OBJECTIVE TYPE QUESTIONS

SECTION- A

Q1. Coulomb's law is analogous to

(a)Charge conservation law

(b)Newton's second law of motion

(c)Law of conservation of energy

(d)Newton's law of gravitation

Q2. Two point charges Q1 and Q2 exert a force F on each other when kept certain distance apart. If the charge on each particles is halved and the distance between the two particles is doubled. Then the new force between the particles would be ?

(a)F/2

(b)F/4

(c)F/8

(d)F/16

Q3. Two equally charged identical small balls kept some fixed distance apart exert a repulsive force F on each other. A similar uncharged ball, after touching one of them is placed at the mid-point of line joining the two balls. Force experienced by the third ball is

(a4F

(b)2F

(c)F

(d)F/2

Q4. Five balls marked a to e are suspended using separate threads. Pairs (b, c) and (d, e) show electrostatic repulsion while pairs (a, b), (c, e) and (a, e)show electrostatic attraction. The ball marked 'a' must be:

(a)Negatively charged

(b)positively charged

(c)Uncharged

(d)Any of the above is possible

Q5.When a plastic rod rubbed wool is brought near a knob of a negatively charged gold leaf electroscope, the gold leaf :

(a)contracts

(b)dilate

(c)starts oscillating

(d)collapse completely

Q6. According to coulomb's law, which is correct relation for the following diagram?

(a)$q_1q_2<0$

(b)$q_1q_2>0$

(c)$q_1q_2=0$

(d)$q_1q_2>>100C$

Q7. A charge Q is to be distributed on two conducting spheres. What should be the value of the charges on the spheres so that the repulsive force between them is maximum when they are placed at a fixed distance from each other in air ?

(a)q/2 and q/2

(b) q/4 and 3q/4

(c) q/3 and 2q/3

(d) q/5 and 4q/5

Q8. A point charge q_1 exerts an electric force on a second point charge q_2. If third charge q_2 is brought near, the electric force of q_1 exerted on q_2

(a)decreases

(b)increases

(c)remain unchanged

(d)increase if q_2 is of same sign as q1 and decreases if if q_2 is of opposite sign

Q9. Three charge +4q,Q and q are placed in a straight line of length l at points 0,l/2 and l distance respectively what should be Q in order to make the net force on q to be zero ?

(a)-q

(b)4q

(c)-q/2

(d)-2q

Q10. A particle of mass m and carrying charge $-q_1$ is moving around a charge $+q_2$ along a circular path of radius r. find period of revolution of the charge $-q_1$

(a) $\sqrt{\frac{16\pi^3 E_0 \mathrm{m} r^2}{\mathrm{q1q2}}}$

(b) $\sqrt{\frac{6\pi^3 E_0 \mathrm{m} r^2}{\mathrm{q1q2}}}$

(c) $\sqrt{\frac{\mathrm{q1q2}}{16\pi^3 E_0 \mathrm{m} r^2}}$

(d)zero

Q11. Consider three point objects P, Q and R,. P and Q repel each other While P and R attracts. What is the nature of force between Q and R?

(a)Repulsive force

(b)Attractive force

(c)No force

(d)None of these

Q12. Which of the following processes involves the principle of electrostatic induction?

(a)pollination

(b) chocolate making

(c)Xerox copying

(d)All of these

Q13. The electric field intensity at a point in vaccum is equal to

(a)zero

(b)force a proton would experience there

(c)force an electron would experience there

(d)force a unit positive charge would experience there

Q14. A sphere of radius r has electric charge uniformly distributed in its entire volume. At a distance d from the centre inside the sphere (d<r) the electric field intensity is directly proportional to

(a)1/d

(b)$1/d^2$

(c)d

(d)d^2

Q15. Two equal point charges A and B are R distance apart. A third point charge placed on the perpendicular bisector at a distance d from the centre will experience maximum electrostatic force when

(a)d=$\frac{R}{2\sqrt{2}}$

(b)d=$\frac{R}{\sqrt{2}}$

(c)d=R√2

(d)d=2√2 R

Q16. A charged gold leaf electroscope has its leaves apart by certain amount having enclosed air. When the electroscope is subjected to X-rays, then the leaves :

(a)Further dilate

(b)starts oscillating

(c)collapse

(d)remain unaltered

Q17. Two equal posive charges Q are fixed at points (a, 0) and (-a, 0) on the X-axis an opposite charge –q at rest is released from point (0, a) on the Y-axis. The charge –q will :

