

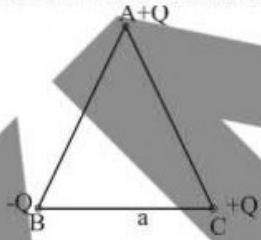
PHYSICS NMDCAT

TOPIC WISE TEST (UNIT- 6)

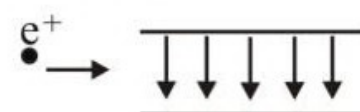
TOPICS:

Electrostatics

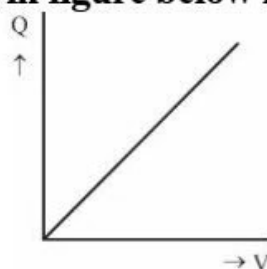
- Q. 1 The magnitude of $\frac{1}{4\pi\epsilon_0}$ is
- A. 9×10^9 B. 8.85×10^{-12}
C. 9×10^{-9} D. 8.85×10^{12}
- Q. 2 A force of 0.01 N is exerted on a charge of 1.2×10^{-5} C. at a certain point. The electric field at that point is
- A. 5.3×10^6 N/C B. 8.3×10^6 N/C
C. 5.3×10^6 N/C D. 8.3×10^2 N/C
- Q. 3 A and B are two points in an electric field. If the work done in carrying 4.0 coulomb of electric charge from A to B is 16.0 joule the potential difference between A and B is
- A. Zero B. 4 V
C. 2.0 V D. 16V
- Q. 4 How many electrons will have a charge of one coulomb?
- A. 6.2×10^{18} B. 5.2×10^{18}
C. 6.2×10^{19} D. 5.2×10^{19}
- Q. 5 Electric lines of force about a negative point charge are
- A. Circular, anticlockwise B. Circular, clockwise
C. Radial inwards D. Radial outwards
- Q. 6 Two charge conducting spheres of radii R_1 and R_2 , separated by a large distance, are connected by a long wire. The ratio of the charges on them is
- A. $\frac{R_1}{R_2}$ B. $\frac{R_1^2}{R_2^2}$
C. $\frac{R_2}{R_1}$ D. $\frac{R_2^2}{R_1^2}$
- Q. 7 The electrostatic force between two point charges q_1 and q_2 at separation r is given by $F = kq_1 q_2 / r^2$. The constant k
- A. Depends on the system of units only
B. Depends on the medium between the charges only
C. Depends on both the system of units and the medium between the charges
D. Is independent of both the system of units and the medium between the charges
- Q. 8 Two plates are 2cm apart. If a potential difference of 10 volts is applied between the plates. The electric field between the plates will be
- A. 20 N/C B. 250 N/C C. 500 N/C D. 1000 N/C
- Q. 9 The space between the plates of a capacitor is filled by a liquid of dielectric constant k . The capacitance of the capacitor
- A. Increases by a factor k B. Increases by a factor k^2
C. Decreases by a factor k D. Decreases by a factor k^2
- Q. 10 Neutral zone in electric field of two similar charges is region where
- A. Both positive and negative charges are present
B. Equal quantity of both positive and negative charges are present
C. An electric dipole exists
D. No electric field line passes
- Q. 11 Two electrons are removed from a conductor the charge on it is
- A. 1.6×10^{-19} C B. 3.2×10^{-19} C
C. -3.2×10^{-19} C D. Neutral
- Q. 12 Uniform electric field exist
- A. Near positive charge B. Near negative charge
C. Between two equal and oppositely charged plates
D. Between two equal and oppositely charged infinite plates
- Q. 13 The unit of electric field is not equivalent to
- A. $\frac{N}{C}$ B. $\frac{J}{C}$ C. $\frac{V}{m}$ D. $\frac{J}{C.m}$

- Q. 14** Which of the following remains unchanged if a dielectric is placed between a charged capacitor?
- A. Q B. E
C. F_e D. V
- Q. 15** If a charge on a capacitor is doubled, then its capacitance will be
- A. Halved B. Doubled
C. Remain unchanged D. Become four times
- Q. 16** A particle of mass m and charge q is released from rest in a uniform electric field E . The K.E attained by the particle after moving a distance d is
- A. $\frac{Ed}{q}$ B. qEd C. qE^2d D. $\frac{qE}{d^2}$
- Q. 17** The force between two point charges placed in air is F . If air is replaced by a medium of relative permittivity ϵ_r the force is reduce to:
- A. $\epsilon_r F$ B. $\frac{F}{\epsilon_r}$ C. $\frac{\epsilon_r}{F}$ D. ϵ_r
- Q. 18** Three charges are placed at the vertices of an equilateral triangle of side 'a' as shown in Fig. The force experienced by the charge placed at the vertex A in a direction normal to BC is:
- 
- A. $Q^2/(4\pi\epsilon_0 a^2)$ B. Zero
C. $-Q^2/(4\pi\epsilon_0 a^2)$ D. $Q^2/(2\pi\epsilon_0 a^2)$
- Q. 19** The potential gradient between the two charged plates having separation of 0.5 cm and potential difference of 12 volts is:
- A. 240 NC^{-1} B. 24 NC^{-1} C. 2.4 NC^{-1} D. 2400 NC^{-1}
- Q. 20** Two charged spheres are separated by 2mm. Which of the following would produce the greatest attractive force?
- A. $+1q$ and $+4q$ B. $+2q$ and $+2q$
C. $-1q$ and $-4q$ D. $+2q$ and $-2q$
- Q. 21** A $50\mu\text{F}$ capacitor has potential difference of 8V across it. The charge on the capacitor is
- A. $4 \times 10^{-4} \text{ C}$ B. $4 \times 10^{-3} \text{ C}$
C. $4 \times 10^{-2} \text{ C}$ D. $6.76 \times 10^{-6} \text{ C}$
- Q. 22** Who introduced the concept of electric field lines?
- A. Michael Faraday C. Maxwell
B. Ampere D. Shawan
- Q. 23** The main function of a capacitor is to
- A. Block current flow B. Store energy
C. Help current flow D. Dissipate heat
- Q. 24** If $4 \times 10^{20} \text{ eV}$ of energy is required to move a charge of 1C between two points, the P. D between the points is
- A. $4 \times 10^{20} \text{ V}$ B. $64 \times 18^{20} \text{ V}$
C. $64 \times 19^{19} \text{ V}$ D. 64 V
- Q. 25** A charge of 10^{-10} C between two parallel plates 1cm apart experiences a force of 10^{-5} N . The potential difference between the plates is
- A. 10 V B. 10^3 V
C. 10^2 V D. 10^5 V
- Q. 26** Potential gradient is defined as
- A. The maximum value of rate of change of potential with distance
B. The minimum value of rate of change of potential with distance
C. The maximum value of rate of change of potential with time
D. None of these
- Q. 27** The electric field intensity at infinite distance from point charge is
- A. Infinite C. Zero
B. Positive D. Negative
- Q. 28** The electric lines are farther apart where field is
- A. Strong C. Zero
B. Weak D. None of these

- Q. 29** A proton enters in a uniform electric field, the path of its motion will be;
 A. A straight line perpendicular to field lines
 B. A curved line in the direction of field line
 C. A curved line opposite to the direction of field lines
 D. Cannot be predicted
- Q. 30** In central region of a parallel plate capacitor the electric field lines are
 A. Perpendicular
 B. Orthogonal
 C. Parallel
 D. Curved
- Q. 31** When a thin mica sheet is placed between the plates of capacitor, then the amount of charge as compared to its previous value on its plates will become
 A. Unchanged
 B. Zero
 C. Less
 D. More
- Q. 32** Electric field intensity is a
 A. Scalar quantity
 B. Linear quantity
 C. Vector quantity
 D. None of these
- Q. 33** The coulomb's law is valid for the charges which are
 A. Moving and point charges
 B. Stationary and point charges
 C. Moving and non-point charges
 D. Stationary and large size charges
- Q. 34** Which one of the following statements regarding electrostatics is wrong?
 A. Charge is conserved
 B. Charge is quantized
 C. There is no field near an isolated charge at rest
 D. A moving charge produces both electric and magnetic fields
- Q. 35** The potential inside a hollow spherical conductor
 A. Is constant
 B. Varies directly as the distance from the centre
 C. Varies inversely as the distance from the centre
 D. Varies inversely as the square of the distance from the centre
- Q. 36** If air is the dielectric between plates of a capacitor, by doubling the distance between the plates and decreasing area to $\frac{1}{3}$ of the original value, its capacitance becomes
 A. 10 times
 B. $\frac{1}{6}$ times
 C. 6 times
 D. 90 times
- Q. 37** The increase in the capacitance of a capacitor is the largest for the dielectric between the plates having relative permittivity value.
 A. $\epsilon_{air} \approx 1$
 B. $\epsilon_{oilpapes} \approx 2$
 C. $\epsilon_{mica} \approx 3$
 D. $\epsilon_{Teflon} \approx 2.1$
- Q. 38** Potential difference of a capacitor ($6\mu F$) is changed from 10V to 20V, then increase in energy stored will be
 A. $2 \times 10^{-4} J$
 B. $4 \times 10^{-4} J$
 C. $3 \times 10^{-4} J$
 D. $9 \times 10^{-4} J$
- Q. 39** A gold nucleus (radius r) is represented by the symbol ${}^{197}_{79}Au$ taking as the elementary charge. What is the electric field strength at the surface of an isolated gold nucleus?
 A. Zero
 B. $\frac{79e}{4\pi \epsilon_0 r^2}$
 C. $\frac{197e}{4\pi \epsilon_0 r^2}$
 D. $\frac{79e^2}{4\pi \epsilon_0 r^2}$
- Q. 40** The potential at a point situated at a distance 50cm from a charge of $5\mu C$ is
 A. $9 \times 10^{-14} C$
 B. $9 \times 10^{-2} V$
 C. $9 \times 10^4 V$
 D. $9 \times 10^2 V$
- Q. 41** Field free region is obtained
 A. Between equal and opposite charges
 B. Surface of charged sphere
 C. Between equal and same charges
 D. None
- Q. 42** When potential in a capacitor rises from 0 to V , then average potential difference is
 A. V
 B. $\frac{V+V}{2}$
 C. $-V$
 D. $\frac{V}{2}$



- Q. 43** An electron is moving towards high potential. Its electrical P.E
 A. Increases
 B. Remains constant
 C. Decrease
 D. May increase may decrease
- Q. 44** The work done in placing a charge of $8 \times 10^{-18} \text{ C}$ on a capacitor of capacitance of $100 \mu\text{F}$ is
 A. $32 \times 10^{-32} \text{ J}$
 B. $3.1 \times 10^{-26} \text{ J}$
 C. $16 \times 10^{-32} \text{ J}$
 D. 4×10^{-10}
- Q. 45** The slope of the graph shown in figure below is

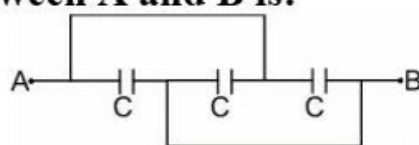


- A. Capacitance
 B. Energy density
 C. Energy stored
 D. Electric intensity
- Q. 46** A charge of $1 \mu\text{C}$ experiences a force of 10^{-6} N at a point then the electric intensity at that point is
 A. 10^6 NC^{-1}
 B. 10^{-12} NC^{-1}
 C. 10^{-6} NC^{-1}
 D. 1 NC^{-1}
- Q. 47** When two charges are of equal magnitude q , force they exert on each other is F . When one of charge is doubled, the $2q$ charge exerts a force of $2F$ on charge q . The force exerted by charge q on $2q$ is
 A. F
 B. $\frac{F}{2}$
 C. $\frac{F}{4}$
 D. $2F$
- Q. 48** The net charge on a capacitor is
 A. infinity
 B. zero
 C. $\frac{q}{2}$
 D. $2q$
- Q. 49** A proton has a mass of $1.67 \times 10^{-27} \text{ kg}$ and charge $1.6 \times 10^{-19} \text{ coulomb}$. If the proton is to be accelerated through a potential difference of one million volts, then the K.E is:
 A. $1.6 \times 10^{-15} \text{ J}$
 B. $1.6 \times 10^{-13} \text{ J}$
 C. $1.6 \times 10^{-13} \text{ J}$
 D. $3.2 \times 10^{-13} \text{ J}$
- Q. 50** A capacitor has charge $50 \mu\text{C}$ when connected to a battery. When a dielectric is placed between the plates $120 \mu\text{C}$ charge flows through the battery. The relative permittivity of dielectric is
 A. 1.4
 B. 2.4
 C. 3.4
 D. 4.4
- Q. 51** A charge particle is free to move in an electric field. It will travel
 A. Always along a line of force
 B. Along a line of force, if its initial velocity is zero
 C. Along a line of force, if it has some initial velocity in the direction of an acute angle with the line of force
 D. None of the above
- Q. 52** The potential at a point, due to a positive charge of $100 \mu\text{C}$ at a distance of 9m , is
 A. 10^4 V
 B. 10^5 V
 C. 10^6 V
 D. 10^7 V
- Q. 53** The quantity $\frac{\Delta V}{\Delta r}$ is known as:
 A. Potential Difference
 B. Potential Energy
 C. Potential Gradient
 D. All of these
- Q. 54** A unit positive charge $+q_0$ placed anywhere in the vicinity of a positive point charge, experiences a repulsive force directed.
 A. Radially inward
 B. Radially out ward

