PHYSICS

BOOKS - MTG PHYSICS (ENGLISH)

ELECTRIC CHARGES AND FIELDS

Mcqs

1. There are two types of electric charges positive charges and negative charges. The

property which differentiates the two types of charges is

A. field of charge

B. amount of charge

C. strength of charge

D. polarity of charge

Answer: D

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2. What will happen when we rub a glass rod with silk cloth?

A. Some of the electrons from the glass rod are transferred to the silk cloth.

B. The glass rod gets positive charge and silk cloth gets negative charge.

C. New charge is created in the process of rubbing.

D. both (a) and (b) are correct.

Answer: D

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3. When s person combs his hair, static electricity is sometimes generated by what process?

A. Contact between the comb and hair results in a charge.

B. Friction between the comb and hair results in a charge.

C. Deduction between the comb and hair.

D. Induction between the comb and hair.

Answer: B

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4. Object may acquire an excess or deficiency of charge by

A. electric force

B. heating

C. shaking

D. by rubbing

Answer: D

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5. The charge on an electron was calculated by

A. Faraday

B. J.J. Thomson

C. Millikan

D. Einstein

Answer: C

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6. A method for charging a conductor without bringing a charged body in contact with it is called

A. Magnetization

B. Electrification

C. Electrostatic induction

D. Electromagnetic induction

Answer: C

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7. An object is charged when it has a charge imbalance, which means the

A. object contains no protons

B. object contains no electrons

C. object contains equal number of electrons and protons

D. object contains unequal number of electrons and protons

Answer: D

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8. A conducting sphere is negatively charged. Which of the following statements is true?

A. The charge is uniformly distributed throughout the entire volume.

B. The charge is located at the center of the sphere.

C. The charge is located at the bottom of the sphere because of gravity.

D. The charge is uniformly distributed on the surface of the sphere.

Answer: D

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9. The number of electrons present in -1 C of charge is

A. 6.25×10^{18}

B. 1.6×10^{19}

C. 6×10^{19}

D. 1.6×10^{18}

Answer: A

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10. A cup contains 250 g of water. Find the total positive charge present in the cup of water.

A. $1.34 \times 10^{19} C$

B. $1.34 \times 10^{7} C$

C. $2.43 \times 10^{19} C$

D. $2.43 \times 10^{7} C$

Answer: B

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11. A polythene piece rubbed with wool is found to have a negative charge of $6 \times 10^{-7} C$. The number of electrons transferred to polythene from wool is

A. 3.75×10^{10}

B. 9.6×10^{10}

C. 9.6×10^{12}

D. 3.75×10^{12}

Answer: D

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12. If 10^9 electrons move out of a body to another body every second, then the time required to get a total charge of 1 C on the other body is

A. 250 years

B. 100 years

C. 198 years

D. 150 years

Answer: C

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13. The number of electrons that must be removed from an electrically neutral silver dollar to give it a charge of +2.4C is

A. 2.5×10^{19}

B. 1.5×10^{19}

C. 1.5×10^{-19}

D. 2.5×10^{-19}

Answer: B

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14. A coin is made up of Al and weighs 0.75 g. It has a square shape and its diagonal measures 17 mm. It is electrically neutral and contains equal amounts of positive and negative charges. The magnitude of these charges is (Atomic mass of Al = 26.98 g)

A. $3.47 \times 10^4 C$

B. $3.47 \times 10^{2} C$

C. $1.67 \times 10^{20} C$

D. $1.67 \times 10^{22} C$

Answer: A

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15. If an object of mass 1 kg contains 4×10^{20} atoms. If one electron is removed from every atom of the solid, the charge gained by the solid in 1 g is

A. 2.8 C

B. $6.4 \times 10^{-2} C$

C. $3.6 \times 10^{-3} C$

D. $9.2 \times 10^{-4} C$

Answer: B

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16. State Coulomb's law of electric force between two charged bodies.

A. proportional to the sum of the charges

B. inversely proportional to the distance between charges

C. proportional to the product of the charges and inversely proportional to the distance

D. proportional to the product of the charges and inversely proportional to the square of distance.

Answer: D

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17. Which of the following statements is true about electrical forces?

