

13.15 MULTIPLE CHOICE QUESTIONS (SELF PRACTICE):

Electric Current:

- Q.1 An electric current is caused by the motion of:
 * Electric discharge ☒ Electric charge
 * Volt ☐ * None of these
- Q.2 The rate of transfer of charges through a circuit is called: (2006)
 * Resistance ☒ Current
 * Potential difference ☐ * All of these
- Q.3 Electrical conductors contain: (2003 P.E)
 * Only free electrons ☒ Only bound electrons
 * Both free and bound electrons ☐ * Neither bound nor free electrons
- Q.4 If a net charge Q passes through any cross section of a conductor in time t , then the electric current established through the conductor is $I =$:
☒ $\frac{Q}{t}$ ☐ $\frac{t}{Q}$ ☐ $\frac{1}{Qt}$ ☒ Qt
- Q.5 The S.I unit of current is:
 * Electron volt ☐ * Volt ☒ Ampere ☐ * Voltage
- Q.6 The current due to flow of charge at the rate of one coulomb per second is called:
 * Electron volt ☐ * Volt ☒ Ampere ☐ * Voltage
- Q.7 Charge carrier in Metallic conductors are the electrons of:
☒ Valence shells ☐ * All shells ☐ * Excited states ☐ * Inner shells
- Q.8 Free electrons in an Electric field moves from:
☒ * All potentials ☐ * High Potential to low potential
☒ Low potential to high potential ☐ * None of these
- Q.9 The drift velocity is of the order of:
☐ 10^5 ms^{-1} ☐ 10^3 ms^{-1} ☐ 10^2 ms^{-1} ☒ 10^{-3} ms^{-1}
- Q.10 2.0×10^8 electrons pass through a conductor in $5.0 \mu\text{s}$. Electronic charge is $1.6 \times 10^{-19} \text{ C}$. The current in ampere following through the conductor is:
☐ $1.6 \times 10^{-6} \text{ A}$ ☐ $2.6 \times 10^{-6} \text{ A}$ ☐ $3.6 \times 10^{-6} \text{ A}$ ☒ $6.4 \times 10^{-6} \text{ A}$
- Q.11 Which of the following represents an electric current:
☐ Erg C^{-1} ☒ C S^{-1} ☐ J S^{-1} ☐ Dyne S^{-1}
- Q.12 If 1 ampere current flows 2m long conductor, the charge flow through this in 1 hour will be:
☒ 3600 C ☐ 7200 C ☐ 1 C ☐ 2 C

Ohm's Law:

- Q.13 The current flowing through a conductor is directly proportional to the potential difference across its ends provided the physical state of the conductor remains constant this is:
☐ Newton's Law ☐ * Coulomb's Law
☐ Maxwell's Law ☒ Ohm's Law
- Q.14 Symbolically Ohm's Law can be written as:
☐ $I \propto \frac{1}{\sqrt{V}}$ ☐ $I \propto \sqrt{V}$ ☐ $I \propto \frac{1}{V}$ ☒ $I \propto V$
- Q.15 In the relation $I = KV$, K stands for:
☒ Conductance ☐ Resistivity
☐ Specific Resistance ☐ Permeability

(2003 P.E)

Q.16 Ohm's Law is obeyed in:

- * A semiconductor
- * An electron tube
- * A metallic conductor
- ☒ In all of these

Q.17 The graphical representation of Ohm's Law is:

- * Hyperbola
- * Ellipse
- * Parabola
- ☒ Straight Line

Q.18 If R is the resistance of the conductor, then Ohm's Law can be written as:

- * $V = \frac{R}{\sqrt{I}}$
- * $V = \frac{R}{I}$
- * $V = \frac{I}{R}$
- ☒ $V = IR$

Resistance and Resistivity:

Q.19 The measure of the opposition to the motion of electrons due to their continuous bumping with the atom of the lattice is the:

- ☒ Resistance
- * Friction
- * Voltage
- * Work

Q.20 The S.I unit of resistance:

- * Volt
- * Ampere
- * mho
- ☒ Ohm

Q.21 If a current of 1 ampere flows through a conductor where a potential difference of 1 volt is applied across its ends, then resistance of the conductor is:

- * 0 Ohm
- ☒ 1 Ohm
- * 2 Ohm
- * 3 Ohm

Q.22 The symbols of Ohm is:

- * α
- * β
- * γ
- ☒ Ω

Q.23 A sample of conductor is said to obey Ohm's Law if its resistance R:

- * Increases
- ☒ Remains constant
- * Decreases
- * None of these

Q.24 Resistance of conductor depends upon:

- * The potential difference between its ends
- * The magnitude of the current flowing through it
- * The nature only
- ☒ The nature, dimension and physical state of the conductor

Q.25 A wire of length L and resistance R is cut into four equal pieces. Resistance of each piece would be:

- * R
- * $\frac{R}{2}$
- * 2R
- ☒ $\frac{R}{4}$

Q.26 The resistance of a conductor of length L, cross-sectional area A and resistivity ρ is given by:

- * $R = \rho A/L$
- ☒ $R = \rho \frac{L}{A}$
- * $R = \frac{\rho}{LA}$
- * $R = \frac{A}{\rho L}$

Q.27 A piece of wire of length "L" and an area of cross-section "A" has a resistance "R". Another piece of wire of the same material and the same length but twice the area of cross-section is connected end-to-end with the previous wire. The effective resistance is:

- * R
- * 2R
- ☒ $\frac{1}{3}R$
- * $\frac{1}{2}R$

Q.28 Volt per Ampere is:

- ☒ Ohm
- * Joule
- * Watt
- * KWh

Q.29 The reciprocal of the resistance of conductor is called:

- * Specific resistance
- ☒ Conductance
- * Current
- * Voltage

Q.30 The unit of conductance is:

- * Ohm
- * Metre
- * Ampere
- ☒ mho or siemens

Q.31 The resistance of a meter cube of the substance is called:

- * Conductivity * Permittivity ☒ Resistivity * Susceptibility

Q.32 The resistivity of the material having the resistance R cross-sectional area A and length L is given by:

- * $\rho = \frac{AL}{R}$ * $\rho = RAL$ ☒ $\rho = \frac{RA}{L}$ * $\rho = \frac{L}{RA}$

Q.33 The S.I unit of resistivity is:

- * Ohm - m⁻² ☒ Ohm - m⁻¹ ☒ Ohm - m * Ohm

Q.34 A copper wire having resistivity " ρ " is stretched in such a way that its diameter reduces to half of that of the original wire. The new resistivity will be:

- * Halved * Doubled ☒ The same * Four fold

Q.35 A wire of a uniform cross-section area is cut into three equal segments. The resistivity " ρ " of each segment will be:

- * $1/3\rho$ * $2/3\rho$
☒ Same as that of the whole wire * Three times as that of the whole wire

Q.36 If the wire of a uniform area of cross section is cut into two equal parts, the resistivity of each part will be:

- * Halved * Doubled
☒ Remains the same * None of the above

Q.37 Resistance of a substance one meter in length and one square meter in cross sectional area is called:

- * Conductivity ☒ Resistivity * Permittivity * Reactance

Q.38 When the temperature of a conductor is raised its resistance:

- ☒ Always decreases ☒ Always increases
* Remains the same * First increases and then decreases

Q.39 The resistance of the conductor increases due to the rise of temperature of a conductor, because the collision cross section of the atoms:

- * Decreases ☒ Increases
* Remains unchanged * sometime increases and sometime decreases

Q.40 The temperature co-efficient of resistivity of a material is given by the relation:

- * $\alpha = \rho \Delta T / \rho_T - \rho_0$ ☒ $\alpha = \frac{(\rho_T - \rho_0)}{\rho_0 \Delta T}$