- C. Radially zero
D. None of these
- Q. 55** Capacitance in the presence of medium is given by:
 A. $\frac{A\epsilon_r\epsilon_o}{r^2}$
 B. $\frac{A\epsilon_r}{r^2}$
 C. $\frac{A\epsilon_r\epsilon_o}{d}$
 D. $\frac{A\epsilon_r}{d}$
- Q. 56** If E be the electric intensity of an electrostatic field, then the electrostatic energy density is proportional to
 A. E
 B. E^2
 C. $1/E^2$
 D. E^3
- Q. 57** The coulombs force between two-point charges is F. If magnitude of each charge is doubled and distance between charges is halved, the forces between them becomes
 A. F
 B. 8F
 C. 4F
 D. 16F
- Q. 58** Relative permittivity ϵ_r is defined by the following relation.
 A. $\frac{C_{med}}{C_{vac}}$
 B. $\frac{C_{vac}}{C_{med}}$
 C. $C_{med} \times C_{vac}$
 D. $C_{med} + C_{vac}$
- Q. 59** A charge of 5C experiences a force of 5000N when it is kept in a uniform electric field. What is the potential difference between two points separated by a distance of 1cm?
 A. 250 V
 B. 2500V
 C. 1000V
 D. 10V
- Q. 60** The quantity $\frac{1}{2}\epsilon_o E^2$ has the significance of:
 A. Energy/farad
 B. Energy/coulomb
 C. Energy/volume
 D. Energy
- Q. 61** A capacitor charges and discharges:
 A. Rapidly
 B. Linearly
 C. Exponentially
 D. Logarithmically
- Q. 62** Force between the plates of a charged parallel plate capacitor is attractive and its magnitude is
 A. $\frac{Q^2}{A\epsilon_o}$
 B. $\frac{Q^2}{2A\epsilon_o}$
 C. $Q^2 A\epsilon_o$
 D. $Q A \epsilon_o$
- Q. 63** Capacity of a parallel plate capacitor can be increased by
 A. Increasing the distance between the plates
 B. Decreasing the thickness of the plates
 C. Increasing the thickness of the plate
 D. Decreasing the distance between the plates
- Q. 64** The electric intensity at infinite distance from the point charge is
 A. Zero
 B. Infinite
 C. 1-volt m^{-1}
 D. Negative
- Q. 65** Value of ϵ_r for air is;
 A. 1.6
 B. 1.96
 C. 1.986
 D. 1.0006
- Q. 66** A positive charge is moved from a low potential (a) to a high potential point (b) then the electric potential energy.
 A. Increase
 B. Will remain the same
 C. Decrease
 D. Nothing definite can be predicted
- Q. 67** The force experience by unit positive charge placed at a point in an electric field is called:
 A. Coulomb's force
 B. Faraday's force
 C. Lorentz's force
 D. Electric field intensity

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- Q. 81** The electric field intensity \vec{E} is the
 A. Integral of potential
 B. Negative gradient of energy
 C. Positive gradient of energy
 D. Negative gradient of potential
- Q. 82** S.I unit of electric intensity is NC^{-1} or equivalent as
 A. V.m^{-1}
 B. $\text{V}^{-1}.\text{m}^{-1}$
 C. mV^{-1}
 D. V.m
- Q. 83** Three equal capacitors, each with capacitance C are connected as shown in fig. the equivalent capacitance between A and B is:



- A. C
 B. $C/3$
 C. $3C$
 D. $3/2C$
- Q. 84** Two thin infinite parallel plates have uniform charge densities $+\sigma$ and $-\sigma$. The electric field in the space between them is
 A. $\sigma/2\epsilon_0$
 B. $\sigma/60$
 C. σ/ϵ_0
 D. Zero
- Q. 85** Neutral zone in electric field of two similar charges is region where
 A. Both positive and negative charges are present
 B. Equal quantity of both positive and negative charges are present
 C. An electric dipole exists
 D. No electric field line passes
- Q. 86** Capacitance with air is 10F , if a dielectric of $r = 100$ is inserted then new capacitance
 A. 1000 F
 B. 1000 F
 C. $10\text{ }\mu\text{F}$
 D. 100 F
- Q. 87** Three capacitors of capacitance $12\text{ }\mu\text{F}$ each are available. The minimum and maximum capacitances which may be obtained from these are
 A. $12\text{ }\mu\text{F}$, $36\text{ }\mu\text{F}$
 B. $4\text{ }\mu\text{F}$, $12\text{ }\mu\text{F}$
 C. $4\text{ }\mu\text{F}$, $36\text{ }\mu\text{F}$
 D. $0\text{ }\mu\text{F}$, $\infty\text{ }\mu\text{F}$
- Q. 88** Presence of dielectric always
 A. Increases the electrostatic force
 B. Reduces the electrostatic force
 C. Does not affect the electrostatic force
 D. Doubles the electrostatic force
- Q. 89** A capacitor stores energy in the form of:
 A. Magnetic field
 B. Heat energy
 C. Electrical energy
 D. Mechanical energy
- Q. 90** When an RC circuit is connected across a battery amount of charge deposited on plates istimes the equilibrium charge after one time constant.
 A. 0.63
 B. 0.67
 C. 0.75
 D. 0.86
- Q. 91** The net charge on a capacitor (each plate having magnitude of charge q) is:
 A. Infinity
 B. $2q$
 C. $\frac{q}{2}$
 D. Zero
- Q. 92** An object carrying $3C$ of charge is moved 10 cm from point A to point B by an electric field if $V_{AB} = 700\text{ V}$, the work done by the electric field is:
 A. 2100 W
 B. 210 W
 C. 70 W
 D. 0.3 W
- Q. 93** Two point charges $+3\mu\text{C}$ and $+8\mu\text{C}$ repel each other with a force of 40N . If a charge of $-5\mu\text{C}$ is added to each of them, then the force between them will become
 A. -20N
 B. $+20\text{N}$
 C. $+10\text{N}$
 D. -10N
- Q. 94** A capacitor of capacitance C has charge Q and stored energy is W . If the charge is increase to $2Q$. The stored energy will be
 A. $W/4$
 B. $W/2$
 C. $2W$
 D. $4W$

- Q. 95** The increase in capacitance of a capacitor due to presence of dielectric is due to _____ dielectric.
- A. Electric polarization
B. Electrolysis
C. Ionization
D. None of these
- Q. 96** If the medium between the charges is not free space, then electrostatic force will
- A. Increase
B. Decrease
C. Remain same
D. none of these
- Q. 97** The force between two neutrons placed at a distance of 1cm from each other is:
- A. $9 \times 10^9 \text{N}$
B. $4 \times 10^4 \text{N}$
C. Zero
D. $1.6 \times 10^{-19} \text{N}$
- Q. 98** Surface charge density of the charge is
- A. charge \times area
B. $\frac{\text{charge}}{\text{area}}$
C. $\frac{\text{area}}{\text{charge}}$
D. $\frac{\text{charge}}{\text{volt}}$
- Q. 99** When two capacitors of capacitance $1\mu\text{F}$ and $2\mu\text{F}$ are connected in series then the effective capacitance will be
- A. $\frac{2}{3}\mu\text{F}$
B. $\frac{3}{2}\mu\text{F}$
C. $3\mu\text{F}$
D. $4\mu\text{F}$
- Q. 100** A capacitor of capacitance C is connected to battery of emf V_0 . Without removing the battery, a dielectric of strength ϵ_r is inserted between the parallel plates of the capacitor C , then the charge on the capacitor is
- A. CV_0
B. $\epsilon_r CV_0$
C. $\frac{CV_0}{\epsilon_r}$
D. None of these
- Q. 101** Coulomb law is employed in
- A) Electrostatics
B) Maxwell theory
C) Electromagnetics
D) None
- Q. 102** Find the force between 2C and -1C separated by a distance 1m in air (in newton).
- A) 18×10^{-9}
B) -18×10^{-9}
C) 18×10^9
D) 18×10^{-9}
- Q. 103** Two charges 1C and -4C exist in air. What is the direction of force?
- A) Away from 1C
B) Away from -4C
C) From 1C to -4C
D) From -4C to 1C
- Q. 104** A charge of $2 \times 10^{-7} \text{C}$ is acted upon by a force of 0.1N . Determine the distance to the other charge of $4.5 \times 10^{-7} \text{C}$, both the charges are in vacuum.
- A) 0.03
B) 0.05
C) 0.07
D) 0.09
- Q. 105** The energy required to charge a capacitor of $5\mu\text{F}$ by connecting a D.C source of 20 kV is
- A) 10 kJ
B) 5 kJ
C) 2 kJ
D) 1 kJ
- Hint: $U = \frac{1}{2} CV^2 = \frac{1}{2} 5 \times 10^{-6} \times (20 \times 10^3)^2 = 1 \text{ kJ}$
- Q. 106** Law stating that "force is directly proportional to product of charges and inversely proportional to square of separation between them" is called
- A) newton's law
B) coulombs law
C) gauss's law
D) Ohm's law
- Q. 107** Value of constant K in Coulomb's law has value of
- A) 9×10^3
B) 9×10^5
C) 9×10^7
D) 9×10^9
- Q. 108** Coulomb's Force is
- A) Adhesive Force
B) Opposing Force
C) Force of friction
D) Mutual Force
- Q. 109** If the distance between the two-point charges become half then force between them becomes
- A) double
B) four times
C) half
D) remains same
- Q. 110** Two charges are placed at a certain distance. If the magnitude of each charge is doubled the force will become
- A) $1/4$ th of its original value
B) $1/8$ th of its original value
C) 4 times of its original value
D) 8 times of its original value
- Q. 111** An electric charge at rest produces
- A) only a magnetic field
B) neither electric field nor magnetic field
C) only an electric field
D) both electric and magnetic fields

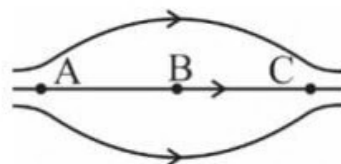
- Q. 112** If free space between the plates of a capacitor is replaced by a dielectric
- The potential difference remains constant capacitance and energy stored increases
 - The potential difference remains constant capacitance decreases and energy increases
 - The capacitance increases but both potential difference and energy decrease
 - both potential difference and capacitance decrease but energy increases
- Q. 113** Some charge is being given to a conductor. Then its potential is
- maximum at surface
 - maximum at centre
 - remain same throughout the conductor
 - maximum somewhere between surface and centre
- Q. 114** The value of the capacitance depends upon the
- voltage applied
 - thickness of the capacitor plates
 - geometry of the capacitor
 - density of the capacitor plates
- Q. 115** The number of electrons in one coulomb charge is equal to
- 6.2×10^{18}
 - 1.6×10^{19}
 - 6.2×10^{21}
 - 1.6×10^{-27}
- Q. 116** A charge of 0.10C accelerated through a potential difference of 1000V acquires kinetic energy
- 200J
 - 100J
 - 1000J
 - 100 eV
- Q. 117** In a charged capacitor the energy resides in
- magnetic field
 - electric field
 - nuclear field
 - gravitational field
- Q. 118** If mica sheet is placed between the plates of a capacitor the capacity
- increases
 - increases then decreases
 - decreases
 - decreases then increases
- Q. 119** A parallel plate capacitor is connected to a battery. Which of the following diagrams most accurately portrays the electric field of a capacitor?



- Q. 120** Equal charges are given to two spheres of different radii. The potential will
- Be more on the smaller sphere
 - Be more on the bigger sphere
 - Be equal on both the spheres
 - Depend on the nature of the materials of the spheres
- Q. 121** A capacitor with air as the dielectric is charged to a potential of 100 volts. If the space between the plates is now filled with a dielectric of dielectric constant 10, the potential difference between the plates will be
- 1000 volts
 - 100 volts
 - 10 volts
 - Zero

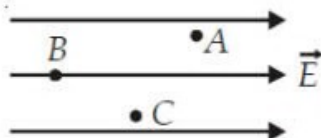
Hint: New potential difference = $\frac{V}{K} = \frac{100}{10} = 10V$

- Q. 122** The figure shows some of the electric field lines corresponding to an electric field. The figure suggests



- $E_A > E_B > E_C$
 - $E_A = E_B = E_C$
 - $E_A = E_C > E_B$
 - $E_A = E_C < E_B$
- Q. 123** Two unlike charges of magnitude q are separated by a distance $2d$. The potential at a point midway between them is
- Zero
 - $\frac{1}{4\pi\epsilon_0}$
 - $\frac{1}{4\pi\epsilon_0} \cdot \frac{q}{d}$
 - $\frac{1}{4\pi\epsilon_0} \cdot \frac{2q}{d^2}$
- Q. 124** What is the magnitude of a point charge which produces an electric field of 2 N/coulomb at a distance of 60 cm ($1/4\pi\epsilon_0 = 9 \times 10^9 \text{ N-m}^2/\text{C}^2$)
- $8 \times 10^{-11} \text{ C}$
 - $2 \times 10^{-12} \text{ C}$
 - $3 \times 10^{-11} \text{ C}$
 - $6 \times 10^{-10} \text{ C}$

Q. 125 A, B and C are three points in a uniform electric field. The electric potential is

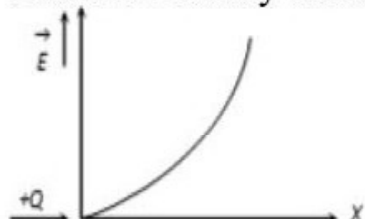


- A) Maximum at A
B) Maximum at B
C) Maximum at C
D) Same at all the three points A, B and C

Q. 126 A positively charged particle moving along x-axis with a certain velocity enters a uniform electric field directed along positive y-axis. Its

- A) Vertical velocity changes but horizontal velocity remains constant
B) Horizontal velocity changes but vertical velocity remains constant
C) Both vertical and horizontal velocities change
D) Neither vertical nor horizontal velocity changes

Hint: Vertical velocity changes due to electric field, but no change in horizontal velocity.



Q. 127 An α -particle is accelerated through a potential difference of 200V. The increase in its kinetic energy is

- A) 100 eV
B) 200 eV
C) 400 eV
D) 800 eV

Q. 128 The electric field created by positive charge is

- A) radially outward
B) circular
C) radially inward
D) zero

Q. 129 Value of potential at a point due to a point charge is

- A) Inversely proportional to square of the distance
B) Directly proportional to square of the distance
C) Inversely proportional to the distance
D) Directly proportional to the distance

Q. 130 The capacity of a parallel plate condenser is $5\mu\text{F}$. When a glass plate is placed between the plates of the condenser, its potential becomes $1/8^{\text{th}}$ of the original value. The value of dielectric constant will be

- A) 1.6
B) 5
C) 8
D) 40

Q. 131 Which of the following will deflect in electric field?

- A) cathode-ray
B) X-rays
C) ultra-violet rays
D) γ -rays

Q. 132 The capacity of a parallel plate capacitor increases with the

- A) Decrease of its area
B) Increase of its distance
C) Increase of its area
D) None of the above

Q. 133 A body can be negatively charged by

- A) Giving some protons to it
B) removing some electrons from it
C) giving excess of electrons to it
D) removing some neutrons from it

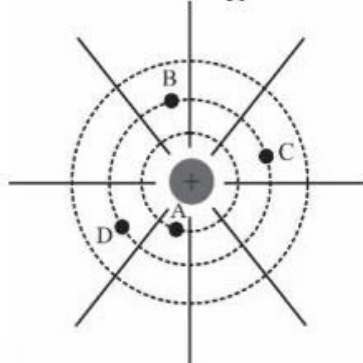
Q. 134 A capacitor having a capacity 2.0 micro farad is charged to 200 volts and then the plates of the capacitor are connected to a resistance wire. The heat produced in joules will be

- A) $4 \times 10^4 \text{ J}$
B) $4 \times 10^{10} \text{ J}$
C) $4 \times 10^{-2} \text{ J}$
D) $2 \times 10^{-2} \text{ J}$

Q. 135 Capacitance decreases with _____

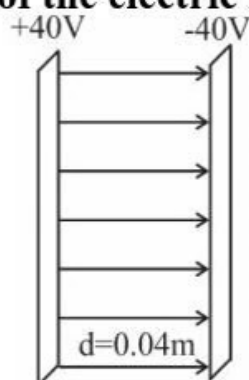
- A) Increase in distance between the plates
B) Decrease in plate area
C) Decrease in distance between the plates
D) Increase in density of the material

Q. 136 An electric field due to a positive charge is represented by the diagram. At which of the following points is the electric field strongest in magnitude?