(a)Move to infinity

(b)move to origin and rest there

(c)Undergo SHM about the origin

(d) Execute oscillatory periodic motion but not SHM

Q18. Four charges each equal to Q are placed in the four corners of a square and a charge q is placed at the centre of the square. If the system is in equilibrium then the value of q is :

(a)$\frac{Q}{2}$(1+2√2)

(b) $\frac{-Q}{4}$(1+2√2)

(c) $\frac{Q}{4}$(1+2√2)

(d) $\frac{-Q}{2}$(1+2√2)

Q19. Which of the following is not true about electric charge

(a)Charge on a body is always integral multiple of certain charge known as charge of electron

(b)charge is scalar quantity

(c)net charge on an isolated system is always conserved

(d)charge can be converted into energy and energy can be converted into charge

Q20. what is the amount of charge possessed by 1 kg of electrons?

(a)$1.76\text{x}10^{11}$C

(b) $1.76\text{x}10^{-8}$C

(c) $1.76\text{x}10^{-7}$C

(d) $1.76\text{x}10^{-5}$C

Q21. If a body has positive charge on it, then it means it has

(a)Gained some protons

(b)Lost some protons

(c)Gained some electrons

(d)Lost some electrons

Q22. Sure check for presence of electric charge is:

(a)process of induction

(b)Repulsion between bodies

(c)Attraction between bodies

(d)Frictional force between bodies

Q23. If a solid and a hollow conducting sphere have same radius then:

(a)Hollow sphere will hold more maximum charge

(b)solid sphere will hold more maximum charge

(c)Both the sphere will hold maximum charge

(d)Both the sphere can't hold maximum charge

Q24. When a conducting soap bubble is negatively charged then:

(a)Its size starts varying arbitrarily

(b)It expands

(c)It contracts

(d)No change in its size takes place

Q25. The electric field at 2R from the centre of a uniformly charged non-conducting sphere of radius R is E. the electric field at a distance R/2 from the centre will be:

(a)Zero

(b) 2E

(c)4E

(d)16E

Q26. In a uniform electric field if a charge is fired in a direction different from the line of electric field the trajectory of a charge will be a :

(a)straight line

(b)circle

(c)parabola

(d)ellipse

Q27. A positively charged pendulum is oscillating in a uniform electric field pointing upward. Its time period as compared to that went it oscillates without electric field

(a)is less

(b)is more

(c)remains unchanged

(d)starts fluctuation

Q28. How many electrons should be removed from a coin of mass 1.6g. so that it may float in an electric field of intensity of 10^9N/C directed upward

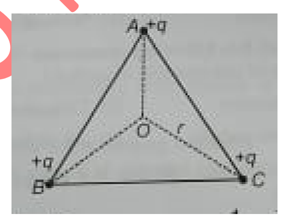
(a)$9.8x10^7$

(b) $9.8x10^5$

(c) $9.8x10^3$

(d) $9.8x10^1$

Q29. ABC is an equilateral triangle. Charges +q are placed at each corner. The electric field intensity at the centroid of triangle will be:



(a) $\frac{1}{4\pi E0} X \frac{q}{r2}$

(b) $\frac{1}{4\pi E0} X \frac{3q}{r2}$

(c) $\frac{1}{4\pi E0} X \frac{q}{r}$

(d)zero

Q30. A charge Q is placed at the centre of a square. If electric field intensity due to the charge at the corners of the square is E_1 and the intensity at the mid point of the side of square is E_2. Then the ration of E_1/E_2 will be;

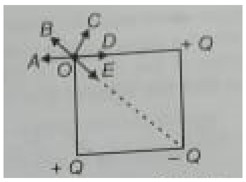
(a)1/2√2

(b) √2

(c)1/2

(d)2

Q31.Point charges each of magnitude Q are placed at three corners of a square as shown in the diagram. What is the direction of the resultant electric field at the fourth corner ?



(a)OC

(b)OE

(c)OD

(d)OB

Q32. Two charge e and 3eare placed at a distance r the distance of the point where the electric field intensity will be zero is

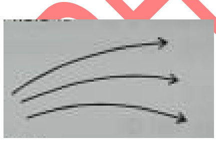
(a)$\frac{r}{1+\sqrt{3}}$ from 3e charge

(b) $\frac{r}{1+\sqrt{3}}$ from e charge

(c) $\frac{r}{1-\sqrt{3}}$ from 3e charge

(d) $\frac{r}{1+(\frac{1}{\sqrt{3}})}$ from e charge

Q33. If electric lines of force in a region are represented as shown in the figure, then one can conclude that, electric field is



