12.19 MULTIPLE CHOICE QUESTIONS (SELF PRACTICE):

Charge:

Q.1 Branch of physics which deals with the charges at rest is called:
* Electricity * Electrostatics * Modern Physics * Magnetism

Q.2 Which one of the following statement is correct:
* Similar charges attract each other * Similar charges repel each other
* Similar charges neither attract nor repel each other
* None of the above

Q.3 Free electrons are:
* Fixed * Tightly bound * Loosely bound * None of these

Q.4 S.I unit of charge is:
* Joule * Volt * Coulomb * Calorie

Q.5 The number of electrons in one coulomb charge are equal to: **(2013)**
* 6.25×10^{18} * 1.6×10^{-19} * Zero * 6.2×10^{21}

Coulomb's Law:

Q.6 The force between two charged particles is inversely proportional to the:
* Coulomb's constant * Product of charges
* Square of the distance between them
* Masses of charges

Q.7 The force between two similar unit charges placed one meter apart in air in Newton is:
* Zero * 1 * 9×10^9 * None of these

Q.8 The magnitude of Coulomb's force will be:
* Maximum in free space * Maximum in other medium
* Same in free space and other medium
* None of these is correct

Q.9 The magnitude of electrostatic force is F and separation between the charges is doubled then the electrostatic force would be:
* 2F * ½ F * 4F * ¼ F

Q.10 Coulomb's Law closely resembles:
* Newton's second law of motion * Newton's third law of motion
* Newton's gravitational law * The law of conservation of energy

Q.11 If the medium between the charges is other than air or space, then the electrostatic force will:
* Not change * Increase * Decrease * Be zero

Q.12 The magnitude of electrostatic force does not depend upon:
* Magnitude of the charges * Medium between the charges
* Distance between the charges * Nature of the charges

Q.13 The magnitude of the force between two unit positive charges when the distance between them is one metre would be:
* 0 N * 1.0 N * 2.0 N * Coulomb's constant

Q.14 Coulomb's Law for the two equal charges "q" when they are at a distance "r" is expressed by:
* Kq^2/r * Kq^2/r^2 * Kq/r * Kq/r^2

Q.15 Unit of Coulomb's constant "K" is:
* Nm^2C^{-2} * NmC^{-2} * $Nm^{-2}C^2$ * Nm^2C^2

Q.16 Hydrogen atom has single electron and single proton each of charge q. If the radius of the first orbit is "r" then the electrostatic force between them would be:
* $-Kq^2/r^2$ * $-Kq/r^2$ * Kq/r ✓ Kq^2/r^2

Q.17 Dielectric always_____ the electrostatic force between the two point charges: **(2000)**
* Increases * Changes ✓ Decreases * Does not change

Q.18 *What would be the distance between the equal charges of 3μC when the coulomb's force between them is $9x10^{-3}N$:*
* 3cm ✓ 3m * 9cm * 9m

Q.19 The electrostatic force between two electrons at a distance is "F" Newton, the electrostatic force between two protons at the same distance is: **(2011)**
* Zero * $2\frac{F}{2}$ ✓ * F * 2F

Q.20 Decreasing the separation of two positive charges by one-half will cause electrostatic force of repulsion to change by: **(2011 Supp, 2010, 2007)**
✓ 4 times * 2 times * ½ time * ¼ time

Q.21 Two positive point charges repel each other with a force of 4×10^{-4} N when placed at a distance of 1 meter. If the distance between them is increased by 2m, the force of repulsion will be: **(2008)**
✓ 1×10^{-4} N * 8×10^{-4} N * 2×10^{-4} N * 4×10^{-4} N

Intensity of Electric Field:

Q.22 The force per unit charge is called: **(2002 P.M)**
* Electric Field * Electric Flux
* Electric Potential ✓ Electric Intensity

Q.23 Newton per coulomb is equivalent to:
* Meter per volt ✓ Volt per meter
* Volt per meter per meter * Volt into meter

Q.24 The physical quantity which possess both units, Newton per coulomb and Volt per meter is: **(2001)**
✓ Electric Intensity * Electric Potential
* Electric Flux * Electric Force

Q.25. Which of the following could not be the units of electric intensity: **(2007, 2002 P.E)**
✓ Joule per coulomb per meter ✓ Joule per coulomb
* Volt per meter * Newton per coulomb

Q.26 Direction of electric force and electric field intensity is:
✓ Parallel to each other * Perpendicular to each other
* Opposite to each other * in any direction

Q.27 The Physical quantity which determines the effect of Force on charged particle in a certain region is called.
✓ Electric Intensity * Electric Flux
* Electric Potential * Electric force