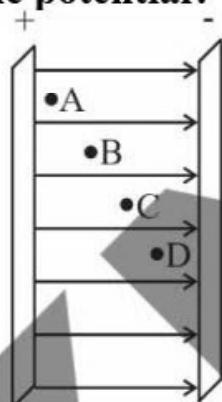
- A) A
B) B
C) C
D) D

Q. 137 A uniform electric field is created by two parallel plates separated by a distance of 0.04 m. What is the magnitude of the electric field established between the plates?



- A) 20 V/m
B) 200 V/m
C) 2,000 V/m
D) 20,000 V/m

Q. 138 An electric field is created by two parallel plates. Which of the following points corresponds to the higher electric potential?



- A) A
B) C
C) D
D) The electric potential is the same at all points

Q. 139 A parallel plate capacitor has a capacitance C_0 . A second parallel plate capacitor has plates with twice the area and twice the separation of the first capacitor. The capacitance of the second capacitor is most nearly:

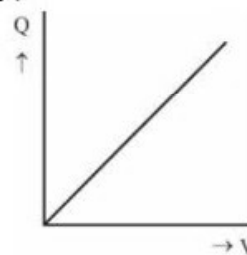
- A) $\frac{1}{4}C_0$
B) $\frac{1}{2}C_0$
C) C_0
D) $2C_0$

Q. 140 A positive charge of $6\mu\text{C}$ moves between two points through an electric field. Work done by the electric field on the charge is 30 mJ. What is the potential difference between the two points?

- A) 3kV
B) 4kV
C) 5kV
D) 6kV

Q. 141 The slope of the graph shown in figure below is

- A) Capacitance
B) Energy density
C) Energy stored
D) Electric intensity



Q. 142 An electron of mass m is accelerated from rest through a potential difference V volt. The speed of electron will be

- A) $\sqrt{\frac{eV}{2m}}$
B) $\frac{eV}{m}$
C) $\sqrt{\frac{2eV}{m}}$
D) $\sqrt{\frac{eV}{m}}$

Q. 143 Charge $2Q$ and $-Q$ are placed as shown in figure. The point at which electric intensity is zero will be



- A) somewhere between $-Q$ and $+2Q$
B) somewhere on the left of $-Q$
C) somewhere on the right of $+2Q$
D) somewhere on the right bisector of line joining $-Q$ and $+2Q$

Q. 144 An electron is moving around the nucleus of a hydrogen atom in a circular orbit of radius r the coulomb force \vec{F} between the two is

- A) $-K \frac{e^2}{r^3} \hat{r}$
B) $K \frac{e^2}{r^3} \vec{r}$
C) $-K \frac{e^2}{r^3} \vec{r}$
D) $K \frac{e^2}{r^2} \hat{r}$

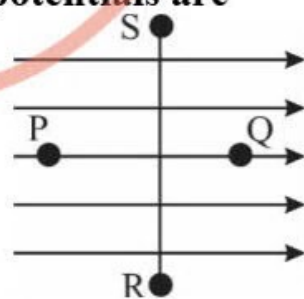
Q. 145 If a body has positive charge of 10^{-12} coulomb:

- A) The body has 6.25×10^6 excess of electrons
B) The body has 625×10^6 excess of electrons
C) The body has 6.25×10^6 deficiency of electrons
D) The body has 6.25×10^3 deficiency of electrons

Q. 146 Two conducting spheres of radius r_1 and r_2 are at the same potential. The ratio of their charges is:

- A) $\left(\frac{r_1^2}{r_2^2} \right)$
B) $\left(\frac{r_1^2}{r_2} \right)$
C) $\left(\frac{r_1}{r_2} \right)$
D) $\left(\frac{r_2}{r_1} \right)$

- Q. 147** A positive charge is moved from a low potential (A) to a high potential point (B) then the electric potential energy.
- A) increase
B) decrease
C) will remain the same
D) nothing definite can be predicted
- Q. 148** If the force between two charges when placed in medium of air and then in oil, is 25N and 5N respectively, then the dielectric constant of the oil is.
- A) $\sqrt{5}$
B) 5
C) 5^2
D) $\frac{1}{5}$
- Q. 149** The magnitude of electric field strength E such that an electron placed in it would experience an electrical force equal to its weight is given by:
- A) mge
B) $\frac{mg}{e}$
C) $\frac{e}{mg}$
D) $\frac{e^2 g}{2m}$
- Q. 150** Inside a charged hollow spherical conductor, the potential:
- A) is constant
B) varies directly as the distance from the center
C) varies inversely as the distance from the center
D) varies inversely as the square of the distance from the center.
- Q. 151** If a unit charge is taken from one point to another over an equipotential surface:
- A) work is done on the charge
B) work is done by the charge
C) work done on the charge is constant
D) no work is done
- Q. 152** Two charged spheres of radii 10 cm and 15 cm are connected by a thin wire. No current will flow, if they have
- A) The same charge on each
B) The same potential
C) The same energy
D) The same field on their surfaces
- Q. 153** Electric lines of force about negative point charge are
- A) Circular, anticlockwise
B) Circular, clockwise
C) Radial, inward
D) Radial, outward
- Q. 154** For a set of oppositely charged, infinite parallel plates, what is true about the electric field inside and outside the plates?
- A) The electric field decreases as you move from the positive to the negative plate and is a non-zero constant outside.
B) The electric field decreases as you move from the positive to the negative plate and is non-zero constant outside.
C) The electric field is a non-zero constant within the plates and zero outside.
D) The electric field is zero within the plates and a non-zero constant outside.
- Q. 155** Electric intensity being a vector quantity always points
- A) along the direction of force experienced by a unit positive charge
B) opposite to the direction of force experienced by a unit positive charge
C) perpendicular to the direction of force experienced by a unit positive charge
D) any of above
- Q. 156** A parallel plate capacitor is charged. If the plates are pulled apart
- A) The capacitance increases
B) The potential difference decreases
C) The total charge increases
D) The charge remain same
- Q. 157** The points resembling equal potentials are

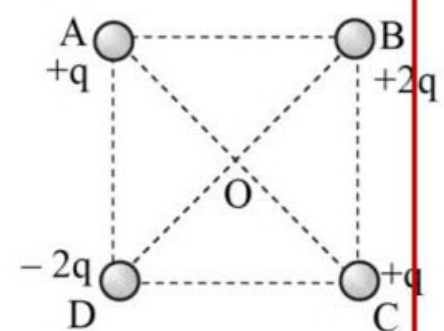


- A) P and Q
B) S and Q
C) S and R
D) P and R
- Q. 158** If two charges are increased by two times then force
- A) Decreases 9 times
B) Increases 4 times
C) Increases 9 times
D) Decreases 4 times
- Q. 159** The expression for electric potential V_r at a distance 'r' from 'q' is
- A) $V_r = \frac{1}{4\pi\epsilon_0} \frac{q}{r^2}$
B) $V_r = K \frac{q}{r}$
C) $V_r = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$
D) both B & C
- Q. 160** A capacitor C "has a charge Q". The actual charges on its plates are:
- A) Q, Q
B) Q/2, Q/2
C) Q, -Q
D) Q/2, -Q/2

- Q. 161** The number of electrons removed from an object to create a charge of one Coulomb are
 A) 6.2×10^{-23} C) 1.6×10^{-19}
 B) 6.2×10^{18} D) 6.2×10^{-18}
- Q. 162** There are two charges of $1 \mu\text{C}$ and $5 \mu\text{C}$ placed at certain distance. The ratio of the forces acting on each other will be:
 A) 1: 5 C) 1: 1
 B) 5: 1 D) 1: 25
- Q. 163** A charge produces an electric E at a point. if the charge on the particle is double then electric field at that point is
 A) Half C) Unchanged
 B) Double D) None
- Q. 164** If force between point charges of $10\mu\text{C}$ and $40\mu\text{C}$ is 9000N , then distance between them is
 A) 2cm C) 20m
 B) 20cm D) 400cm
- Q. 165** There are four-point charges A, B, C and D, if A and B repel each other and C and D also repel each other but A and C attract each other, then charges B and D will
 A) Repel each other C) exert no force
 B) Attract each other D) Have no effect
- Q. 166** The value of electrostatic constant k depends upon
 A) System of units C) Force between charges
 B) Medium D) both a and b
- Q. 167** The electrostatic force between two charges of magnitude 1C each lying at a distance of 1 m in vacuum is:
 A) $9 \times 10^9\text{N}$ C) $8.85 \times 10^{-12}\text{N}$
 B) $9 \times 10^{-9}\text{N}$ D) $8.85 \times 10^{12}\text{N}$
- Q. 168** The value of permittivity of free space ϵ_0 is:
 A) $9 \times 10^9\text{Nm}^2/\text{C}^2$ C) $8.85 \times 10^{-12}\text{Nm}^2/\text{C}^2$
 B) $8.85 \times 10^{-12}\text{C}^2/\text{Nm}^2$ D) $8.85 \times 10^{12}\text{C}^2/\text{Nm}^2$
- Q. 169** If the magnitudes of charges and distance between them is doubled then force will be
 A) Halved C) unaffected
 B) Doubled D) one forth
- Q. 170** The concept of electric field theory was introduced by
 A) R.A Millikan C) Kepler
 B) Coulomb D) Michael Faraday
- Q. 171** Two identical charges repel each other with a force of 4N. If the distance between the charges is halved, the force will be
 A) 1N C) 8N
 B) 2N D) 16N
- Q. 172** Electric charge is
 A) Base quantity C) Derived quantity
 B) Supplementary quantity D) none of these
- Q. 173** Sure test for the presence of a charge on any object is:
 A) Electrostatic attraction C) Both a and b
 B) Electrostatic repulsion D) none of these
- Q. 174** The electrostatic force between two-point charges kept at a distance d apart, in a medium $\epsilon_r = 6$, is 0.3 N. The force between them at the same separation in vacuum is
 A) 20 N C) 1.8 N
 B) 0.5 N D) 2 N
- Q. 175** Electric field intensity is 400 V m^{-1} at a distance of 2 m from a point charge. It will be 100 V m^{-1} at a distance?
 A) 50 cm C) 4 m
 B) 4 cm D) 1.5 m
- Q. 176** The ratio of electrostatic force between two charges in vacuum to that when there is medium of relative permittivity ϵ_r is placed between them is
 A) 1:1 C) $\epsilon_r : 1$
 B) $1/\epsilon_r : 1$ D) $1 : \epsilon_r$

- Q. 177 A glass rod rubbed with silk acquires a charge of $+8 \times 10^{-12}\text{C}$. The number of electrons it has gained or lost
 A) 5×10^{-7} (gained) C) 5×10^7 (lost)
 B) 2×10^{-8} (lost) D) -8×10^{-12} (lost)
- Q. 178 Two-point charges $+4q$ and $+q$ are placed 30 cm apart. At what point on the line joining them the electric field is zero?
 A) 15 cm from the charge q C) 7.5 cm from the charge q
 B) 20 cm from the charge $4q$ D) 5 cm from the charge q
- Q. 179 The number of electric lines of force originating from a charge of 1 C is
 A) 1.129×10^{11} C) 6.25×10^{18}
 B) 1.6×10^{-19} D) 8.85×10^{12}
- Q. 180 2 C and +6 C two charges are repelling each other with a force of 12 N. If each charge is given -2 C of charge, then the value of the force will be
 A) 4 N (Attractive) C) 8 N (Repulsive)
 B) 4 N (Repulsive) D) Zero
- Q. 181 The force between two charges 0.06 m apart is 5 N. If each charge is moved towards the other by 0.01m, then the force between them will become
 A) 7.20 N C) 22.50 N
 B) 11.25 N D) 45.00 N
- Q. 182 A charge of 0.01C accelerated through a P.D of 1000V acquires K.E
 A) 10 J C) 200 J
 B) 100 J D) 400 eV
- Q. 183 The electric potential at a point of distance 1 m from $2 \mu\text{C}$ charge is
 A) 1.8×10^{-3} V C) 1.8×10^4 V
 B) 1.8×10^6 N/C D) 1.8×10^5 V
- Q. 184 Sharks has special organs called the ampullae of Lorenzini that are sensitive to electric field to locate their prey very precisely that can detect the potential of the order of
 A) Milli volts C) Nano volt
 B) micro volt D) pico volts
- Q. 185 In electroencephalography, the potential difference created by the electrical activity of the _____ are used for diagnosing abnormal behavior.
 A) Heart C) retina
 B) Brain D) Kidney
- Q. 186 The capacitance of capacitor increases with decrease in
 A) Dielectric constant C) plates separation
 B) Plates area D) thickness of plates
- Q. 187 The energy stored in a capacitor is given by
 A) $E = \frac{1}{2} CV^2$ C) $E = \frac{1}{2} qV$
 B) $E = \frac{1}{2} \frac{q^2}{C}$ D) All of these
- Q. 188 The automobiles wind shield wipers works on
 A) Electricity C) Charging and discharging of capacitor
 B) Cell D) None of these
- Q. 189 The area of plates of 1 farad capacitor separated 8.85mm placed in the air is
 A) 10^9m^2 C) 10^{-9}m^2
 B) 10^5m^2 D) 10^{-15}m^2
- Q. 190 When two capacitors of same capacitance are connected in parallel and then in series, the capacitance in these two cases are in ratio of
 A) 1:4 C) 6:1
 B) 4:1 D) 1:2
- Q. 191 When two capacitors are connected in parallel, then their equivalent capacitance is $5\mu\text{F}$ and when connected in series the equivalent capacitance is $1.2\mu\text{F}$, the capacitances of capacitors are
 A) $1\mu\text{F}$ and $4\mu\text{F}$ C) $2\mu\text{F}$ and $3\mu\text{F}$
 B) $2.5\mu\text{F}$ and $2.5\mu\text{F}$ D) $1.5\mu\text{F}$ and $3.5\mu\text{F}$
- Q. 192 The capacitance of parallel plate capacitor is $A\epsilon_0/d$ can also be written as
 A) $A/4\pi Kd$ C) $KA/4\pi d$
 B) $A/4\pi d$ D) $4\pi\epsilon_0 A/d$