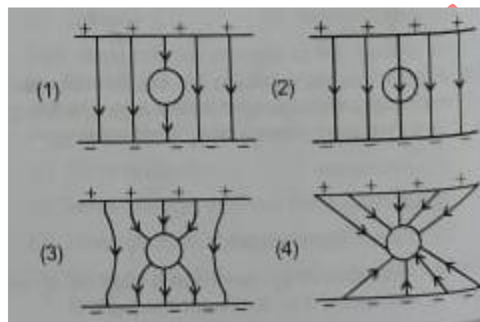
(a)non- uniforn

(b)uniform

(c)both uniform and non-uniform

(d)ero everywhere

Q34. An uncharged sphere of a metal is placed in a uniform electric field produced by two oppositely charged plates. The line of force will appear as



Q35. An electron released on the axis of a positively charged ring at a large distance from the centre will

(a) not move

(b) do oscillatory motion

(c)Do SHM

(d) Do non periodic motion

Q36. Electric charge Q, Q and -2Q respectively are placed at the three corners of an equilateral triangle of side a. Magnitude of the electric dipole moment of the system is:

(a)√2 Qa

(b)√3 Qa

(c)Qa

(d)2Qa

Q37. AN electric dipole placed in a uniform electric field experiences maximum moment of couple when the dipole is placed

(a)Against the direction of the field

(b)Towards the electric field

(c)perpendicular to the direction of the field

(d)At 135 degree to the direction of the field

Q38. Force of interaction between two co-axial short electric dipoles whose centres are R distance apart varies as

(a)1/R

(b)$1/R^2$

(c)$1/R^3$

(d)$1/R^4$

Q39. Two charges of +25x10-9 coulomb are placed 6m apart. Find the electric field intensity ration at points 4m from the centre of the electric dipole (i)on axial line (ii)on equatorial line

(a)1000/49

(b)49/1000

(c)500/49

(d)49/500

Q40. The electric force on a point charge situated on the axis of a short dipole is F. if the charge is shifted along the axis to double the distance, the electric force acting will be

(a)4F

(b)F/2

(c)F/4

(d)F/8

Q41. An electric dipole is placed at an angle with 60^0 with an electric field of strength $4x10^5$N/C. It experiences a torque equal to 8√3 Nm. Calculate the charge on the dipole, if the dipole is of length 4cm

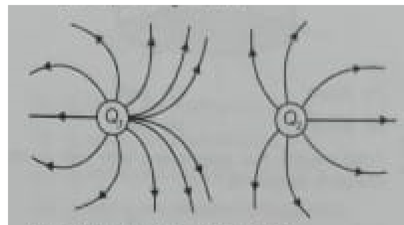
(a)10^{-1}C

(b)10^{-2}C

(c)10^{-3}C

(d)10^{-4}C

Q42. Figure shows electric lines of forces due to charge Q_1 and Q_2 hence



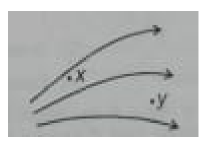
(a) Q_1 and Q_2 are negative

(b) Q_1 and Q_2 are positive

(c) $Q_1 > Q_2$

(d) both (a) and (b)

Q43. Figure shows electric lines of force. E_X and E_Y are the magnitudes of electric field at points X and Y respectively then



(a)$E_X > E_Y$

(b) $E_X = E_Y$

(c) $E_X < E_Y$

(d)Any of these

Q44. A charge q is situated at the centre of a cube. Electric flux through one of the faces of the cube is

(a)q/E_0

(b)$Q/3E_0$

(c)$q/6E_0$

(d) Zero

Q45. A charge Q is placed at the centre of the open end of a cylindrical vessel. Electic flux through the surface of the vessel is

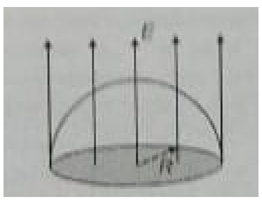
(a)$q/2E_0$

(b) q/E_0

(c) $2q/E_0$

(d)Zero

Q46. The hemispherical surface of radius R is kept in a uniform Electric Field E. as shown in figure. The flux the curved surface is



(a)$E2\pi R^2$

(b) $E\pi R^2$

(c) $E4\pi R^2$

(d)Zero

Q47.A charged body has an electric flux F associated with it Now if the body is placed inside a conducting shell then the electric flux outside the shell is

(a)zero

(b)Greater than F

(c)less than F

(d)Equal to F

Q48. A cylinder of radius R and length L is placed in a electric field E parallel to the cylinder axis. The outward flux over the surface of the cylinder is given by

(a)$2\pi R^2 E$

(b) $\pi R^2 E/2$

(c) $2\pi RLE$

(d) $\pi R^2 E$

Q49. A rectangular surface of side 10 cm and 15 cm is placed inside a uniform electric field of 25v/m, Such that the surface makes an angle of 30^0 with the direction of electric field. Find the flux of the electric field through the rectangular surface.

