (D) 5/4 ohm

Q.47 The effective resistance (in Ω) between (B) and (C) of letter (A) , containing resistance as shown in fig. as



(A) 60 (B) 40
(C) 80/3 (D) 160/9

Q.48 Four identical resistances are joined as shown in fig. The equivalent resistance between points (A) and (B) is R_1. The equivalent resistance between points A and C is R_2 then ratio of R_1/R_2 is -

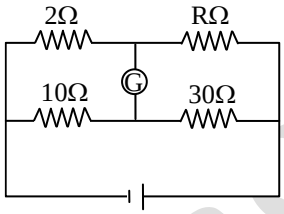


(A) 1 : 1 (B) 4 : 3
(C) 3 : 4 (D) 1 : 2

Q.49 Kirchoff's first law ie $\Sigma i = 0$ at a junction deals with -
(A) conservation of charge
(B) conservation of energy
(C) conservation of momentum
(D) conservation of angular momentum

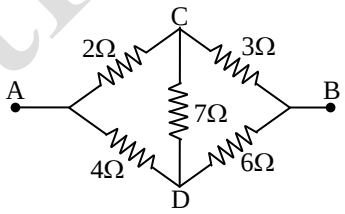
Q.50 Kirchoff's second law is based on law of conservation of -
(A) charge
(B) energy
(C) momentum
(D) sum of mass and energy

Q.51 In the adjoining fig. there is no deflection in the galvanometer . Then R is equal to -



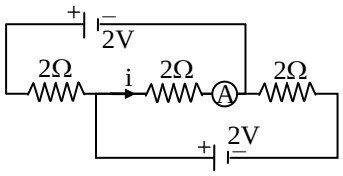
(A) 2Ω (B) 30Ω
(C) 6Ω (D) (2/3)Ω

Q.52 Five resistance are connected as shown in fig. The effective resistance between the points A and B is -



(A) 10/3Ω (B) 20/3 Ω
(C) 15Ω (D) 6Ω

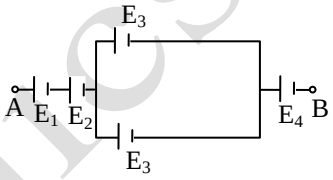
Q.53 Reading of ammeter is -



(A) 1 (B) 2
(C) $\frac{2}{3}$ (D) 3

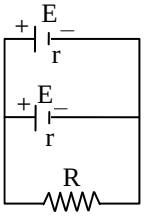
Questions based on Cell

Q.54 In the following circuit the resultant emf between AB is -



(A) $E_1 + E_2 + E_3 + E_4$
(B) $E_1 + E_2 + 2E_3 + E_4$
(C) $E_1 + E_2 + (E_3/2) + E_4$
(D) $E_1 + E_2 + (E_3/4) + E_4$

Q. 55 Two cells of same emf E and internal resistance r are connected in parallel with a resistance of R. To get maximum power in the external circuit, the value of R is -



(A) $R = \frac{r}{2}$ (B) R = r
(C) R = 2 r (D) R = 4r

Q.56 A cell of e.m.f (E) and internal resistance (r) is connected in series with an external resistance (nr.) then the ratio of the terminal p.d. to E.M.F is -
(A) 1/n (B) 1/(n+1)
(C) n/(n+1) (D) (n+1)/n

Q.57 The terminal potential difference of a cell , when short circuited is -
(A) E (B) E/2 (C) zero (D) E/3

Q.58 Five dry cell each of e.m.f 1.5V are connected in parallel. The e.m.f of the combination is -

(A) 7.5 V (B) 0.3 V

(C) 3V (D)1.5 V

Questions based on Heating effect of current

Q.59 Two bulbs, one of 50 watt and another of 25 watt are connected in series to the mains , the ratio of the current through them is -

(A) 2 : 1

(B) 1 : 2

(C) 1 : 1

(D) can't be determined without the p.d. of the main supply

Q.60 Constant voltage is applied between the two ends of a uniform metallic wire. The heat developed is doubled if -

(A) both the length and radius of the wire are halved

(B) both the length and radius of the wire are doubled

(C) the radius of wire is doubled

(D) the length of the wire is doubled

Q.61 Two electric bulbs rated P_1 watt V volt and P_2 watt V volt are connected in parallel across V volt mains then the total power is -

(A) $P_1 + P_2$ (B) $\sqrt{P_1P_2}$

(C) $\frac{P_1P_2}{(P_1+P_2)}$ (D) $\frac{(P_1+P_2)}{P_1P_2}$

Q.62 Lamps used for the house lightening are connected in -

(A) series (B) parallel

(C) mixed grouping (D) arbitrary manner

Q.63 Two electric bulbs whose resistances are in the ratio of 1 : 2 are connected in parallel to a constant voltage source. The power's dissipated in them have the ratio -

(A) 1 : 2 (B) 1 : 1

(C) 2 : 1 (D) 1 : 4

Q.64 An electric bulb is rated 220 volt and 100 watt. The resistance of the filament of the electric bulb is -

(A) 2.2 ohm (B) 2.2×10^4ohm

(C) 484 ohm (D) 100 ohm

Q.65 Three electric bulbs 40w, 60w and 100w are designed to work on a 220V mains. Which bulb will burn most brightly if they are connected in series across 220V mains -

(A) 100w bulb

(B) 60w bulb

(C) 40 w bulb

(D) all bulbs will burn equally brightly

Q.66 If the current in a electric bulb drops by 2% then the power decreases by -

(A) 1% (B) 2%

(C) 4% (D) 16%

Q.67 If the current in an electric bulb decreases by 0.5 percent, then the power in the bulb decreases approximately by -

(A) 0.5 percent (B) 1 percent

(C) 2 percent (D) 0.25 percent