- Q. 193** The capacitance of a parallel plate capacitor increases from $5\ \mu\text{f}$ to $60\ \mu\text{f}$ when a dielectric is filled between the plates. The dielectric constant of the dielectric is
 A) 65 C) 12
 B) 55 D) 10
- Q. 194** A capacitor is charged by using a battery, which is then disconnected. A dielectric slab is then slipped between the plates, which results in:
 A) Reduction of charge on the plates and increase of potential difference across the plates
 B) Increase in the potential difference across the plates, reduction in stored energy, but no change in the charge on the plates
 C) Decrease in the potential difference across plates, reduction in stored energy, but no change in the charge on plates
 D) None of the above
- Q. 195** The difference in the effective capacitance of two equal capacitors when joined in parallel and series is $3\ \mu\text{F}$. The value of each capacitor is
 A) $1\ \mu\text{F}$ C) $3\ \mu\text{F}$
 B) $2\ \mu\text{F}$ D) $4\ \mu\text{F}$
- Q. 196** Potential difference between head and tail of an eel is up to:
 A) 400V C) 800V
 B) 600V D) 900V
- Q. 197** The electric potential due to the nucleus of the hydrogen atom at a distance of $5.3 \times 10^{-11}\ \text{m}$ is 27.2 V. What is the potential due to the helium nucleus at the same distance?
 A) 27.2 V C) 13.6 V
 B) 54.4 V D) 20.4 V
- Q. 198** A $40\ \mu\text{F}$ capacitor in a defibrillator is charged to 3000 V. The energy stored in the capacitors sent through the patient during a pulse of duration 2 ms. The power delivered to the patient is
 A) 45 kW C) 180 kW
 B) 90 kW D) 360 kW
- Q. 199** Two positive point charges are 3 m apart and their combined charge is $20\ \mu\text{C}$. If the force between them is 0.075 N, then the charges are
 A) $10\ \mu\text{C}$, $10\ \mu\text{C}$ C) $12\ \mu\text{C}$, $8\ \mu\text{C}$
 B) $15\ \mu\text{C}$, $5\ \mu\text{C}$ D) $14\ \mu\text{C}$, $6\ \mu\text{C}$
- Q. 200** Three equal charges are placed on the three corners of a square. If the force between q_1 and q_2 is F_{12} and that between q_1 and q_3 is F_{13} , the ratio of magnitudes $\frac{F_{12}}{F_{13}}$ is
 A) $1/2$ C) $1/\sqrt{2}$
 B) 2 D) $\sqrt{2}$
- Q. 201** 1 joule =
 A) $1.6 \times 10^{-19}\ \text{eV}$ C) $6.25 \times 10^{18}\ \text{eV}$
 B) $1.6 \times 10^{19}\ \text{eV}$ D) $6.25 \times 10^{-18}\ \text{eV}$
- Q. 202** Four charges are arranged at the corners of a square ABCD, as shown in the adjoining figure. The force on the charge kept at the center O is
 A) zero. C) along the diagonal AC.
 B) along the diagonal BD. D) perpendicular to side AB.
- Q. 203** The force of repulsion between two charges is taken as:
 A) -ve C) may be both
 B) +ve D) always both
- Q. 204** Capacitor is also known as:
 A) Resister C) Inductor
 B) Reactor D) Condenser
- Q. 205** When a body is connected to earth, electrons from the earth flow into the body. This means the body is...
 A) Uncharged C) charged negatively
 B) charged positively D) an insulator

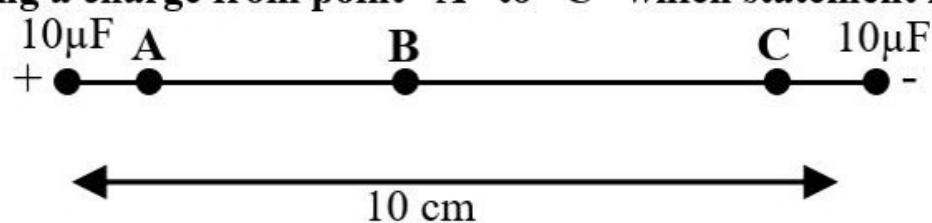


- Q. 206** A battery is used to charge a series combination of two identical capacitors. If the potential difference across the battery terminals is V and total charge Q flows through the battery during the charging process then the charge on the positive plate of each capacitor and the potential difference across each capacitor are:
 A). $Q/2$ and $V/2$, respectively
 B). $Q/2$ and V , respectively
 C). Q and V , respectively
 D). Q and $V/2$, respectively
- Q. 207** A battery is used to charge a parallel combination of two identical capacitors. If the potential difference across the battery terminals is V and total charge Q flows through the battery during the charging process then the charge on the positive plate of each capacitor and the potential difference across each capacitor are:
 A). $Q/2$ and $V/2$, respectively
 B). $Q/2$ and V , respectively
 C). Q and V , respectively
 D). Q and $V/2$, respectively
- Q. 208** Two identical capacitors, each with capacitance C , are connected in parallel and the combination is connected in series to a third identical capacitor. The equivalent capacitance of this arrangement is:
 A) $2C/3$
 B) C
 C) $3C/2$
 D) $2C$
- Q. 209** A charged capacitor stores $10C$ at $40V$. Its stored energy is:
 A) 400 J
 B) 4 J
 C) 0.2 J
 D) 200 J
- Q. 210** An air-filled parallel-plate capacitor has a capacitance of 1 pF . The plate separation is then doubled and a wax dielectric is inserted, completely filling the space between the plates. As result, the capacitance becomes 2 pF . The dielectric constant of the wax is:
 A) 0.25
 B) 0.5
 C) 2.0
 D) 4.0
- Q. 211** Dielectric constant can never be:
 A) Less than 1
 B) Infinity
 C) both a and b
 D) 1
- Q. 212** A parallel-plate capacitor, with air dielectric, is charged by a battery, after which the battery is disconnected. A slab of glass dielectric is then slowly inserted between the plates. As it is being inserted:
 A) a force repels the glass out of the capacitor
 B) no force acts on the glass
 C) a force attracts the glass into the capacitor
 D) a net charge appears on the glass
- Q. 213** An alpha particle is moved through a potential difference of 10 V then acquired energy by it is:
 A) 1 eV
 B) 10 eV
 C) 20 eV
 D) 40 eV
- Q. 214** During a lightning discharge, $30C$ of charge move through a potential difference of $1.0 \times 10^8\text{ V}$ in $2.0 \times 10^{-2}\text{ s}$. The energy released by this lightning bolt is:
 A) $1.5 \times 10^{11}\text{ J}$
 B) $3.0 \times 10^9\text{ J}$
 C) $6.0 \times 10^7\text{ J}$
 D) $3.3 \times 10^6\text{ J}$
- Q. 215** A $20\text{ }\mu\text{F}$ capacitor is charged to $200V$. Its stored energy is:
 A) 4000 J
 B) 4 J
 C) 0.4 J
 D) 2000 J
- Q. 216** A charged capacitor stores $10C$ at $40V$. Its stored energy is:
 A) 400 J
 B) 4 J
 C) 0.2 J
 D) 200 J
- Q. 217** A hollow metal sphere is charged to a potential V . The potential at its center is:
 A). V
 B). 0
 C). $-V$
 D) $2V$
- Q. 218** $M\Omega$ times $\text{pF} =$
 A) m sec
 B) $\mu\text{ sec}$
 C) n sec
 D) sec
- Q. 219** t/RC has the same dimensions as those of:
 A) Time
 B) Strain
 C) Frequency
 D) Capacitance

Q. 220 How three capacitors of $2\mu\text{F}$ capacitance each are connected to have an equivalent capacitance of $3\mu\text{F}$?

- A) All in series
B) All in parallel
C) Two in series and one in parallel
D) Two in parallel and one in series

Q. 221 While moving a charge from point "A" to "C" which statement is true?



- A) E and V both will decrease
B) E and V both will increase
C) E and V both will remain same
D) E will remain same but "V" will decrease at a constant rate

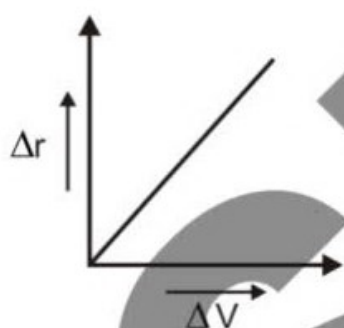
Q. 222 If we bring a positive charge near a body such that it gets attracted towards it, then which of the following statements is true?

- A) It may have negative charge
B) It may have positive charge
C) It may have no charge
D) Both "A" and "C"

Q. 223 In a double electron volt, we have:

- A) $1.6 \times 10^{-19}\text{V}$
B) $1.6 \times 10^{-19}\text{JC}^{-1}$
C) $3.2 \times 10^{-19}\text{J}$
D) $6.25 \times 10^{18}\text{J}$

Q. 224 The slope of the following graph has units:



- A) NC^{-1}
B) JC^{-1}
C) CN^{-1}
D) CJ^{-1}C

Q. 225 eV is the unit of:

- A) Voltage
B) Charge
C) Electric intensity
D) Energy

Q. 226 The number of electrons in a charge of 1 coulomb are:

- A) $+1.6 \times 10^{-19}$
B) -1.6×10^{-19}
C) 6.25×10^{18}
D) None of these

Q. 227 The unit of dielectric constant is:

- A) $\text{C}^2\text{N}^{-1}\text{m}^{-2}$
B) Nm^2C^{-2}
C) $\text{N}^{-1}\text{m}^{-2}\text{C}^2$
D) No units

Q. 228 When we place a dielectric between two charges then electrical force:

- A) Increases
B) Remains same
C) Decreases
D) May increase or decrease

Q. 229 Which of the following is not correct?

- A) Electric lines never cross
B) \vec{E} always has same value at each point
C) \vec{E} has a unique value at a particular point
D) All of these

Q. 230 A charge of 0.1C is accelerated through a potential difference of 1000V , it acquires K.E of:

- A) 200J
B) 1000J
C) 400J
D) 100J

Q. 231 Two charges $q_1 = +5\mu\text{C}$ and $q_2 = +500\mu\text{C}$ are separated by a distance "r" such that " q_1 " applies force " F_1 " while " q_2 " applies force " F_2 " then:

- A) $F_1 = F_2/100$
B) $F_1 = 100 F_2$
C) $F_1 = F_2$
D) None of these

Q. 232 Which of the following is true for " ϵ_r " for any medium?

- A) $\epsilon_r = \frac{F}{F'}$
B) $\epsilon_r \geq 1$
C) $\epsilon_r < 1$
D) Both "A" & "B"

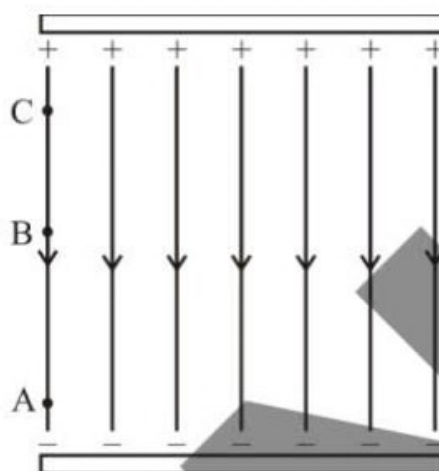
Q. 233 The sure test of charge present on any object under observation is:

- A) Attraction
- B) Repulsion
- C) Both "A" & "B"
- D) Never sure

Q. 234 The force of repulsion between two charges is considered as:

- A) – ve
- B) + ve
- C) May be +ve or – ve
- D) Can't be predicted

Q. 235 If a charge particle is placed one by one at point A, B and C then at which point it will experience a larger force.



- A) At point "A"
- B) At point "B"
- C) At point "C"
- D) Same at all points

Q. 236 If an α - particle is accelerated through a potential difference of "4 volt", it will acquire energy:

- A) 6 eV
- B) 2 eV
- C) 4 eV
- D) 8 eV

Q. 237 Two charges experience a force of 100 N when there is free space between them. What will be the new force if a medium of dielectric constant 8 is placed between them?

- A) 400 N
- B) 12.5 N
- C) 25 N
- D) 100 N

Q. 238 Which of the following is true about \vec{E} regarded as constant?

- A) If potential increases at a constant rate w.r.t distance
- B) If potential decreases at a constant rate w.r.t distance
- C) If potential does not change
- D) All of these

Q. 239 The relation between E and ΔV is:

- A) $E = -\frac{\Delta V}{\Delta t}$
- B) $E = -\frac{\Delta V}{\Delta r}$
- C) $E = +\frac{\Delta V}{\Delta t}$
- D) $E = -\frac{E}{\Delta r}$

Q. 240 Two identical metal spheres with charges +3Q and -2Q are separated by some distance such that they exert a force "F" on each other. They are later joined by a conducting wire, which is then removed. The force between them will be:

- A) F/4
- B) F/8
- C) F/16
- D) F/24

Q. 241 An electric line of force is leaving a charged spherical conductor. What is the angle between \vec{A} and \vec{E} ?

- A) 90°
- B) 0°
- C) 45°
- D) 30°

Q. 242 A cube of side 5 cm has a charge of 6C. The surface density of charge is;

- A) 200 Cm⁻²
- B) 100 Cm⁻²
- C) 300 Cm⁻²
- D) 400 Cm⁻²

Q. 243 A positive point charge Q is brought near an isolated metal cube. Which of the following is correct?

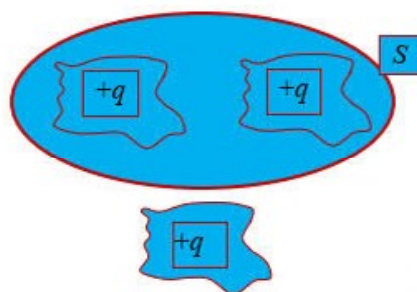
- A) The cube becomes positive charge
- B) The cube becomes negative charge
- C) The interior becomes positively charged and the surface becomes negatively charged
- D) The interior remains charge free and the surface gets non-uniform charge distribution

- Q. 244** An electron moves with velocity \vec{v} in x-direction. An electric field acts on it in y-direction. The force on the electron acts in:
- A) -ve direction of Y-axis
B) +ve direction of Z-axis
C) +ve direction of Y-axis
D) -ve direction of Z-axis
- Q. 245** Two metal plates "A" and "B" having charges Q , $-Q$ face each other at some separation and are dipped into an oil tank. If the oil is pumped out, the electric field between the plates will:
- A) Decrease
B) Increase
C) Remains same
D) Become zero
- Q. 246** A unit positive charge is somehow placed inside a hollow conducting sphere which is negatively charged. Unit positive charge is free to move then it will:
- A) Move towards the nearer wall of the sphere
B) Oscillate between the centre and the nearer wall
C) Remain stationary
D) Will move in a circular path
- Q. 247** Two identical simple pendulums, A and B, are suspended from the same point. The bobs are given positive charges, with A having more charge than B, which makes angles " θ_1 " and " θ_2 " with the vertical respectively. Which of the following is correct?
- A) $\theta_1 < \theta_2$
B) $\theta_1 = \theta_2$
C) $\theta_1 > \theta_2$
D) Both "A" and "B" are possible
- Q. 248** Two copper spheres of the same radii, one hollow and the other solid, are charged to the same potential. Which of the two will hold more charge?
- A) Hollow
B) Solid
C) Solid sphere cannot hold any charge
D) Both the spheres will hold the same charge
- Q. 249** A charged particle is in the electric field between two horizontal metal plates connected to a battery, as shown. There is a force F on the particle due to the electric field.