(a)$0.1675 N/m^2C$

(b) $0.1675 Nm^2/C$

(c) $0.1675 n/M^2C$

(d) $0.1075 n/M^2C$

Q50. If an electric field is given by $10\hat{\imath} + 3\hat{\jmath} + 4\hat{k}$, calculate the electric flux through a surface of area 10 units lying in yz plane

(a)100 units

(b) 10 units

(c) 30 units

(d) 40 units

Q51. A charge Q is kept at the corner of a cube electric flux passing through one of those faces not touching that charge is

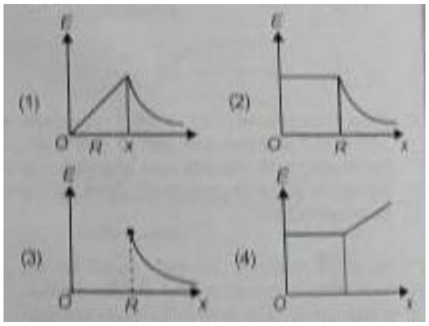
(a)$Q/24E_0$

(b)Q/3E0

(c)Q/8E0

(d)Q/6E0

Q52.A isolated solid metal sphere of radius R is given an electric charge. Which of the graphs below best shows the way in which the electric field E varies with distance x from the centre of the sphere.



Q53. The electric field intensity at P and Q in the shown arrangement are in the ration of

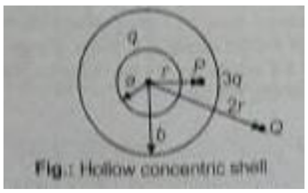


Fig.: Hollow concentric shell

(a)1:2

(b)2:1

(c)1:1

(d)4:3

Q54. Consider an atom with atomic number Z as consisting of a positive point charge at the centre and surrounded by a distribution of negative electricity uniformly distributed within a sphere of radius R. the electric field at a point inside the atom at a distance r from the centre is

(a)$\frac{Ze}{4\pi E0}[\frac{1}{r2} - \frac{1}{R2}]$

(b) $\frac{Ze}{4\pi E0}[\frac{1}{r2} + \frac{1}{R2}]$

(c) $\frac{Ze}{4\pi E0r2}$

(d)Zero

Q55. An electron is rotating around an infinite positive linier charge in a circle of radius 0.1m. If the linear charge density is 1μC/m, then the velocity of electron in m/s will be

(a)$0.562x10^7$

(b) $5.62x10^7$

(c) $562x10^7$

(d) $0.0562x10^7$

Q56. A dipole with an electric moment $\vec{p}$ is located at a distance r from a long thread charged uniformly with a linear charge density λ. Find the force F acting on the dipole if the vector $\vec{p}$ is oriented along the thread

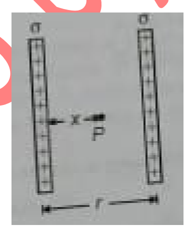
(a)$p\ \lambda/2\pi E_0 r^2$

(b) $p\ \lambda/2\pi E_0 r$

(c) $p\ /2\pi E_0 r^2\ \lambda$

(d)Zero

Q57. For two infinitely long charged parallel sheets. The field P will be



(a)$\frac{\sigma}{2x} - \frac{\sigma}{2(r-x)}$

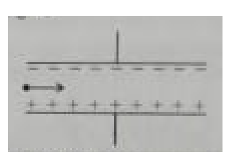
(b) $\frac{\sigma}{2E0\ x} + \frac{\sigma}{2(r-x)E0}$

(c) $\frac{\sigma}{E0}$

(d)Zero

SECTION B

Q1. A proton and α particle having equal kinetic energy are projected in a uniform transverse electric field as shown in the figure



(a)proton trajectory is more curved

(b) α particle trajectory is more curved

(c)both trajectory are equally curved but in opposite direction

(d) both trajectory are equally curved but in same direction

Q2. Electric field in a region is uniform and is given by $\vec{E}= a\vec{i}+ b\vec{j}+ c\vec{k}$. Electric flux associated with a surface of area $\vec{A}= \pi R^2\vec{j}$

(a)$a\pi R^2$

(b)$3a\pi R^2$

(c)2abR

(d)aCR

Q3. Which of the following is not true about electric charge ?