- * $\alpha = \rho_0 (\rho_T - \rho_0) / \Delta T$ * $\alpha = \Delta T (\rho_T - \rho_0) \rho_0$

Q.41 The temperature co-efficient of resistance of a material is given by the relation:

- ☒ $\alpha = \frac{(R_T - R_0)}{R_0 \Delta T}$ * $\alpha = \frac{R_0 \Delta T}{(R_T - R_0)}$

- * $\alpha = \frac{R_0}{(R_T - R_0) \Delta T}$ * $\alpha = \frac{\Delta T (R_T - R_0)}{R_0}$

Q.42 The S.I unit of the temperature co-efficient of resistivity of material is:

- * Ohm - m * K ☒ K⁻¹ * Ohm - K

Resistance in Series:

Q.43 If the resistance are connected end to end such that the same current passes through all of them, then they are said to be connected:

- * Parallel ☒ Series
* Not in Series * Neither in Series nor parallel

Q.44 If equivalent resistance R of the resistance R_1, R_2, R_3 is series is $R =$:

* $\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ * $\frac{R_1}{R_2} + \frac{R_2}{R_3} + \frac{R_3}{R_1}$ * $R_1 + R_2 + R_3$ * $R_1 R_2 R_3$

Q.45 The potential difference across each resistance in series combination is:

- * Same * ☒ Different * Infinity * Zero

Q.46 When the resistance are connected in series, the equivalent resistance is always:

- * ☒ Greater than the greatest resistance in series
 * Equal to the greatest resistance in series
 * Less than the largest resistance in series
 * Less than the smallest resistance in series

Q.47 When the resistors are connected in series then:

- * ☒ The total current through each is the same
 * The voltage across each is the same
 * The total resistance is the sum of the reciprocals of the individual
 * The total resistance is the product of the individual resistors

Q.48 Resistors of 2 ohm, 3 ohm, 4 ohm and 5 ohm are connected in series. If the current through the 2 ohm resistor is one ampere the current through the other resistors will be:

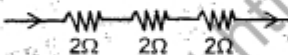
- * 4 ampere * ☒ 1 ampere * 14 ampere * 0.1 ampere

Q.49 A piece of wire of length "L" and an area of cross-section "A" has a resistance "R". Another piece of wire of the same material and the same length but twice the area of cross-section is connected end-to-end with the previous wire. The effective resistance is:

- * R * 2R * ☒ $\frac{1}{3}R$ * $\frac{1}{2}R$

Q.50 If Net resistance of resistors increases, then resistors are in:

- * Parallel combination * ☒ Series Combination
 * Simultaneously in series and in parallel combination
 * Either in series or in parallel combination

Q.51 

In the figure above the equivalent resistance is:

- * 3 Ω * ☒ 6 Ω * 4 Ω * 2 Ω

Q.52 Three resistance 5000, 500, 50 ohm are connected in series across 555 volt mains. The current flowing through them will be:

- * 1 A * 100 mA * 10 mA * 10 A

Resistance in Parallel:

Q.53 If the resistors are connected side by side with their ends joined together at common point, then they are said to be connected:

- * ☒ Parallel * ~~Series~~
 * Not Parallel * Neither in Series nor parallel

Q.54 The equivalent resistance R of the resistance R_1, R_2, R_3 connected parallel is R :

* ☒ $\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ * $\frac{R_1}{R_2} + \frac{R_2}{R_3} + \frac{R_3}{R_1}$ * $R_1 + R_2 + R_3$ * $R_1 R_2 R_3$

Q.55 The potential difference across each resistance are connected is parallel combination:

- * ☒ Same * Different * Infinity * Zero

Q.56 When the resistance are connected in parallel, the equivalent resistance is always:

- * Greater than the sum of the individual resistance
- * Greater than the smallest resistance in combination
- * Equal to the sum of the individual resistance
- ✓ Less than the smallest resistance in the combination

Q.57 In a house circuit all the electrical appliances are connected in parallel with the phase and the neutral to get:

- ✓ The same current and different potential difference
- ✓ The different currents but the same potential difference
- * The different currents and different potential differences
- * The same current and the same potential difference

Q.58 The resistances of 2 ohms, 5 ohms, 7 ohms and 9 ohms are connected in parallel. If the potential difference across the 5 ohms resistance is 5V, the potential difference across 9 ohm resistance will be:

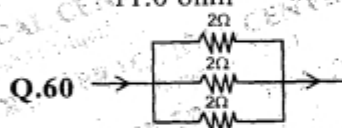
- * 9V
- ✓ 5V
- * 2.5V
- * 1.5V

Q.58(a) Resistors of 3Ω, 5Ω and 7Ω are connected in parallel. If the P.D across 5Ω resistor is 6V, the P.D across the other resistors is: (2013)

- * 4 Volt
- ✓ 6 Volt
- * 8 Volt
- * 10 Volt

Q.59 Three resistors of resistance 2, 3 and 6 ohms are connected in parallel, their equivalent resistance is:

- * 11.0 ohm
- * 1.33 ohm
- * 1.5 ohm
- * 1.0 ohm



If the figure above the equivalence is: $\frac{2}{3}\Omega$ * $\frac{3}{2}\Omega$ * $\frac{1}{3}\Omega$ * 6Ω

Power Dissipation in Resistance:

Q.61 As the charge flows through the conductor energy is dissipated in the form of:

- ✓ Heat
- * Solar energy
- * Light
- * None of these

Q.62 One-Kilo-Watt-Hour is equal to:

- ✓ $3.6 \times 10^5 \text{ J}$
- * $360 \times 10^6 \text{ J}$
- * $3.6 \times 10^4 \text{ J}$
- * $36 \times 10^5 \text{ J}$

Q.63 The power dissipated by a resistance is given by:

- * $P = VR$
- ✓ $P = V^2/R$
- * $P = IR^2$
- * None of these

Q.64 The power dissipated in a resistance is given by:

- ✓ IV
- * I^2R
- ✓ V^2/R
- ✓ All of these

Q.65 The electrical energy dissipated as heat in a resistor is given by:

- * I^2R
- ✓ I^2Rt
- * V^2R
- * V^2Rt

Q.66 The commercial unit of electrical energy is:

- * Ohm
- ✓ Watt
- ✓ Kilowatt-Hour
- * Ampere

Q.67 Two wires of resistance R_1 and R_2 are connected in series in a circuit. If R_1 is the greater than R_2 , Heating would be:

- ✓ More in R_1
- * More in R_2
- * Same in R_1 & R_2
- * All of these

Q.68 When a resistor carries a current "I", the power dissipated by it is "P". If the same resistor carries the current of "3I", the power dissipated will be:

- * P
- * $P/3$
- ✓ $3P$
- * None of the above

Q.69 Unit of Power, Joule / Second is called:

- * Joule
- * Volt
- ✓ Watt
- * Newton

Q.70 If one ampere current flows through a resistor against potential difference of one volt, this is called:

- * Ampere
- ✓ Watt
- * Volt
- * Joule

- Q.71 The practical unit power is:
 * Watt ☒ Kilowatt * Joule * None of these
- Q.72 One Kilowatt is equal to:
 * 10^5 Watt * 10^6 Watt ☒ 10^3 Watt * None of these
- Q.73 Amount of energy delivered by the current in one hour when it supplies energy at the rate of 1000 J/S is known as:
 * Joule ☒ KWh * Newton * None of these
- Q.74 Which one of the following bulbs has least resistance?
 * 100 Watt * 200 Watt ☒ 500 Watt * 60 Watt
- Q.75 If a 40 watt light bulb for 2 hour, how much heat is generated?
 * 80 J * 400 J * 288×10^3 J * 3600 J
- Q.76 The resistance of 60 watt bulb is a 120 volt line is:
 * 30 ohm * 120 ohm * 240 ohm * 60 ohm

Electromotive Force:

- Q.77 The work per unit charge done by the source in moving a charge around a closed loop is called:
☒ Electromotive force * Potential difference
 * Potential energy * Kinetic energy
- Q.78 The total energy expended per coulomb of electricity when charge is driven round a circuit is called:
☒ Electromotive force * Electromotive source
 * Potential energy * Kinetic energy
- Q.79 The unit of electromotive force is:
☒ Joule per coulomb * Joule per second
 * Coulomb per second * Volt per ampere
- Q.80 By electromotive force:
☒ Current is produced * Heat is produced
 * Light is produced * Sound is produced
- Q.81 The terminal potential difference V_t of a battery is always:
☒ Less than emf of battery
 * Equal to emf of the battery * Zero
 * Greater than the emf of battery
- Q.82 Internal resistance is the resistance offered by:
☒ Source of emf * The conductor * The circuit * The resistance
- Q.83 Terminal potential difference V_t of a battery of internal resistance ' r ' and emf ' E ' is: (2011 Supp.)
 * $V_t = E + Ir$ ☒ $V_t = E - Ir$ * $V_t = EIr$ * $V_t = E \frac{r}{I}$
- Q.84 The emf of a source is equal to the potential difference across the terminals of the source when its internal resistance is: (2001)
☒ Zero * Very high * Very low * None of these
- Q.85 The E.M.F. of the three cells, each of 2 volts, in parallel will be:
 * 6V * 8V ☒ 2V * Zero V
- Q.86 Total potential difference across the combination of three cells becomes maximum when: (2003 P.M.)
☒ All the three cells are connected in series
 * All the three cells are connected in parallel
 * Two cells are connected in parallel and the third cell in series with the combination.
 * Two cells are connected in series and the third cell in parallel with the combination.

ANSWER KEY

1. Electric Charge	2. Current
3. Both free and bound electrons	4. $\frac{Q}{t}$
5. Ampere	6. Ampere
7. Valence shells	8. Low potential to high potential
9. 10^{-3} m/s	10. 6.4×10^{-6} A
11. CS^{-1}	12. 3600 C
13. Ohm's Law	14. $I \propto V$
15. Conductance	16. In all of these
17. Straight Line	18. $V = IR$
19. Resistance	20. Ohm
21. 1 Ohm	22. Ω
23. Remains Constant	24. The nature dimension and physical state of the conductor
25. $R/4$	26. $R = \rho \frac{L}{A}$
27. $1/3 R$	28. Ohm
29. Conductance	30. mho or semen
31. Resistivity	32. $\rho = \frac{RA}{L}$
33. Ohm - m	34. The same
35. Same as that of the whole wire	36. Remains the same
37. Resistivity	38. Always increases
39. Increases	40. $\alpha = \frac{(\rho_T - \rho_0)}{\rho_0 \Delta T}$
41. $\alpha = \frac{R_T - R_0}{R_0 \Delta T}$	42. K^{-1}
43. Series	44. $R_1 + R_2 + R_3$
45. Different	46. Greater than the greatest resistance in series
47. The total current through each is the same	48. 1 ampere
49. $\frac{1}{3} R$	50. Series Combination
51. 6Ω	52. 10 A
53. Parallel	54. $\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$
55. Same	56. Less than the smallest resistance in combination
57. The different current but same potential difference	58. 5 V 58(a). 6 V
59. 1.0 ohm	60. $\frac{2}{3}$
61. Heat	62. 36×10^3 J
63. $P = V^2/R$	64. All of these
65. $I^2 Rt$	66. Kilowatt Hour
67. More in R_1	68. 3 P
69. Watt	70. Watt
71. Kilowatt	72. 10^3 Watt
73. KWh	74. 500 Watt
75. 288×10^3 J	76. 240 ohms
77. Electromotive Force	78. Electromotive Force
79. Joule per coulomb	80. Current is produced
81. Less than emf of battery	82. Source of emf
83. $V_t = E - I_r$	84. Zero
85. 2V	86. All the three cells are connected in series

