13.15 MULTIPLE CHOICE QUESTIONS (SELF PRACTICE):

Electric Current:

Q.1 An electric current a 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 =
✓ $\frac{\theta}{t}$ * $\frac{t}{\theta}$ * $\frac{1}{\theta t}$ * θt

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 5.0μs. Electronic charge is 1.6×10^{-6}. The current in ampere following through the conductor is:
* 1.6×10^{-6} A * 2.6×10^{-6} A * 3.6×10^{-6} A ✓ $6.4 \times 10^{+6}$ A

Q.11 Which of the following represents and electric current:
* $ErgC^{-1}$ ✓ CS^{-1} * JS^{-1} * Dyne S^{-1}

Q.12 If 1 ampere current flows 2m long conductor, the charge flow through this is 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

Q.16 Ohm's Law is obeyed in: **(2003 P.E)**

* A semiconductor * A metallic conductor
* An electron tube ✓* 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:

* $V = \frac{R}{\sqrt{I}}$ * $V = \frac{R}{I}$ * $V = \frac{I}{R}$ ✓$V = I R$

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 * Decreases
✓Remains constant * None of these $V \propto I$

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 ✓1/3R * 1/2R

Q.28 Volt per Ampere is:

✓Ohm * Joule * Watt * KWh

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

* Specific resistance * Current
✓* Conductance * 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 * Permitivity ✓ 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:
* 1/3ρ * 2/3ρ
✓ 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 * Permitivity * 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:
* $\propto = \rho\, \Delta T / \rho_T - \rho_O$ ✓ $\propto = \frac{(\rho_T - \rho_O)}{\rho_O \Delta T}$
* $\propto = \rho_O (\rho_T - \rho_O) / \Delta T$ * $\propto = \Delta T (\rho_T - \rho_O)\rho_O$

Q.41 The temperature co-efficient of resistance of a material is given by the relation:
✓ $\propto = \frac{(R_T - R_O)}{R_O \Delta T}$ * $\propto = R_O \Delta T / (R_T - R_O)$
* $\propto = \frac{R_O}{(R_T - R_O)\Delta T}$ * $\propto = \frac{\Delta T (R_T - R_O)}{R_O}$

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 resistence 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:

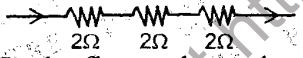
* 4 ampere ✓* 1 ampere * 14 ampere * 0.1 ampere

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 ✓* 1/3R * 1/2R

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

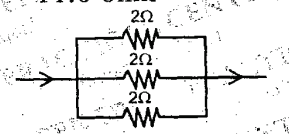
Q.57 In a house circuit all the electrical appliances are connected in parallel with the phase and the neutral to get:
* The same current and different potential difference
* The different currents but the same potential difference
* The different currents and different potential differences
* The same 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 07 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

Q.60



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 is the form of:
* Heat * Solar energy * Light * None of these

Q.62 One-Kilo-Watt-Hour is equal to:
* 3.6×10^5J * 360×10^6J * 3.6×10^4J * 36×10^5J

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:
* Coulomb per second * Joule per second
* Joule per coulomb * Volt per ampere

Q.80 By electromotive force:
* Light is produced * Heat is produced
* Current is produced * Sound is produced

Q.81 The terminal potential difference V_t of a battery is always:
* Equal to emf of the battery * Less than emf of battery
* Greater than the emf of battery * Zero

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 'γ' 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. $\frac{\theta}{t}$
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. $\alpha = \frac{(\rho_T - \rho_o)}{\rho_o \Delta T}$
41. $\alpha = \frac{R_T - R_o}{R_o \Delta T}$	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 some	48. 1 ampere
49. $\frac{1}{3}R$	50. Series Combination
51. 6 Ω	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. 36×10^5 J
63. $P = V^2/R$	64. All of these
65. I^2Rt	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. $Vt = E - Ir$.	84. Zero
85. 2V	86. All the three cells are connected is series