(a)charge is a scalar quantity

(b)Charge on an isolated system is always conserved

(c)A particle having zero rest mass can have non zero charged

(d)A particle having zero rest mass can have non zero charged

Q4. If E0 is permitivity of free space , e is charge of proton, G is universal gravitational constant and mp is mass of a proton then the deimensional formulae of

$E^2/4\pi E_0 G m_p^2$

(a)$[M^1L^1T^{-3}A^{-1}]$

(b))$[M^3L^1T^3A^{-1}]$

(c))$[M^1L^3T^{-3}A^{-1}]$

(d))$[M^{-1}L^1T^0A^2]$

Q5. two positive point charges of unequal magnitude are placed at a certain distance apart. A small positive test charge is placed at null point then.

(a)The test charge is in unstable equilibrium

(b) The test charge is in stable equilibrium

(c) The test charge is in neutral equilibrium

(d) The test charge is not in equilibrium

Q6. Three particles are projected in a uniform electric field with same velocity perpendicular to the field as shown. Which particles has highest charge to mass ration?

(a)A

(b)B

(c)C

(d)All have same charge to mass ratio

Q7. A infinite line charge is at the axis of a cylinder length 1m and radius 7 cm. If electric field at any point on the curved surface of cylinder is $250NC^{-1}$ then net electric flux through the cylinder is

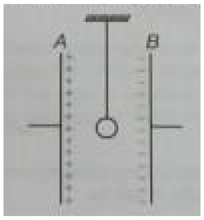
(a)$1.1x102Nm^2C^{-1}$

(b)$9.74x$ $10\text{-}8Nm^2C^{-1}$

(c)$5.5x1088Nm^2C^{-1}$

(d)$2.5x102Nm^2C^{-1}$

Q8. A small conducting sphere is hanged by a insulating thread between the plates of a parallel plate capacitor as shown in figure. The net force on the sphere is



(a) Towards plate A

(b) Towards plate B

(c)Upward

(d)Zero

Q9. Select the correct statement about electric charge:

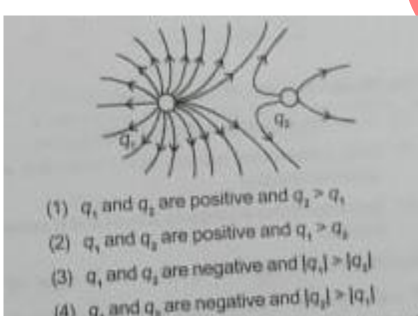
(a)Charge can be converted into energy and energy can be converted into charge

(b)Charge of particle increases with increase in its velocity

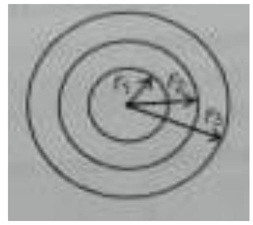
(c)Charge on a body is always integral multiple of a certain charge called charge of electron

(d)charge on a body is always positive or zero

Q10. Figure shows electric field lines due to a charge configuration, from this conclude that



Q11. Figure shows thee concentric metallic spherical shells. The outermost shell has charges q_3, the inner most shell has charge q_1 and the middle shell is uncharged. The charge appearing on the inner surface of outermost shell is



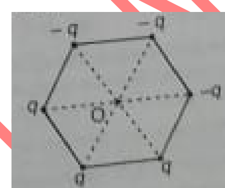
(a)q_1+q_2

(b)$q_2/2$

(c)$-q_1$

(d)Zero

Q12. Six point charges are placed at the vertices of a hexagon of a side 1m as shown in the figure. Net electric field at the centre of the hexagon is



(a)zero

(b)$6q/4\pi E_0$

(c)$q/ \pi E_0$

(d)$q/4\pi E_0$

Q13. Which of the following is not the unit of charge ?

(a)farad

(b)coulomb

(c)stat coulomb

(d)Faraday

Q14.If two charges of 1 coulomb each are placed 1km apart, then the force between them will be

(a)$9x10^3$N

(b) $9x10^3$N

(c) 9×10^{-4}N

(d) 10^{-6}N

Q15. The magnitude of electric electric field strength E such that an electron placed in it would experience an electrical force equal to its weight is given by

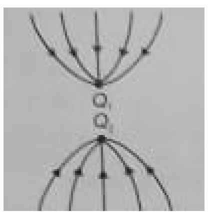
(a)mge

(b)mg/e

(c)e/mg

(d)$e^2g/2m$

Q16.The figure shown is a plot of electric field lines due to two charges Q_1 and Q_2 the sign of charges is