Q.28 The relation "$-\frac{\Delta V}{\Delta r}$" represents:
* Gauss's law * Electric flux ✓ Electric Intensity ✓ Potential difference

Q.29 Which of the following cannot be scalar quantity? **(2010, 2007)**
* Electric Potential * EMF * Electric Flux ✓ Electric Intensity

Q.30 When a dielectric is placed in an electric field, it becomes: **(2009)**
* Negatively charged only * Positively charged only
✓ Polarized * Conductive

Q.31 The introduction of a dielectric between the oppositely charged plates causes the intensity: **(2008)**
* To increase * To decrease
* To remain constant * To increase and decrease

Q.32 Force experienced by a unit positive charge in the electric field is known as:
* Charge density * Electric intensity
* Electric flux * Electric flux density

Electric Lines of Force:

Q.33 The concept of the electric lines of force was introduced by a famous scientist called: **(2006)**
* Newton * Einstein * Coulomb * Faraday

Q.34 The field lines start from positive charge and:
* And on a positive charge * And on a negative charge
* Do not end on a negative charge * None of these

Q.35 In the regions where the field lines are parallel and equally spaced, the field is:
* Uniform on all points * Not uniform on all points
* Uniform on some points and not uniform on some point
* None of these

Q.36 The direction of the electric field at point is given by the:
* Normal to a field line at the point * Tangent to a field line at the point
* Line between the tangent and normal to field line at that point
* None of these

Q.37 The electric field lines are closer where the field is:
* Strong * Weak
* Weaken * Neither strong nor weak

Q.38 Electric field lines:
* Can cross each other * Cannot cross each other
* Can cross each other at low temperature
* Non of these

Q.39 The Electric Lines of Force:
* Physically exist around the charges
* Physically exist only near the charge
* Physically exist every where * Imaginary

Electric Flux:

Q.40 The number of the field lines passing through a certain element of area is known as:
* Electric flux through that area * Electric current through that area
* Voltage through that area * Amperes through that area

Q.41 The electric flux is denoted by:
* α * μ * ϕ * β

Q.42 Electric flux is:
* Neither scalar nor vector quantity * A vector quantity
* A scalar quantity * None of these

Q.43 ϕ = _____:
* $\vec{E} \cdot \overline{\Delta A}$ * $\vec{E} \times \overline{\Delta A}$ * $\overline{\Delta A} \times \vec{E}$ * $\vec{E} \cdot \vec{E}$

Q.44 If area ΔA is inclined at angle θ with the field lines, then the flux is:
* $E\Delta A \sec\theta$ * $E\Delta A \tan\theta$ * $E\Delta A \sin\theta$ * $E\Delta A \cos\theta$

Q.45 The electric flux through an area will be maximum if:
* Surface is held parallel to the electric field $\vec{E}$
* Surface is held perpendicular to the electric field $\vec{E}$
* Surface makes an angle 45° with electric field $\vec{E}$
* Surface makes an angle 30° with electric field $\vec{E}$

Q.46 If area ΔA is held parallel to field lines, then:
* All field lines cross this area
* Some field lines cross and some do not cross this area
* No field lines cross this area
* None of these

Q.47 S.I. Unit of elastic flux is:
* Nmc^{-1} * Nm^2c^{-1} * Nm^2c^{-2} * Nmc^{-2}

Q.48 The Flux through a surface will be minimum, when angle between $\vec{E}$ and $\vec{\Delta A}$ is: **(2002 P.E)**
* 90° * 60° * 30° * 0°

Q.49 Electric flux will be positive when the angle between $\vec{E}$ and vector area is:
* Greater then 90^0 * Less than 90^0
* 90^0 * None of these

Gauss's Law:

Q.50 The Electric Flux through a closed surface depends upon: **(2001)**
* Size of the surface * Shape of the surface
* Position of charge enclosed in the surface
* Magnitude of charge enclosed in the surface

Q.51 The electric flux through the surface of the sphere is directly proportional to the:
* Surface area of the sphere * Radius of the sphere **(2008)**
* Charge at the center of the sphere * (A) and (C) are correct

Q.52 Gauss's Law is applied to determine the:
* Absolute potential
* Electric intensity due to a large charge distribution
* Electric intensity of an isolated point charge
* Electric potential between two points in an electric field

Q.53 Electric flux through the surface of a sphere which constants a charge at its centre depends on: **(2008)**
* The radius of the sphere * The surface area of the sphere
* The amount of charge inside the sphere
* The amount of charge outside the sphere

Q.54 The electric field intensity between two uniformly oppositely charged parallel plates is:
* $\frac{\sigma}{\epsilon_o}$ * $\frac{\sigma}{2\epsilon_o}$ * $\frac{2\sigma}{\epsilon_o}$ * Zero