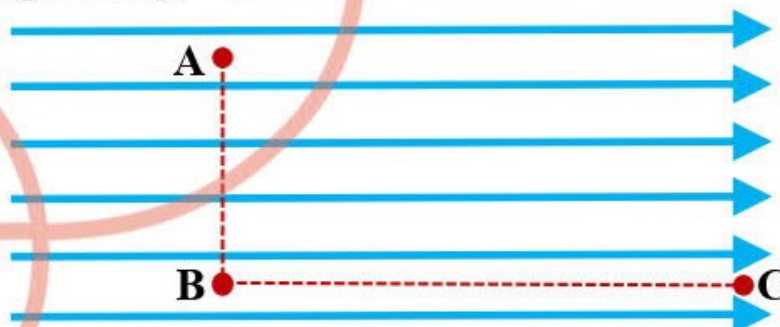


- The separation of the plates is double. What is the new force on the particle?
- A) $F/4$
B) $F/2$
C) F
D) $2F$
- Q. 250** The electric field between two plates is E . Now the electric field between same two plates in a medium of relative permittivity "10" is:
- A) $10E$
B) $10/E$
C) $E/10$
D) $E+10$
- Q. 251** The number of electric lines of force passing through unit area held perpendicular to electric field is called:
- A) Electric flux
B) Electric flux density
C) $|\vec{E}|$
D) Both "B" & "C"
- Q. 252** The relation for electric intensity between two oppositely charged plates is:
- A) $\frac{\sigma}{\epsilon_0}$
B) $\frac{\sigma}{2\epsilon_0}$
C) $\frac{2\sigma}{\epsilon_0}$
D) $\frac{\sigma}{4\epsilon_0}$
- Q. 253** If 10 N is the force between two charges when dielectric is present. Now if that dielectric of dielectric constant " $\epsilon_r = 10$ " is removed, the new force will be:
- A) 100 N
B) 50 N
C) 1 N
D) 10 N

- Q. 254 A particle has a charge of $+2.0 \text{ mC}$ and is in a vertical uniform electric field. An electric force of $1.0 \times 10^{-2} \text{ N}$ acts upwards on the particle. What is the electric field strength?
- A) 0.20 V m^{-1} downwards
 B) 0.20 V m^{-1} upwards
 C) 5.0 V m^{-1} downwards
 D) 5.0 V m^{-1} upwards
- Q. 255 A charge Q is divided into two parts q_1 and q_2 which are placed at certain fixed distance. The force of ____ between these parts will be maximum when $q_1: q_2 =$ ____?
- A) Attraction, 2:1
 B) Attraction, 1:1
 C) Repulsion, 1:2
 D) Repulsion, 1:1
- Q. 256 Shown in the Figure below is a distribution of charges. The flux of electric field due to these charges through the surface is:



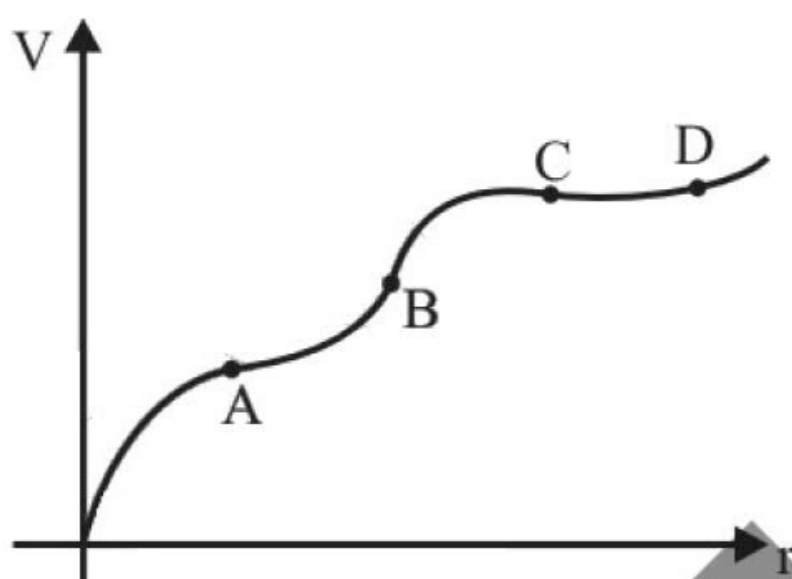
- A) $\frac{3q}{\epsilon_0}$
 B) $\frac{q}{\epsilon_0}$
 C) $\frac{2q}{\epsilon_0}$
 D) Zero
- Q. 257 The ratio of the forces between two small spheres with same charges when they are in air to when they are in medium of dielectric constant K is:
- A) 1: K
 B) K :1
 C) 1: K^2
 D) K^2 : 1
- Q. 258 A charge Q is divided into two parts of magnitude q and $Q-q$. If the coulomb repulsion between them when they are separated at some distance is to be maximum, the ratio of Q/q should be:
- A) 2
 B) 4
 C) $1/2$
 D) $1/4$
- Q. 259 There are two charges $+1 \mu\text{C}$ and $+5 \mu\text{C}$. The ratio of the forces acting on them will be:
- A) 1:5
 B) 1:1
 C) 5:1
 D) 1:25
- Q. 260 Figure below shows three points A, B and C in a region of uniform electric field \vec{E} . The line AB is perpendicular and BC is parallel to the field lines. Then which of the following holds good. Where V_A , V_B , and V_C represent the electric potential at points A, B and C respectively.



- A) $V_A = V_B = V_C$
 B) $V_A = V_B > V_C$
 C) $V_A = V_B < V_C$
 D) $V_A > V_B = V_C$
- Q. 261 If electric field is given by $\vec{E} = \left(\frac{1}{x^2}\right) \hat{i} \frac{\text{V}}{\text{m}}$, the magnitude of potential difference between points $x=10 \text{ cm}$ and $x=20 \text{ cm}$ is:
- A) 1V
 B) 5V
 C) 2V
 D) 10V
- Q. 262 The magnitude of electric intensity at a distance x from a charge q is E . An identical charge is placed at a distance $2x$ from it. Then the magnitude of the force it experiences is:
- A) qE
 B) $qE/2$
 C) $2qE$
 D) $qE/4$

- Q. 263** Coulomb's law is applicable to,
 A) Point charges
 B) Spherical charges
 C) Like charges
 D) All of these
- Q. 264** A body has a charge of two coulomb. The number of excess (or lesser) electrons on it from its normal state will be:
 A) ∞
 B) 12.5×10^{18}
 C) 1.6×10^{19}
 D) 6.25×10^{18}
- Q. 265** On moving a charge of 20 C by 2 cm, 2J of work is done. The potential difference between the points:
 A) 0.1 V
 B) 2 V
 C) 8 V
 D) 0.5 V
- Q. 266** An electron travelling in a region of electrostatic potential "V1" passes into a region of higher potential "V2". Then the change in its kinetic energy is proportional to:
 A) $\sqrt{V_2 - V_1}$
 B) $\frac{1}{\sqrt{V_2 - V_1}}$
 C) $(V_2 - V_1)^2$
 D) $V_2 - V_1$
- Q. 267** A tin nucleus has charge +100e. If the proton is at a distance of 10^{-14} m from the nucleus, then the potential "V" at this position is [charge on proton = 1.6×10^{-19} C]:
 A) 14.4 m volt
 B) 1.44 m volt
 C) 0.144 m volt
 D) 144 m volt
- Q. 268** A cloud is at a potential of 2×10^3 volt with respect to the ground. A charge of 12 coulomb is transferred in a lightning stroke between the cloud and the earth. The energy dissipated will be:
 A) 6×10^3 J
 B) 12×10^3 J
 C) 24×10^3 J
 D) 3×10^3 J
- Q. 269** A positron is brought from a point "A" to another point "B". The electric potential at "A" and "B" is " V_1 " and V_2 . The work done on the charge is:
 A) $-e(V_2 + V_1)$
 B) $-e(V_1 - V_2)$
 C) $-2e(V_2 - V_1)$
 D) $+2e(-V_2 - V_1)$
- Q. 270** A 20 C charge experiences a force of 300 N when moved between two points separated by a distance of 1 cm in a uniform electric field. The potential difference between the two points is:
 A) 6 V
 B) 0.15 V
 C) 60 V
 D) 0.06 V
- Q. 271** Two charges of +2 μ C each are kept at a distance of 2 m from each other. Their potential energy will be:
 A) 36×10^{-3} J
 B) 9×10^{-3} J
 C) 18×10^{-3} J
 D) 9×10^{-9} J
- Q. 272** The potential gradient in an electric field region between two charged plates represents?
 A) Electric Potential energy stored in a charge
 B) Electric field strength between plates
 C) Work done on the charge
 D) Kinetic Energy gained by charge
- Q. 273** Which of following is true?
 A) Coulomb's force is a very long-range force
 B) Coulomb's force is much greater than gravitational force
 C) Coulomb's both attractive and repulsive but gravitational force is only attractive
 D) All of these
- Q. 274** The electric potential at a point 1.6 cm away from an alpha particle will be:
 A) 18×10^{-10} V
 B) 9×10^{-8} V
 C) 9×10^{-10} V
 D) 18×10^{-8} V

Q. 275 The variation of electric potential “V” with distance “r” is given in the figure shown. The value of electric field in the figure shown is maximum at:



A) Point A

B) Point B

C) Point C

D) Point D

Q. 276 Which of the following force can be shielded?

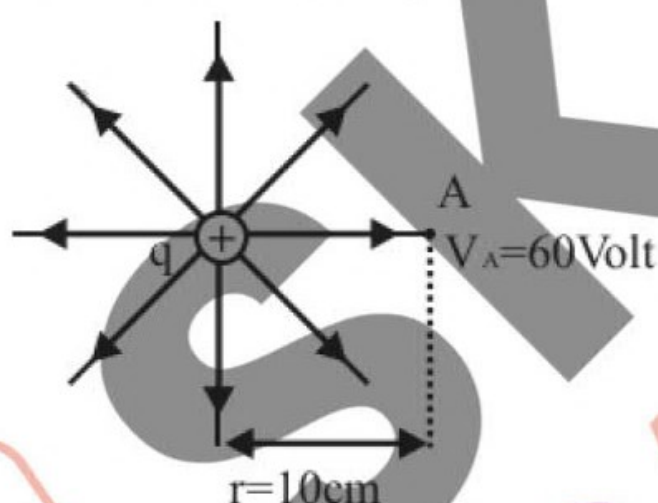
A) F_E

B) F_G

C) Both “A” & “B”

D) None of these

Q. 277 The electric field strength at point “A” in the diagram shown is:



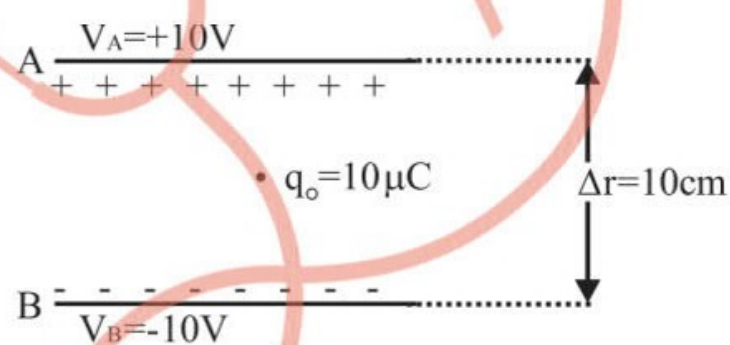
A) 600 Vm^{-1}

B) 6 Vm^{-1}

C) 60 Vm^{-1}

D) None of these

Q. 278 What will be the force acting on the charge “ q_0 ” shown in diagram?



A) Zero

B) $2 \times 10^{-3} \text{ N}$

C) $2 \times 10^{-4} \text{ N}$

D) $2 \times 10^{-5} \text{ N}$

Q. 279 The potential gradient between the two charged plates having separation of 0.25 cm and potential difference of 24 volts is:

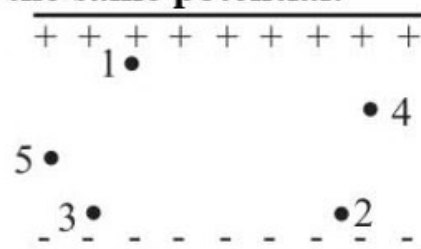
A) 960 N C^{-1}

B) 9.6 N C^{-1}

C) 96 N C^{-1}

D) 9600 N C^{-1}

Q. 280 Which points in the uniform electric field between the plates of the capacitor shown in diagram, lie on the same potential:



- A) 1 and 4
B) 2 and 3

- C) 3 and 5
D) 4 and 5

Q. 281 The energy stored in a unit volume of the dielectric between parallel plates of a capacitor is:

A) Energy density = $\frac{1}{2} E^2 \epsilon_0 \epsilon_r$

C) Energy density = $\frac{E^2}{2 \epsilon_0 \epsilon_r}$

B) Energy density = $\frac{E^2 \epsilon_0}{2 \epsilon_r}$

D) Energy density = $\frac{1}{2} \epsilon_0 \epsilon_r E$

Q. 282 The value of the capacitance depends upon:

- A) Thickness of the capacitor's plates
B) Voltage applied

- C) Charge on the plates
D) Geometry of the capacitor

Q. 283 A capacitor remains connected to a voltage source after being fully charged. Now if we place a dielectric between its plates then:

- A) Its capacitance increases
B) It takes more charge from source

- C) Its capacitance remains same
D) Both "A" & "B"

Q. 284 If we double the thickness of plates of a capacitor making separation between them to be halved then capacitance becomes:

- A) Remain same
B) Halved

- C) Doubled
D) Quadrupled

Q. 285 Which of the following relations can be used to calculate energy of a capacitor?

A) $\frac{1}{2} CV^2$

C) $\frac{1}{2} QV$

B) $\frac{1}{2} \frac{Q^2}{C}$

- D) All of these

Q. 286 The net charge on a capacitor is:

- A) +Q
B) -Q

- C) $\pm 2Q$
D) Zero

Q. 287 The area of plates of a capacitor is halved then the energy stored in it when connected to the same source as previous:

- A) Is halved
B) Is doubled

- C) Remains same
D) None of these

Q. 288 A capacitor stores energy "E" when connected to a voltage source. What will be effect on energy stored if area of plates is halved but using a voltage source of double the voltage as before:

- A) Is halved
B) Is doubled

- C) Is quadrupled
D) Remains same

Q. 289 Concerning the relation for a capacitor as $C = \frac{Q}{V}$, how will it effect the capacitance when voltage is doubled:

- A) Halved
B) Doubled

- C) Quadrupled
D) Remains same

Q. 290 Charge on a capacitor is 200C. If voltage applied across its plates is 2V then its capacitance:

- A) 2F
B) 100F

- C) 200F
D) 0.2F

Q. 291 10 V potential difference is applied across the plates of 1 μ F capacitor. What is the energy stored in capacitor?