(a)Both negative

(b)Q_1 positive and Q_2 negative

(c)Both positive

(d)Q_1 negative and Q_2 positive

Q17.The electric field at 20 cm from the centre of a uniformly charged non-conducting sphere of radius 10cm is E. Then at a distance 5 cm from the centre it will be

(a)16E

(b)4E

(c)2E

(d)zero

Q18. When two particles having charges q1 and q2 are kept at certain distance, they exert a force F on each other. If the distance between the two particles is reduced to half and the charge on each particle is doubled then the force between the particles would be

(a)2F

(b)4F

(c)8F

(d)16F

Q19.Charge 2Q and –Q are placed as shown in figure. The point at which electric field intensity is zero will be somewhere

-Q.____________.+2Q

(a)between –Q and 2Q

(b)on the left of -Q

(c) on the right of +2Q

(d)on the perpendicular bisector of line joining the charges

Q20.If a small sphere of mass m and charge Q is hung from a silk thread at an angle ϴ with the surface of a vertical charged conducting plate, then for equilibrium of sphere, the surface charge density of plate is

(a)E_0(mg/q)tanϴ

(b) E_0(2mg/q)tanϴ

(c) E_0(mgq)tanϴ

(d) E_0(mg/3q)tanϴ

Q21. Two long thin charged rods with charge density λ each are placed parallel to each other at a distance d apart. The force per unit length extended on one rod by the other will be (where $k=1/4\pi E_0$)

(a)k2λ/d

(b) $k2\lambda^2/d$

(c) $k2\lambda/d^2$

(d) $k2\lambda^2/d^2$

Q22. The dimensional formulae of linear charge density λ is

(a)$[M^{-1}L^{-1}T^{-1}A]$

(b) $[M^0L^{-1}T^{+1}A]$

(c) $[M^{-1}L^{-1}T^{+1}A^{-1}]$

(d) $[M^0L^{-1}T^{-1}A^{-1}]$

Q23.Two isolated metallic sphere of radii 2cm and 4cm are given equal charge, then the ratio of charge density on the surfaces of the sphere will be

(a)1:2

(b)4:1

(c)8:1

(d)1:4

Q24. If the number of electric lines of force emerging as of a closed surface is 1000. Then the charge enclosed by the surface is

(a)8.854×10^{-8}C

(b) 8.854×10^{-4}C

(c) 8.854×10^{-1}C

(d) 8.854C

Q25. A charge of 1 coulomb is located at the centre of a sphere of radius 10cm and a cube of side 20cm. the ratio of outgoing flux from the sphere and cube will be

(a)more than one

(b)less than one

(c)one

(d)nothing certain can be said

Q26. Gauss's law can help in easy calculation of electric field due to

(a)moving charge only

(b)any charge configuration

(c)Any symmetrical charge configuration

(d)some special symmetric charge configuration

Q27. An electric dipole when placed in a uniform electric field Ewill have minimum potential energy, where the angle made by the dipole moment with field E is

(a)π

(b)3 π/2

(c)zero

(d) π/2

Q28. An electric dipole is placed in non-uniform electric field. It may experience

(a)Resultant force and couple

(b)only resultant force

(c)only couple

(d)All of these

Q29. The figure shows electric field lines. If E_A and E_B are electric fields at A and B and distance AB is r then

(a)$E_A>E_B$

(b)$E_A=E_B/r$

(c)$E_A<E_B$

(d)$E_A=E_B/r^2$

Q30.Electric charge q, q and -2q are placed at the corners of an equilateral triangle ABC of side L. The magnitude of electric dipole moment of system is

(a)ql

(b)2ql

(c)√3ql

(d) 4ql

Q31. The given charge situated at a certain distance from a short electric dipole in the end on position experience a force F. If the distance of the charge is doubled, the force acting on the charge will be

(a)2F

(b) F/2

(c) F/4

(d) F/8

Q32. The torque τ acting on an electric dipole of dipole moment $\vec{p}$ in an electric field $\vec{E}$

(a) $\tau=\vec{p}.\vec{E}$

(b) $\tau=\vec{p}\mathrm{x}\vec{E}$

(c) $\tau=p\vec{E}$

(d) $\tau=\vec{p}$.E

Q33.AN electric dipole consists of two opposite charges each of magnitude 1μC separated by a distance of 2 cm. The dipole is placed in an external field of 10^5N/C. The maximum torque on the dipole is