Q.55 Electric intensity between two similarly charged plane sheets is: **(2012, 2002 P.E)**
* $\frac{\sigma}{\epsilon_0}$ * $\frac{2\sigma}{\epsilon_0}$ * $\frac{\sigma}{2\epsilon_0}$ * Zero

Q.56 Electric Intensity at the centre of uniformly distributed charge is:

* Zero * $\frac{Kq}{r^2}$ * $\frac{q}{r^2}$ * $\frac{q}{\epsilon_0}$

Q.57 Electric field at the center of square when 1μC charge are placed at its each corner is:

* Zero * 2 Volt/m * $\sqrt{2}$ Volt/m * 4 Volt/m

Q.58 The electric field intensity between two oppositely charged planes is: **(2004)**

* $\frac{2\sigma}{\epsilon_0}$ * $\frac{\sigma}{2\epsilon_0}$ * $\frac{\sigma}{\epsilon_0}$ * Zero

Q.59 The unit of electric flux density is:

* N/C * V/m * Nm^2 * A and B

Electric Potential:

Q.60 Change in P.E. per unit charge in the electric field is.

* Electric potential * Power * K.E * Work done

Q.61 Electric potential, which is measured with respect to the zero potential, is called:

* Absolute electric potential * Change in K.E.
* An electric potential * None of these

Q.62 In equipotential surface work done in moving the charged particle is:

* Positive * Negative * Zero * Infinity

Q.63 The potential difference between the pair of similar conducting plates is known. What additional information is needed in order to find the electric field intensity?

* Permitivity of the medium * Dielectric constant
* Separation between the plates * Separation and area of the plates

Q.64 The change in potential energy per unit charge between two points in an electric field is called: **(2009, 2005, 2003 P.E)**

* Potential difference * Absolute potential
* Electric intensity * Permitivity

Q.65 Work done per unit charge between two points in an equal potential surface is:

* Electric intensity * Electric flux
* Potential difference * None of these

Q.66 The quantity $\frac{\Delta V}{\Delta S}$ is called: **(2011, 2006)**

* Electric potential * Electric field intensity
* Potential gradient * Electric induction

Q.67 Joule per coulomb is called: **(2012, 2010 Supp. 2004)**

* Farad * Ampere * Volt * Henry

Capacitor:

Q.68 If capacitors are connected in such a way that their net capacitance increases then they are connected in:

* Complex network * Different paths
* A single path * Bridge Circuit

Q.69 Equivalent capacitance of three 3μF capacitors connected in series is:

* 1μF * 3μF * 9μF * Zero

Q.70 Two capacitors of 3μF and 6μF are connected in series, their equivalent capacitance is:

* 9μF * 2μF * $\frac{1}{2}$μF * 3μF

Q.71 If 4μF and 2μF capacitors are connected in series, the equivalent capacitor is:

* 1.33μF * 0.75μF * 6μF * 2μF

(2010 Supp, 2006, 2002 P.M)

Q.72 Relative permitivity of medium is the ratio of its permitivity with the:

* Permitivity of any medium * Permitivity of itself **(2005)**
* Permitivity of free space * Permitivity of water

Q.73 A dielectric k = 2 is inserted between the plates of a 20μF capacitor. Its capacitance will become: **(2005)**

* 10μF * 18μ.F * 22μF * 40μF

Q.74 Net capacitance of parallel capacitors:

* Does not change * Increases
* Decreases * None of these

Q.75 One coulomb per Volt is: C/V → Farad **(2007)**

* Farad * Tesla * Joule * Ampere

Q.76 The concept of the electric lines of force was introduced by a famous scientist called:

* Newton * Einstein * Coulomb * Faraday

Q.77 The capacitance of a parallel plate capacitor does not depend on the: **(2009)**

* Area of the plates * Nature of the plates
* Distance between the plates * Medium between the plates

Q.78 How three capacitors each of capacitance 2μF could be connected in circuit to obtain equivalent capacitance of 3μF.