- A) 0.5mJ
B) 0.05mJ

- C) 5mJ
D) 50mJ

Q. 292 A capacitor is connected to a voltage source such that it gets fully charged. Now if battery is removed and a dielectric is placed between the plates of capacitor then what is not correct?

- A) Capacitance increases
B) Charge remains same

- C) Voltage and electric field decreases
D) Energy remains same

Q. 293 If on one plate of a charged capacitor charge is +2 μ C on then on another plate charge is:

- A) Zero

- C) -2 μ C

B) $+2\mu\text{C}$

D) $-4\mu\text{C}$

Q. 294 The potential difference between capacitor plates is 100 V when there is a dielectric slab with $\epsilon_r = 4$ between its plates. If slab is removed now potential difference is:

A) 40 V

C) 20 V

B) 50 V

D) 400 V

Q. 295 If the numerical value of area of each plate is equal to distance between parallel plates of a condenser (capacitor), then capacitance is equal to:

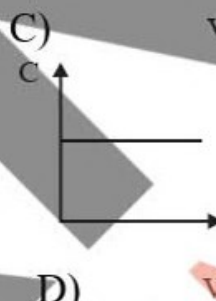
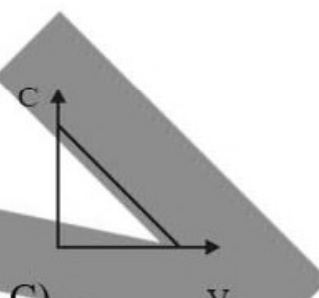
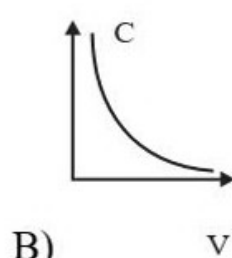
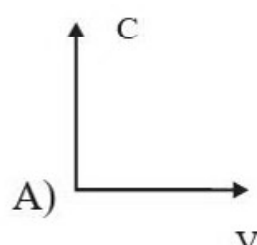
A) $\frac{2}{\epsilon_0}$

C) ϵ_0

B) $2\epsilon_0$

D) $\frac{1}{\epsilon_0}$

Q. 296 In the relation $C = \frac{Q}{V}$, the graph between "C" and "V" when no dielectric is placed is:



Q. 297 " $\frac{t}{RC}$ " has the dimensions same as that of?

A) Time

C) Strain

B) Frequency

D) Capacitance

Q. 298 A capacitor is connected to a voltage source such that it gets fully charged. Now if battery is removed and a dielectric is also removed from the plates of capacitor then what is correct?

A) Capacitance decreases

C) Voltage and electric field increases

B) Charge remains same

D) All of these

Q. 299 A student has three capacitors such that $C_1 > C_2 > C_3$. Now he connects them independently to same batteries of voltage V. Which of these capacitors will get a greater voltage?

A) C_1

C) C_3

B) C_2

D) All will have same voltage

Q. 300 With reference to the question 299 which of these capacitors will gain more charge?

A) C_1

C) C_3

B) C_2

D) All will gain same charge

Q. 301 A technician connects two capacitors of different capacitances such as $C_1 < C_2$ and he joins them independently with two sources of same voltages. Which of the two capacitors will gain fewer energy?

A) C_1

C) Neither C_1 nor C_2

B) C_2

D) Data is insufficient

Q. 302 A capacitor is always charged through a resistor with a source. Now if we replace smaller resistor with a bigger one then the capacitor will be charged:

A) Slower

C) In same time as previous

B) Faster

D) Will not be charged

Q. 303 Two capacitors of capacitances such that $C_1 > C_2$ are connected through identical sources and identical resistors. Which of these capacitors will be charged prior to other?

A) C_1

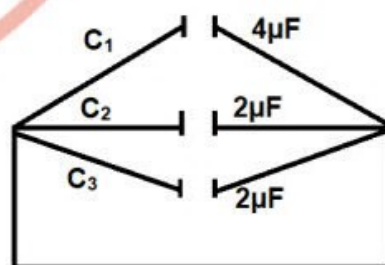
C) Both at same time

B) C_2

D) Data is not sufficient

- Q. 304** A capacitor has a capacitance of $2\mu\text{F}$ such that it is connected with a source of voltage of 20V . What is the energy stored in the capacitor?
 A) $200\mu\text{J}$ C) $400\mu\text{J}$
 B) $100\mu\text{J}$ D) $300\mu\text{J}$
- Q. 305** A capacitor stores energy in the form of:
 A) Charge on plates C) Electric field between plates
 B) Magnetic field between plates D) Capacitance
- Q. 306** A capacitor of capacitance $10\mu\text{F}$ is connected to voltage source such that it gains a charge of $20\mu\text{C}$ on one of the plates. What must be the energy stored in it?
 A) $40\mu\text{J}$ C) $20\mu\text{J}$
 B) $400\mu\text{J}$ D) $200\mu\text{J}$
- Q. 307** For a capacitor if keeping capacitance constant applied voltage is doubled then the stored energy becomes;
 A) Quarter C) Four times
 B) Half D) Double
- Q. 308** A capacitor has energy of 100J such that its capacitance is 1F . What must be the voltage of source to which it was connected?
 A) 12-volt C) 14 volt
 B) 13-volt D) 20 volt
- Q. 309** A capacitor is connected to a source such that it gets a charge of $2\mu\text{C}$ on one of its plates. It gains an energy of 0.01J . What must be the voltage of source?
 A) 1000V C) $10,000\text{V}$
 B) 2000V D) 100V
- Q. 310** What must be value of time constant such that $R = 10\Omega$ and $C = 1\text{F}$?
 A) 0.1 sec C) 10 sec
 B) 1 sec D) 100 sec
- Q. 311** When we rub a glass rod with a silk cloth then
 A) Glass rod acquires negative charge while silk acquires positive charge
 B) Glass rod acquires positive charge while silk acquires negative charges
 C) Both glass rod and silk acquire negative charge
 D) Both glass rod and silk acquire positive charge
- Q. 312** When the distance between two charged particles is halved, then the force between them becomes
 A) One-fourth B) Half
 C) Four times D) Double
- Q. 313** Electric force between two-point charges in air or vacuum is F . If we replace air or vacuum by an insulator (dielectric) of relative permittivity ϵ_r the force between the charges will _____?
 A) Decrease B) Increase
 C) Remain constant D) Depends upon composition of dielectric
- Q. 314** Two charges are placed at a certain distance. if the magnitude of each charge is doubled, the force will become _____
 A) $1/4$ th of its original value B) $1/8$ th of its original value
 C) 4 times of its original value D) 8 times of its original value
- Q. 315** An electric charge at rest produces
 A) Only a magnetic field B) Only an electric field
 C) Neither electric field nor magnetic field D) Both electric and magnetic fields
- Q. 316** Electric flux linked with a surface will be maximum when
 A) The surface is held parallel to the electric field
 B) The surface is held perpendicular to the electric field
 C) The surface makes an angle of 45° with the field
 D) All of the above
- Q. 317** The unit of ϵ_r
 A) $\text{Nm}^{-1}\text{A}^{-1}$ B) $\text{Nm}^{-1}\text{m}^{-1}\text{C}^2$
 C) Nm^2C^2 D) No unit
- Q. 318** The electric lines of force are
 A) Imaginary B) Physically existing every where
 C) Physically existing near the charges D) Depends upon case

- Q. 319** A capacitor of capacitance C has charge Q stored energy is W . if the charge is increase to $2Q$. The stored energy will be
 A) $W/4$ B) $W/2$
 C) $2W$ D) $4W$
- Q. 320** Two similar charges each of one coulomb placed in air one meter apart repel each other with a force
 A) $9 \times 10^9 \text{N}$ B) $9.2 \times 10^4 \text{N}$
 C) $9 \times 10^9 \text{N}$ D) $9 \times 10^7 \text{N}$
- Q. 321** The value of the capacitance depends upon the
 A) voltage applied B) thickness of the capacitor plates
 C) geometry of the capacitor D) density of the capacitor plates
- Q. 322** A 24eV electron has a speed of
 A) $2 \times 10^6 \text{m/sec}$ B) $3 \times 10^6 \text{m/sec}$
 C) $5 \times 10^6 \text{m/sec}$ D) $4 \times 10^6 \text{m/sec}$
- Q. 323** A $5 \mu\text{F}$ capacitor has a potential difference across its plates of 200 volts.
 A) $2.5 \times 10^{-8} \text{C}$ B) 10^{-5}C
 C) 10^3C D) $4 \times 10^3 \text{C}$
- Q. 324** Equivalent capacitance is greater than individual capacitances in
 A) Series combination B) Parallel combination
 C) Both series and parallel combinations D) None of above
- Q. 325** If the distance between the plates of a parallel plates condenser is increased, its potential will
 A) Remain same B) Increase
 C) Decrease D) Decrease exponentially
- Q. 326** The number of electrons in one coulomb of charge is
 A) 6.2×10^8 B) 1.6×10^{-19}
 C) 6.2×10^{21} D) 1.6×10^{-27}
- Q. 327** With what speed electric field travels
 A) $2 \times 10^6 \text{ms}^{-8}$ B) $3 \times 10^8 \text{ms}^{-1}$
 C) $1.5 \times 10^6 \text{ms}^{-1}$ D) 330ms^{-1}
- Q. 328** Electric intensity at infinite distance from the point charge is
 A) Zero B) Infinite
 C) Positive D) Negative
- Q. 329** $\text{N/C} =$
 A) V/A B) J/V
 C) V/m D) A/m
- Q. 330** Acquires kinetics insulator for ____
 A) Direct current B) Alternative current
 C) Both for the direct and alternative current D) None of the above.
- Q. 331** Three capacitors C_1 , C_2 and C_3 are connected in parallel as in the Fig. The equivalent capacitance will be



- A. $8 \mu\text{F}$ B. $0.8 \mu\text{F}$
 C. $1 \mu\text{F}$ D. $16 \mu\text{F}$
- Q. 332** Two plates are 2cm apart. If a potential difference of 10 volts is applied between them, the electric field between them plates
 A) 20N/C B) 500N/C
 C) 5N/C D) 250N/C
- Q. 333** Work done in moving a point charge from one point to another of equipotential surface is
 A) $\Delta W = q\Delta V$ B) $\Delta W = F\Delta r$
 C) Zero D) $W = \frac{1}{14\epsilon_0\Delta V}$

Q. 334 If mica sheet is placed between the plates of a capacitor. The capacitor _____

- A) Increase
- B) Decrease
- C) Increases then decrease
- D) Decrease then increase

Q. 335 According Coulomb's law, the electrostatic force between two charges is

- A) Inversely proportional to the product of the charges
- B) Inversely proportional to the square of the distance the charges
- C) Directly proportional to the cube of the distance between the charge
- D) Directly proportional to the product of the two charges and also the distance between them

Q. 336 When charge is transferred from one to another, which of following is actually transferred?

- A) Electrons
- B) Protons
- C) Neutrons
- D) Quarks
- E) Photons

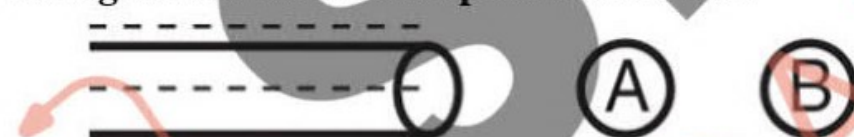
Q. 337 If the electric force between two charges is positive, which of the following must be true?

- A) One charge is positive and the other charge is negative.
- B) The force between the charges is repulsive.
- C) The force between the charges is attractive
- D) The two charges must be equal in magnitude.
- E) The force must be directed toward the larger charge.

Q. 338 Two charges q_1 and q_2 are separated by a distance r and apply a force F to each other. If both charges are doubled, and the distance between them is halved, the new force between them is

- A) $\frac{1}{4} F$
- B) $\frac{1}{2} F$
- C) $4F$
- D) $8F$
- E) $16F$

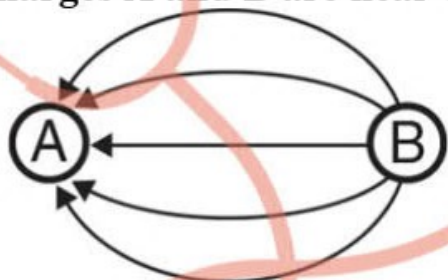
Q. 339 Two uncharged spheres A and B are near each other. A negatively charged rod is brought near one of the spheres as shown.



The far-right side of sphere B is

- A) Uncharged
- B) Neutral
- C) Positive
- D) Negative
- E) Equally positive and negative

Q. 340 Two charges A and B are near each other, producing the electric field lines shown.



What are the two charges A and B, respectively?

- A) Positive, Positive
- B) Negative, Negative
- C) Positive, Negative
- D) Negative, Positive
- E) Neutral, Neutral

Q. 341 A force of 40 N acts on a charge of 0.25 C in a region of space. The electric field at the point of the charge is

- A) 10 N/C
- B) 100 N/C
- C) 160 N/C
- D) 40 N/C
- E) 0.00625 N/C

Q. 342 Electric potential

- A) is a vector quantity.
- B) Is proportional to the work done in an electric field.
- C) Is always equal to the electric field.
- D) Is zero when a charge is in an electric field.

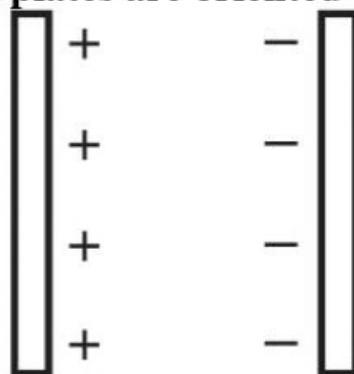
E) Is measured in N/C.

Q. 343 Two conducting plates are separated by a distance of 0.001 m. A 9V battery is connected across the plates. The electric field between the plates is

- A) 9,000 V/m.
- B) 900 V/m.
- C) 9 V/m.
- D) 0.009 V/m.
- E) 0.00011 V/m.

Questions 344 - 345:

Two charged parallel plates are oriented as shown.