(a)$2x10^{-4}$Nm

(b) $2x10^{-3}$Nm

(c) $4x10^{-3}$Nm

(d) 10^{-3}Nm

Q34. A charge Q is situated at the centre of a cube. The electric flux through one of the faces of the cube is

(a)Q/E_0

(b)$Q/2E_0$

(c)$Q/4E_0$

(d)$Q/6E_0$

Q35. A charge q is placed at the centre of the open end of a cylindrical vessel flux of the electric field through one of the surface of the vessel is

(a)Zero

(b)Q/E_0

(c)$Q/2E_0$

(d)$2Q/E_o$

Q36. A charged body has an electric flux ϕ associated with it. The body is now placed inside a metallic container. The flux ϕ, outside the container will be

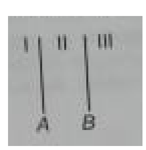
(a)Zero

(b)Equal to ϕ

(c)Greater than ϕ

(d)less than ϕ

Q37. The given figure shows, two parallel plates A and B of charge densities +σ and –σ respectively Electric intensity will be zero in a region



(a) I only

(b) II only

(c) III only

(d)Both (a) and (c)

Q38. If the electric field intensity in a fair weather atmosphere is 100V/m, then the total charge on the earth's surface is(radius of the earth is 6400km).

(a) 4.55×10^7C

(b) 4.55×10^8C

(c) 4.55×10^5C

(d) 4.55×10^6C

Q39. A sphere of radius R has a uniform distribution of electric charge in its volume. At a distance x from its centre for x<R, the electric field is directly proportional to

(a)$1/X^2$

(b)1/x

(c)x

(d)x^2

SECTION C

Q1.The electric field at a distance 3R/2 from the centre of a charged conducting spherical shell of radius R is E. the electric field at a distance R/2 from the centre of the sphere is

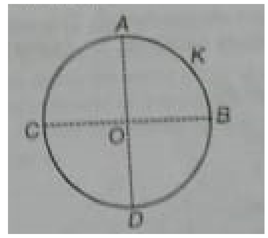
(a)Zero

(b)E

(c)E/2

(d)E/3

Q2. A thin conducting ring of radius R is given a charge +Q the electric field at the centre O of the ring due to the charge on the part AKB of the ring is E. The electric field at the centre due to the charge on the part ACDB of the ring is



(a)3E along OK

(b)3E along KO

(c)E along OK

(d)E along KO

Q3. Three point charges +q, -2q and +q are placed at points(x=0, y=a, z=0) , (x=0, y=0, z=0) and (x=a, y=0, z=0) respectively. The magnitude and direction of the electric dipole moment vector of this charge assembly are

(a)√2 qa along +x direction

(b) √2 qa along +x direction

(c))√2 qa along the line joining points(x=0, y=0, z=0) and (x=0, y=a, z=0)

(d) qa along the (x=0, y=0, z=0) and (x=0, y=a, z=0)

Q4. A hollow cylinder has a charge q coulomb within it. If ϕ is the electric flux in units of voltmeter associated with the curved surface B, the flux linked with the plane surface A in units of voltmeter will be (Charge is symmetrically placed within it)

(a)$\frac{q}{E0}$ - ϕ

(b)$\frac{1}{2}(\frac{q}{E0}$ - ϕ)

(c) $\frac{q}{2E0}$

(d)$\frac{ϕ}{3}$

Q5.An electric dipole moment $\vec{P}$ is lying along a uniform electric field $\vec{E}$. the work done in rotating the dipole by 90^0 is

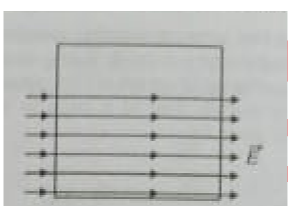
(a)√2pEA

(b)pE/2

(c)2pE

(d)pE

Q6. square surface of side L metre is in the plane of the paper. A uniform electric field $\vec{E}$ (volt/m), also is in the plane of the paper, is limited only to the lower half of the square surface (see figure). The electric flux in SI units associated with the surface is



(a)$EL^2/^{2E}{}_0$

(b)$EL^2/2$

(c)Zero

(d)EL^2

Q7. the electric field in a certain region is acting radially outward and is given by E=Ar. A charge contained in a sphere of radius 'a' centred at the origin of a field will be given by

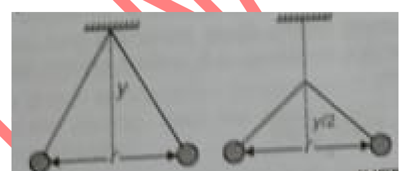
(a) E0Aa2

(b)4πE0Aa2

(c)AE0a2

(d)None

Q8. Two pith balls carrying equal charge are suspended from a common point by strings of the equal length, the equilibrium separation between them is r. now the strings are rigidly clamped at half the height. The equilibrium separation between the balls now become