* Two in series and one in parallel * Two in parallel and one in series
* In parallel combination * In series combination

Q.79 S. I. Unit of Relative permitivity is:

* C^2Nm^2 * $Nm^{-2}C^{-2}$ * $C^2N^{-1}m^{-2}$ * None of these

Q.80 If capacitors are connected in such a way that their net capacitance decreases, then they are connected in:

* Bridge circuit * A single path (series) * Different paths * Complex network

Q.81 Charge stored in a capacitor is directly proportional to the:

* Current * Physical conditions of capacitor
* Potential difference * Resistance

Q.82 The ratio between the charge stored and potential difference of a capacitor is known as:

* Inductance * Conductance * Reactance * Capacitance

Q.83 For the capacitance of a parallel plate capacitor which of the following is correct:

* It is inversely proportional to the area of the plates and distance between the plates
* It is inversely proportional to the area of the plates and distance between the plates
* Capacitance is directly proportional to the area of the plates and distance between the plates
* It is directly proportional to the area of the plate and inversely proportional to the distance between the plates

Q.84 When two or more capacitors are connected in series then they will have:
* Same charge * Same capacitance **(2001)**
* Same potential difference * Same charge and same capacitance

Q.85. When two or more capacitors are connected in parallel then they will have:
* Same charge * Same capacitance
* Same potential difference * Same charge and same capacitance

Q.86 A capacitor of 1.0 F will:
* Store 1.0C charge at the potential difference of 1.0V
* Discharge in 1 second when connected across a resistor of 1.0 Ohm
* Be fully charged in 1 second by a current of 1 amp
* Block the alternating current

Q.87 The separation between the parallel plates of a capacitor is doubled then its capacitance C will be:
* 2C * ½ C * 4C * ¼C

Q.88 Capacity of a capacitor means:
* Total potential of the capacitor
* Surface density of charge on the plates
* Total charge held by the capacitor * None of these

Q.89 After charging the parallel plates capacitor, the battery is removed. If the separation between the plates increases then:
* Capacitance decreases
* The charge on the capacitor increases
* The voltage across the plates increases
* None of these

Q.90 In order to get maximum equivalent capacitance, the capacitors must be connected in:
* Complex combination * Series combinations
* Parallel combination * None of these

Q.91 Three capacitor of 3μF of each are connected in _____ combination to get equivalent capacitance of 1μF:
* Complex network * Parallel
* Series * None of these

Q.92 The presence of dielectric between the plates of a capacitor results in:
* No change in capacitance * Increase in the capacitance
* Decrease in the capacitance * None of these
(2010 Supp, 2003 P.E, 2003 P.M)

Q.93 If the area of the a parallel plats capacitor is doubled, the capacitance: **(2012)**
* Remains uncharged * Is half
* Is double * Is increased four times

ANSWER KEY

1. Electrostatics	2. Similar charges repel each other
3. Loosely bound	4. Coulomb
5. 6.25×10^{18}	6. Square of the distance between them
7. 9×10^{9}	8. Maximum in free space
9. ¼ F	10. Newton's gravitational law
11. Decrease	12. Nature of the charges
13. Coulomb's constant	14. Kq^2/r^2
15. Nm^2C^{-2}	16. Kq^2/r^2
17. Decreases	18. 3m
19. F	20. 4 times
21. 1×10^{-4} N	22. Electric Intensity
23. Volt per meter	24. Electric Intensity
25. Joule per coulomb	26. Parallel to each other
27. Electric Intensity	28. Potential difference
29. Electric Intensity	30. Polarized
31. To decrease	32. Electric intensity
33. Faraday	34. And on a negative charge
35. Uniform on all points	36. Tangent to a field line at the point
37. Strong	38. Cannot cross each other
39. Imaginary	40. Electric flux through that area
41. ϕ	42. A scalar quantity
43. $\vec{E} \cdot \overrightarrow{\Delta A}$	44. $E\Delta A \cos\theta$
45. Surface is held parallel to the electric field $\vec{E}$	46. All field lines cross this area
47. Nm^2c^{-1}	48. 90°
49. Less than 90^0	50. Magnitude of charge enclosed in the surface
51. Charge at the center of the sphere	52. Electric intensity due to a large charge distribution
53. The amount of charge inside the sphere	54. $\frac{\sigma}{\epsilon_o}$
55. Zero	56. Zero
57. Zero	58. $\frac{\sigma}{\epsilon_o}$
59. A and B	60. Electric potential
61. Absolute electric potential	62. Zero
63. Separation between the plates	64. Potential difference
65. Potential difference	66. Potential gradient
67. Volt	68. Different paths
69. 1μF	70. 2μF
71. 1.33μF	72. Permitivity of free space
73.	74. Increases
75. Farad	76. Faraday
77. Nature of the plates	78. Two in series and one in parallel
79. None of these	80. A single path
81. Potential difference	82. Capacitance
83. It is directly proportional to the area of the plate and inversely proportional to the distance between the plates	84. Same charge
85. Same potential difference	86. Store 1.0C charge at the potential difference of 1.0V
87. ½ C	88. Total charge held by the capacitor
89. Capacitance decreases	90. Parallel combination
91. Series	92. Increase in the capacitance
93. Is double	