The following particles are placed between the plates, one at a time:

I. Electron

II. Proton

III. Neutron

Q. 344 Which of the particles would move to the right between the plates?

- A) I and II only
- B) I and III only
- C) II and III only
- D) II only
- E) I only

Q. 345 Which of the particles would not experience a force while between the plates?

- A) I and II only
- B) II and III only
- C) I only
- D) III only
- E) I, II, and III

Q. 346 Consider two small spheres, one carrying a charge of +4.0 nC and the other a charge of 22.0 nC, separated by a distance of 2 cm. Find the electric force between them. is the abbreviation "nano," which means 10^{-9}

- A) -1.8×10^{-4}
- B) $-1.8 \times 10^{+4}$ N
- C) -2.3×10^{-7} N
- D) -5.6×10^{-7} N
- E) -3.7×10^{-4} N

Q. 347 A charge $q = +3.0$ nC is placed at a location at which the electric field strength is 400 N/C. Find the force felt by the charge q

- A) 1.2×10^{-6} N
- B) 2×10^{-6} N
- C) 3×10^{-10} N
- D) 5×10^{-1} N
- E) 20×10^7 N

Q. 348 Electric field inside a charged shell is

- A) $\frac{E}{\epsilon_0}$
- B) $\frac{6}{2\epsilon_0}$
- C) $\frac{26}{2\epsilon_0}$
- D) $\frac{46}{\epsilon_0}$

Q. 349 If the distance between two positive charges is tripled, then the strength of the electrostatic repulsion between them will decrease by a factor of

- A) 3
- B) 6
- C) 8
- D) 9
- E) 12

Questions 250-251

A 10- nano-farad parallel-plate capacitor holds a charge of magnitude 50 μ C on each plate.

Q. 350 What is the potential difference between the plates?

- A) 1000 V
- B) 2000 V
- C) 3000 V
- D) 4000 V
- E) 5000 V

Q. 351 If the plates are separated by a distance of 0.885 mm, what is the area of each plate?

- A) 1 m²
- B) 2 m²
- C) 3 m²
- D) 4 m²
- E) 5 m²

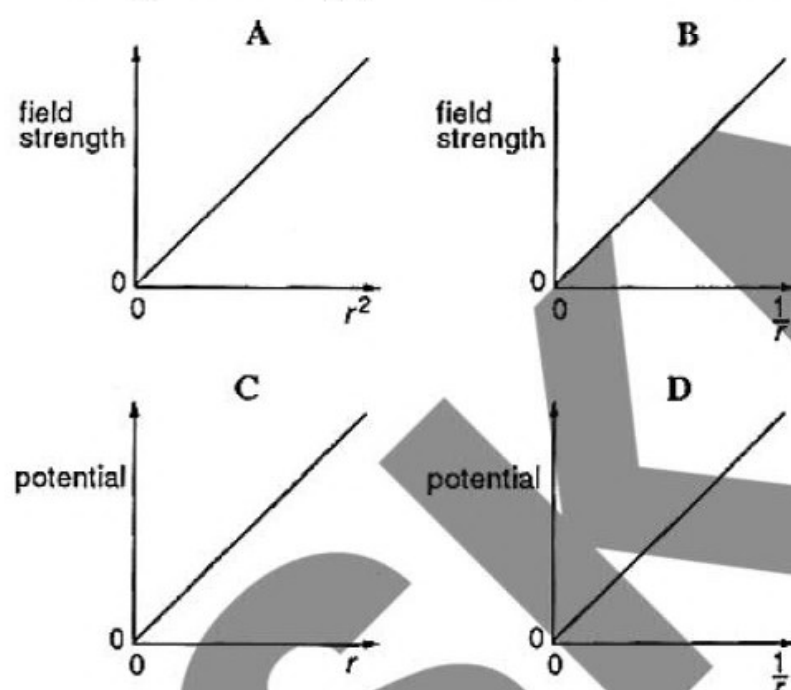
Q. 352 If the direction indicated by electric field line

- A) The electric field must increase
- B) The electric field strength must decrease.
- C) The potential must remain constant.
- D) The potential must increase.
- E) The potential must decrease.

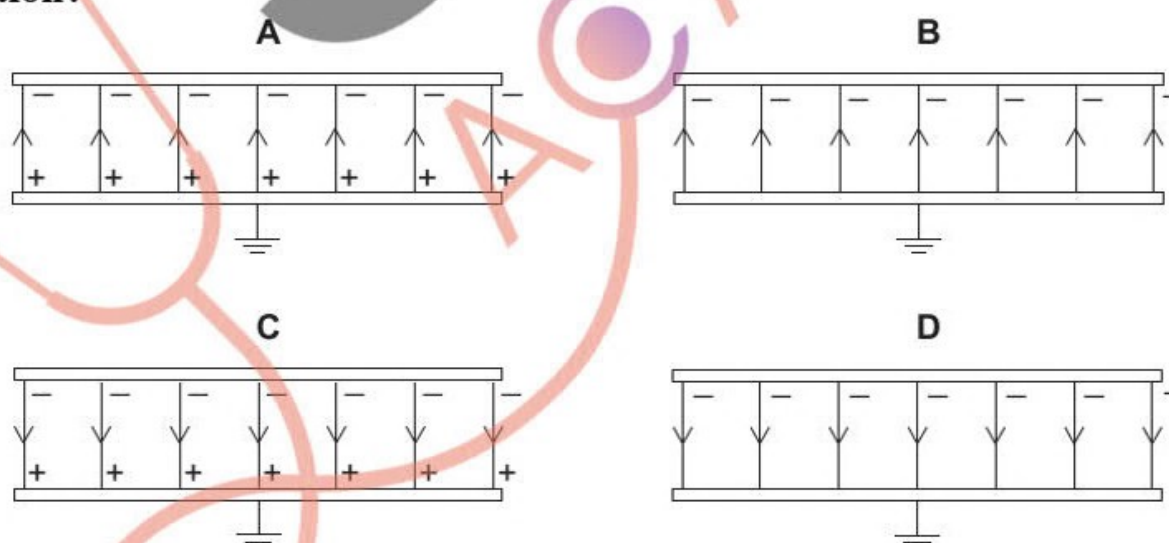
Q. 353 The charge on a uranium nucleus is $1.5 \times 10^{-17} \text{ C}$ and the charge on the α -particle is $3.2 \times 10^{-19} \text{ C}$. What is the electrostatic force between a uranium nucleus and an α -particle when separated by a distance of $1.0 \times 10^{-13} \text{ m}$?

- A) $4.3 \times 10^{-33} \text{ N}$
- B) $4.3 \times 10^{-20} \text{ N}$
- C) $4.3 \times 10^{-13} \text{ N}$
- D) 4.3 N
- E) $4.3 \times 10^{10} \text{ N}$

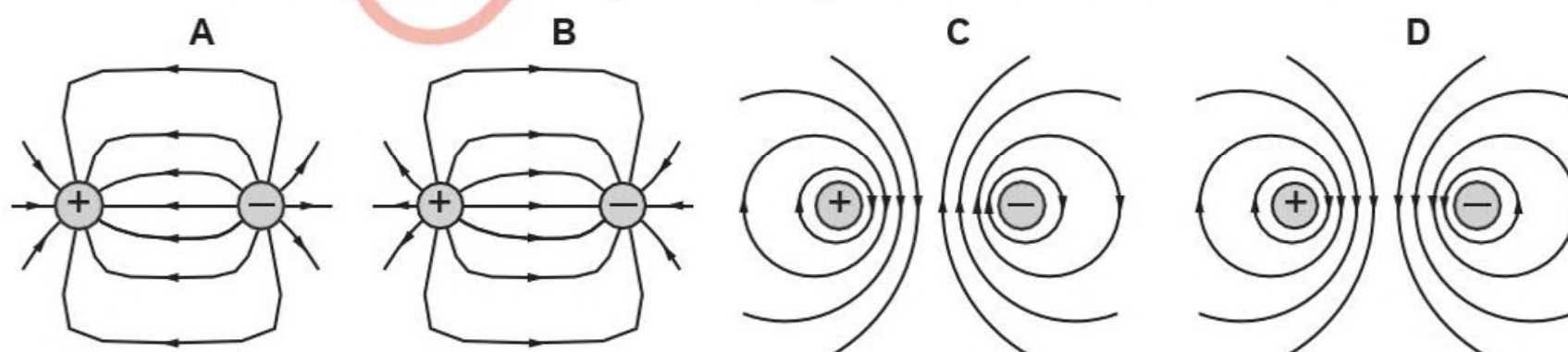
Q. 354 Which graph correctly relates the electric field strength or electric potential in the field of a point charge, with distance r from the charge?



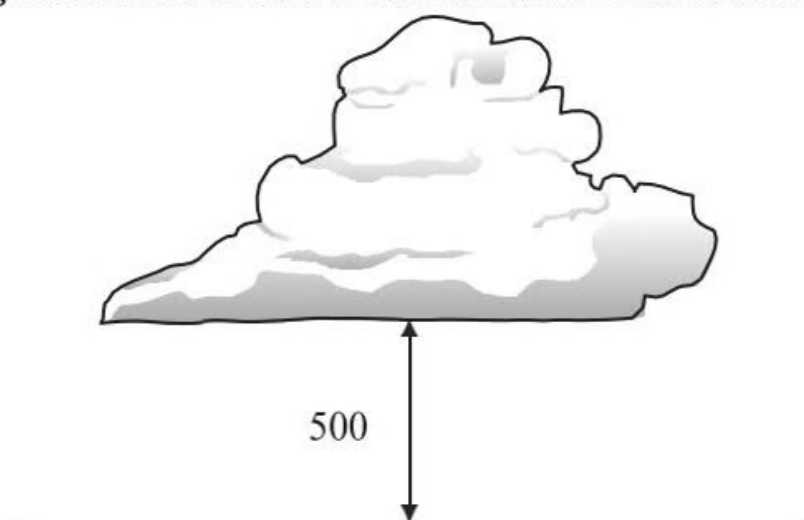
Q. 355 Two parallel, conducting plates with air between them are placed close to one another. The top plate is given a negative charge and the bottom one is earthed. Which diagram best represents the distribution of charges and the field in this situation?



Q. 356 A positive charge and a negative charge of equal magnitude are placed a short distance apart. Which diagram best represents the associated electric field?



Q. 357 The diagram shows a thundercloud whose base is 500 m above the ground.



The potential difference between the base of the cloud and the ground is 200 MV. A raindrop with a charge of $4.0 \times 10^{-12} \text{ C}$ is in the region between the cloud and the ground. What is the electrical force on the raindrop?

- A) $1.6 \times 10^{-6} \text{ N}$ B) $8.0 \times 10^{-4} \text{ N}$
 C) $1.6 \times 10^{-3} \text{ N}$ D) 0.40 N
- Q. 358 Negative charges are accelerated by electric fields toward points
 A) At lower electric potential B) At higher electric potential
 C) Where the electric field is zero D) Where the electric field is weaker
 E) Where the electric field is stronger
- Q. 359 Potential difference of two points would be _____ if both points have same magnitude of charge
 A) $A \cdot E / r$ B) Q / c
 C) Zero D) kq / r
 E) Kq / r^2
- Q. 360 A capacitor of 1 Farad capacitance having a resistance of 1 ohm is charged 63% in
 A) 1 sec B) 2 sec
 C) 3 sec D) 4 sec
 E) 5 sec
- Q. 361 If a test charge moves freely in the direction of electric line of force, then:
 (I) Electrical potential of the system decreases
 (II) Electrical potential of the system remains same
 (III) Potential energy of system decreases
 (IV) Kinetic energy of charge decreases
 A) I only B) II only
 C) I and III only D) II and IV only
- Q. 362 Which of the following is NOT correct for the Electric lines of Forces?
 I. These are imaginary lines II. These lines for a point charge are curved
 III. These lines do not intersect IV. These lines are discontinuous
 A) I only B) I & II
 C) III D) IV only
 E) III & IV
- Q. 363 Which of the following statement is/are correct?
 I. If electric field at a certain point is zero, then the electric potential at the same point is also zero
 II. If the electric potential at a certain point is zero, then the electric field at the same point is also zero
 III. The electric potential is inversely proportional to strength of the electric field
 A) I only B) II only
 C) I & II only D) I & III only
 E) N.O.T
- Q. 364 What will happen to the capacitance of a capacitor if thickness of its plates is doubled?
 A) Becomes double C) Becomes one fourth
 B) Becomes half D) Remains same

Q. 365 The capacitance of a capacitor on removal of dielectric:

- A) Increases
- B) Decreases
- C) Remains same
- D) None of these

Q. 366 The capacitance of capacitor depends on:

- A) Area of plates
- B) Distance between plates
- C) Geometry of plates
- D) All of these

Q. 367 If area of plates of capacitor is doubled & distance between them is also doubled then capacitance:

- A) Is doubled
- B) Is halved
- C) Remains unchanged
- D) Is increased by four times

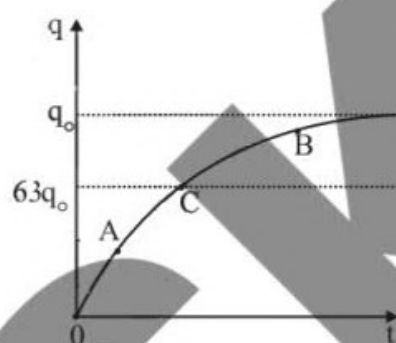
Q. 368 A capacitor has a capacitance of $30\ \mu\text{F}$ when there is a dielectric of dielectric constant 2 between its plates. If the dielectric is removed then capacitance becomes:

- A) $30\ \mu\text{F}$
- B) $15\ \mu\text{F}$
- C) $60\ \mu\text{F}$
- D) $40\ \mu\text{F}$

Q. 369 Which one is not the expression of energy stored in a capacitor?

- A) $\frac{1}{2} CV^2$
- B) $\frac{1}{2} \frac{Q}{V}$
- C) $\frac{1}{2} \frac{Q^2}{C}$
- D) $\frac{1}{2} E^2 \epsilon_0 \epsilon_r$

Q. 370 In the following charging curve of capacitor what does the slope represent?



- A) Capacitance
- B) Current passing
- C) Charge stored
- D) Voltage

Q. 371 Referring to the question # 370, the value of current will be maximum at:

- A) Point A
- B) Point C
- C) Point B
- D) All of these

Q. 372 Referring to Question # 370, the charging speed of capacitor is maximum at:

- A) Point A
- B) Point C
- C) Point B
- D) Same at all points

Q. 373 If the electric field strength is doubled, the energy stored in capacitor becomes:

- A) Double
- B) Remains same
- C) Half
- D) Four times

Q. 374 If a dielectric slab of dielectric constant ϵ_r is placed between plates of a charged capacitor, the energy stored:

- A) Decreases
- B) Remains same
- C) Increases
- D) None of these

Q. 375 A capacitor is connected to a battery. The force of attraction between the plates when the separation between them is halved:

- A) Remains the same
- B) Becomes four times
- C) Becomes eight times
- D) Becomes double

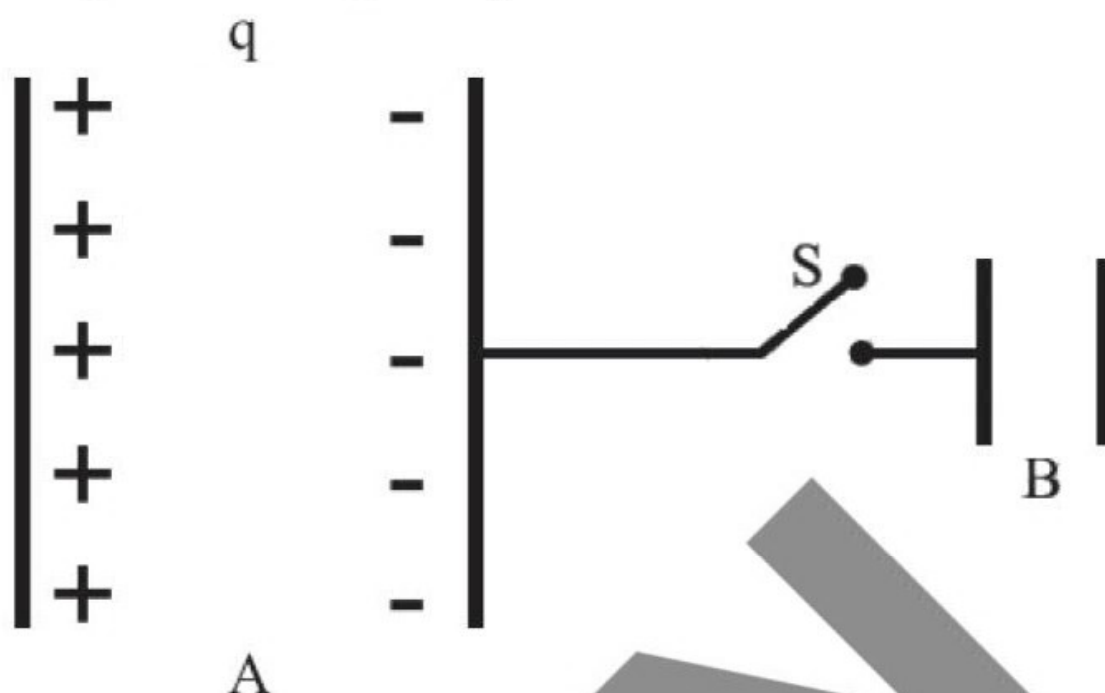
Q. 376 If on one plate of a charged capacitor charge is $+2\mu\text{C}$ then on other plate charge is:

- A) Zero
- B) $+2\mu\text{C}$
- C) $-2\mu\text{C}$
- D) $-4\mu\text{C}$

Q. 377 A parallel plate capacitor of capacitance C is connected to a battery of emf V . If a dielectric slab is completely inserted between the plates of the capacitor and battery remains connected, then electric field between plates:

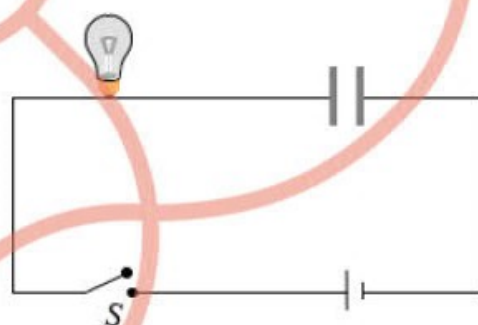
- A) Decreases
- B) Remains constant
- C) Increases
- D) May be increase or may be decrease

Q. 378 In the following figure two capacitors “A” and “B” are shown, capacitor “A” has a charge “q” whereas capacitor “B” is neutral. Now if the switch is made closed then after a long time the charge on capacitor “B” will be:



- A) $q/2$
 B) q
 C) $2q$
 D) Zero
- Q. 379** A parallel plate capacitor has plates of 0.04 m^2 area of each plate and $2.0 \times 10^{-3} \text{ m}$ separation. If a potential difference of 200 volt is applied, the charge will be:
 A) $30 \times 10^{-9} \text{ C}$
 B) $32 \times 10^{-9} \text{ C}$
 C) $35.4 \times 10^{-9} \text{ C}$
 D) $36 \times 10^{-9} \text{ C}$
- Q. 380** The capacity of a parallel plate capacitor is $10 \mu\text{F}$. When a glass plate is placed between the plates of the capacitor, its potential becomes $1/4^{\text{th}}$ of the original value. The value of dielectric constant will be:
 A) 40
 B) 0.25
 C) 4
 D) $1/8$
- Q. 381** A $4 \mu\text{F}$ capacitor is charged to 400 V and then its plates are joined through a resistance of $2 \text{ k}\Omega$. The heat produced in the resistance is:
 A) 1.28 J
 B) 0.64 J
 C) 0.32 J
 D) 0.16 J
- Q. 382** The capacity of a parallel plate capacitor is $5 \mu\text{F}$. When a glass plate is placed between the plates of the condenser, its potential difference reduces to $1/8$ of the original value. The value of dielectric constant of glass is:
 A) 1.6
 B) 8
 C) 5
 D) 40
- Q. 383** A capacitor is charged to store an energy U . The charging battery is now disconnected. An identical capacitor is now connected to the first capacitor in parallel. The energy in each of the capacitor is:
 A) $U/4$
 B) $U/2$
 C) U
 D) $3U/2$
- Q. 384** A student has three capacitors such that $C_1 = C_2 = C_3$. Now he connects them independently to batteries of different voltages. Which of these capacitors will get a greater voltage?
 A) One connected to greater voltage
 B) One connected to smallest voltage
 C) All will get same potential
 D) Data is insufficient
- Q. 385** An electrician connects three capacitors of different capacitances such as $C_1 < C_2 < C_3$ and he joins them independently with sources of same voltages. Which of the three capacitors will gain greater energy?
 A) C_1
 B) C_2
 C) C_3
 D) All will gain same energy
- Q. 386** A capacitor is always charged through a resistor with a source. Now if we replace greater resistor with a smaller one then the capacitor will be charged:
 A) Slower
 C) In same time as previous

- B) Faster
D) Will not be charged
- Q. 387** Two capacitors of capacitances such that $C_2 > C_1$ are connected through identical sources and identical resistors. Which of these capacitors will be charged prior to other?
- A) C_1
B) C_2
C) Both at same time
D) Data is not sufficient
- Q. 388** A capacitor has a capacitance of $10\mu\text{F}$ such that it is connected with a source of voltage of 2V . What is the energy stored in the capacitor?
- A) $10\mu\text{J}$
B) $200\mu\text{J}$
C) $20\mu\text{J}$
D) $40\mu\text{J}$
- Q. 389** A capacitor of capacitance $6\mu\text{F}$ is connected to voltage source such that it gains a charge of $3\mu\text{C}$ on one of the plates. What must be the energy stored in it?
- A) $75\mu\text{J}$
B) $750\mu\text{J}$
C) $0.75\mu\text{J}$
D) $7.5\mu\text{J}$
- Q. 390** For a capacitor if keeping capacitance constant applied voltage is quadrupled then the stored energy becomes;
- A) Quarter
B) Half
C) Sixteen times
D) Double
- Q. 391** A capacitor has energy of 8J such that its capacitance is 4F . What must be the voltage of source to which it was connected?
- A) 1 volt
B) 3 volt
C) 2 volt
D) 4 volt
- Q. 392** A capacitor is connected to a source such that it gets a charge of $0.5\mu\text{C}$ on one of its plates. It gains an energy of 1J . What must be the voltage of source?
- A) $2 \times 10^6\text{V}$
B) $3 \times 10^6\text{V}$
C) $4 \times 10^6\text{V}$
D) 4V
- Q. 393** Two electric charges originally 4cm apart are brought closer to each other until the force between them becomes of 4 times. How much they separated now?
- A) 1cm
B) 0.5cm
C) 2cm
D) 0.25cm
- Q. 394** An uncharged capacitor is connected to a battery. On charging the capacitor
- A) All the energy supplied is stored in the capacitor
B) Half the energy supplied is stored in the capacitor
C) The energy stored depends upon the capacity of the capacitor only
D) The energy stored depends upon the time for which the capacitor is charged
- Q. 395** A light bulb, a capacitor and a battery are connected together as shown here, with switch S initially open. When the switch S is closed, which one of the following is true



- A) The bulb will light up for an instant when the capacitor starts charging
B) The bulb will light up when the capacitor is fully charged
C) The bulb will not light up at all
D) The bulb will light up and go off at regular intervals
- Q. 396** The electric field lines emerge from the charges in:
- A) Three dimensions
B) One dimension
C) Two dimensions
D) All of above
- Q. 397** In discussing electric fields, the terms 'electric field strength', 'electric potential' and 'potential gradient' are used. Which statement about these terms is correct?
- A) Electric field strength at a point is the work done in bringing unit positive charge from infinity to the point
B) Electric potential and potential gradient are both scalar quantities

C) The potential gradient at a point is numerically equal to the electric field strength at that point

D) Unit potential gradient exists between any two points, if one joule of work is done in transporting one coulomb of charge between the points

Q. 398 A point charge A of charge $+4 \text{ WC}$ and another point charge B of charge -1 pc are placed in air at a distance 1 meter apart. Then the distance of the point on the line joining the charges A and from the charge B, where the resultant electric field is zero, is (in meter)

A) 1.5

B) 1

C) 0.5

D) 2

Q. 399 The capacity of a condenser in which a dielectric of dielectric constant 5 has been used, is C . If the dielectric is replaced by another with dielectric constant 20, the capacity will become

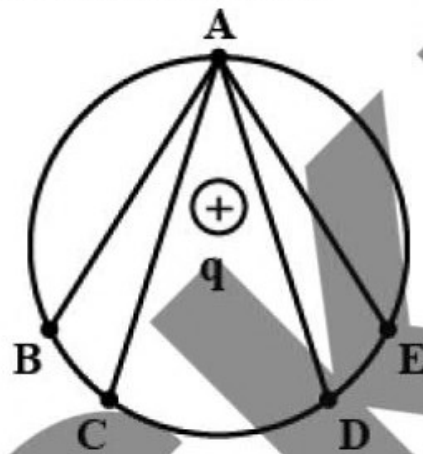
A) $C/4$

B) $C/2$

C) $4C$

D) $2C$

Q. 400 In the electric field of a point charge q , a certain charge is carried from point A to B, C, D and E. Then the work done



A) Is least along path AB

B) Is least along path AD

C) Is least along path AE

D) Is zero along all the paths

1	A	51	B	101	A	151	D	201	C	251	D	301	A	351	A
2	D	52	B	102	A	152	B	202	B	252	A	302	A	352	E
3	B	53	C	103	C	153	C	203	B	253	A	303	B	353	D
4	A	54	B	104	D	154	C	204	C	254	D	304	C	354	D
5	C	55	C	105	D	155	A	205	B	255	D	305	C	355	A
6	A	56	B	106	B	156	D	206	D	256	D	306	C	356	B
7	C	57	D	107	D	157	C	207	B	257	B	307	C	357	A
8	C	58	A	108	D	158	B	208	A	258	A	308	C	358	B
9	A	59	D	109	B	159	D	209	D	259	B	309	C	359	C
10	D	60	C	110	C	160	C	210	D	260	B	310	C	360	A
11	B	61	C	111	C	161	B	211	A	261	D	311	B	361	C
12	D	62	A	112	C	162	C	212	C	262	D	312	C	362	D
13	B	63	D	113	C	163	B	213	C	263	A	313	A	363	E
14	A	64	A	114	C	164	A	214	B	264	B	314	C	364	D
15	C	65	D	115	A	165	B	215	C	265	A	315	B	365	A
16	B	66	A	116	B	166	D	216	D	266	D	316	B	366	D
17	B	67	D	117	B	167	A	217	A	267	B	317	D	367	C
18	B	68	A	118	A	168	B	218	B	268	C	318	A	368	B
19	D	69	C	119	A	169	C	219	B	269	B	319	C	369	D
20	D	70	B	120	A	170	D	220	C	270	B	320	A	370	B
21	A	71	D	121	C	171	D	221	D	271	C	321	C	371	A
22	A	72	B	122	C	172	C	222	D	272	B	322	B	372	A
23	B	73	B	123	A	173	B	223	C	273	C	323	B	373	D
24	D	74	A	124	A	174	C	224	C	274	D	324	B	374	A
25	B	75	D	125	B	175	C	225	D	275	B	325	B	375	D
26	A	76	D	126	A	176	C	226	C	276	A	326	A	376	C
27	C	77	B	127	C	177	C	227	D	277	A	327	B	377	B
28	B	78	A	128	D	178	B	228	C	278	B	328	A	378	D
29	B	79	C	129	C	179	A	229	B	279	D	329	C	379	C
30	C	80	A	130	C	180	D	230	D	280	B	330	B	380	C
31	A	81	D	131	A	181	B	231	C	281	A	331	A	381	C
32	C	82	A	132	C	182	A	232	D	282	D	332	B	382	B
33	B	83	C	133	C	183	C	233	B	283	D	333	C	383	A
34	C	84	C	134	C	184	C	234	B	284	C	334	A	384	A
35	A	85	D	135	A	185	B	235	D	285	D	335	B	385	C
36	B	86	B	136	A	186	C	236	D	286	D	336	A	386	B
37	C	87	C	137	C	187	D	237	B	287	A	337	A	387	A
38	C	88	B	138	A	188	C	238	D	288	B	338	E	388	C
39	B	89	C	139	C	189	A	239	B	289	D	339	D	389	C
40	C	90	A	140	C	190	B	240	D	290	B	340	D	390	C
41	C	91	D	141	A	191	C	241	B	291	B	341	C	391	C
42	D	92	A	142	C	192	A	242	D	292	D	342	B	392	C
43	C	93	D	143	B	193	C	243	D	293	C	343	A	393	C
44	A	94	D	144	C	194	C	244	A	294	D	344	D	394	B
45	A	95	A	145	C	195	B	245	B	295	C	345	D	395	A
46	D	96	B	146	C	196	B	246	C	296	D	346	A	396	A
47	D	97	C	147	A	197	B	247	B	297	C	347	A	397	C
48	B	98	B	148	B	198	B	248	D	298	D	348	C	398	B
49	B	99	A	149	B	199	B	249	B	299	D	349	D	399	C
50	C	100	B	150	A	200	B	250	C	300	A	350	E	400	D