(a)r/√2

(b)2r/√3

(c)2r/3

(d)1/√2

Q9.A charge Q is enclosed by a Gaussian spherical surface of radius R. if the radius is doubled, then the outward electric flux will

(a)be doubled

(b)increase four times

(c)be reduced to half

(d)remain the same

Q10. A charged cloud system produces an electric field in the air near the earth's surface. A particle of charge $-2x10^{-9}$ C is acted on by a downward electrostatic force of $3x10^{-6}$N when placed in this field. The gravitational and electrostatic force, respectively exerted on a proton placed in this field are

(a)1.64×10^{-26}N, 2.4×10^{-16}N

(b) 1.64×10^{-26}N, 1.5×10^{3}N

(c) 1.56×10^{-18}N, 2.4×10^{-16}N

(d) 1.5×10^{3}N, 2.4×10^{-16}N

Q11. The frequency of oscillation of an electric dipole moment having dipole moment p and rotational inertia I, oscilatingin a uniform electric field E is given

(a) $(1/2\pi)\sqrt{l/pE}$

(b) $(1/2\pi)\sqrt{pE/l}$

(c) $(2\pi)\sqrt{pE/l}$

(d) $(2\pi)\sqrt{l/pE}$

Q12.What is the net charge on a conducting sphere of radius 10 cm ? Given that the electric field 15cm from the centre of the sphere is equal to 3×10^{3}N/C

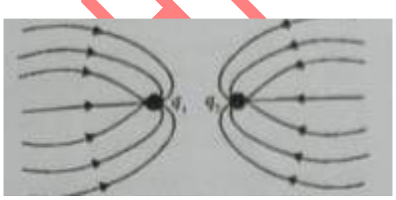
(a) -7.5×10^{-5} C

(b) -7.5×10^{-9} C

(c) 7.5×10^{-5} C

(d) 7.5×10^{-9} C

Q13. The given figure gives electric lines of force due to two charges q_1 and q_2. What are the signs of the two charges?



(a)q_1 is positive but q_2 is negative

(b) q_1 is negative but q_2 is positive

(c)Both are negative

(d)Both are positive

Q14.A charge q is placed at the centre of the line joining two exactly equal positive charges Q. The system of three charges will be in equilibrium. If q is equal to :

(a)-Q

(b)Q/2

(c)-Q/4

(d)+Q

Q15.A point charge +q is placed at the centre o a cube of side l . the electric flux emerging from the cube is :

(a)$6ql^2/E_0$

(b)$q/6l^2E_0$

(c)Zero

(d)q/E_0

Q16.A point Q lies on the perpendicular bisector of an electric dipole of dipole moment p. If the distance of Q from the dipole is r (much larger than the size of the dipole), then the electric field at Q is proportional to

(a)p^2 & r^{-3}

(b) p & r^{-2}

(c) p^{-1} & r^{-2}

(d) p & r^{-3}

Q16. A particle of mass m and charge q is placed at rest in a uniform electric field E and then released. The kinetic energy attended by the particle after moving a distance y is:

(a)qEy

(b)qE^2y

(c)qEy^2

(d)q^2Ey

Q17. A hollow insulated conducting sphere is given a positive charge of 10μC. what will be the electric field at the centre of the sphere if the radius is 2 metre?

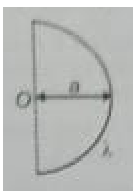
(a)$20\mu Cm^{-2}$

(b)$5\mu Cm^{-2}$

(c)zero

(d)$8\mu Cm^{-2}$

Q18. Electric field at centre O of semicircle of radius a having linear charge density λ is given as



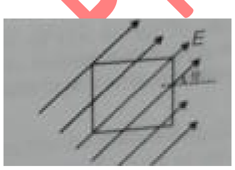
(a)$2\lambda/E_0a$

(b)$\lambda\pi/E_0a$

(c) $\lambda/2\pi E_0a$

(d) $\lambda/\pi E_0a$

Q19.A square surface of side L meter in the plane of the paper is placed in a uniform electric field E (volt/m) acting along the same plane at an angle Θ with the horizontal side of the square as shown in the figure. The electric flux linked to the surface, in units of volt-m, is:



(a) zero

(b)El^2

(c)$EL^2\cos\Theta$

(d) $EL^2\sin\Theta$