A. Electrical forces are produced by electrical charges.

B. Like charges attract, unlike charges repel.

C. Electric forces are weaker than gravitational forces.

D. Positive and negative charges can combine to produce a third type of charge.

Answer: A

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18. In coulomb's law, on what factors does the value of electrostatic force constant K depend ?

A. nature of medium

B. system of units

C. intensity of charge

D. both (a) and (b)

Answer: A

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19. Which of the following statement is not a similarity between electrostaic and gravitational forces?

A. Both forces obey inverse square law.

B. Both forces operate over very large distances.

C. Both forces are conservative in nature.

D. Both forces are attractive in nature always.

Answer: D

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20. The unit of permittivity of free space ε_0 is:

A. Farad

B. Weber

C. $C^2N^{-1}m^{-2}$

D. $C^2N^{-1}m^{-1}$

Answer: C

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21. The force between two small charged spheres having charges of $1 \times 10^{-7} C$ and $2 \times 10^{-7} C$ placed 20 cm apart in air is

A. $4.5 \times 10^{-2} N$

B. $4.5 \times 10^{-3} N$

C. $5.4 \times 10^{-2} N$

D. $5.4 \times 10^{-3} N$

Answer: B

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22. The nucleus of helium atom contains two protons that are separated by distance $3.0 \times 10^{-15} m$. The magnitude of the electrostatic force that each proton exerts on the other is

A. 20.6 N

B. 25.6 N

C. 15.6 N

D. 12.6 N

Answer: B

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23. Two insulated charged metallic spheres P and Q have their centres separated by a distance of 60 cm. The radii of P and Q are negligible compared to the distance of separation. The mutual force of electrostatic repulsion if the charge on each is $3.2 \times 10^{-7} C$ is

A. $5.2 \times 10^{-4} N$

B. $2.56 \times 10^{-3} N$

C. $1.5 \times 10^{-3} N$

D. $3.5 \times 10^{-4} N$

Answer: B

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24. Two point charges of $+3\mu C$ and $+4\mu C$ repel each other with a force of 10 N. If each is given an additional charge of $-6\mu C$, the new force is

A. 2 N

B. 4 N

C. 5 N

D. 7.5 N

Answer: D

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25. The ratio of magnitude of electrostatic force and gravitational force for an electron and a proton is

A. 6.6×10^{39}

B. 2.4×10^{39}

C. 6.6×10^{29}

D. 2.4×10^{29}

Answer: B

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26. The electrostatic attracting froce on a small sphere of charge $0.2\mu C$ due to another small sphere of charge $-0.4\mu C$ in air is 0.4N. The distance between the two spheres is

A. $43.2 \times 10^{-6}m$

B. $42.4 \times 10^{-3}m$

C. $18.1 \times 10^{-3}m$

D. $19.2 \times 10^{-6}m$

Answer: B

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27. Under the action of a given coulombic force the acceleration of an electron is $2.5 \times 10^{22} ms^{-1}$. Then, the magnitude of the acceleration of a proton under the action of same force is nearly

A. $1.6 \times 10^{-19} ms^{-2}$

B. $9.1 \times 10^{31} ms^{-2}$

C. $1.5 \times 10^{19} ms^{-2}$

D. $1.6 \times 10^{27} ms^{-2}$

Answer: C

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28. The acceleration for electron and proton due to electrical force of their mutual attraction when they are 1 Å apart is

A. $3.1 \times 10^{22} ms^{-2}, 1.3 \times 10^{19} ms^{-2}$

B. $3.3 \times 10^{28} ms^{-2}, 3.2 \times 10^{16} ms^{-2}$

C. $2.5 \times 10^{22} ms^{-2}, 1.4 \times 10^{19} ms^{-2}$

D. $2.5 \times 10^{18} ms^{-2}, 1.3 \times 10^{16} ms^{-2}$

Answer: C

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29. Consider the charges q,q and -q placed at the vertices of an equilateral triangle of each side l. What is the force on each charge ?

A. $\dfrac{q^2}{4\sqrt{2}\pi\varepsilon_0 l^2}$

B. $\dfrac{-q^2}{4\pi\varepsilon_0 l^2}$

C. $\dfrac{q^2}{4\pi\varepsilon_0 l^2}$

D. zero

Answer: D

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30. Consider three charges q_1, q_2 and q_3 each equal to q, at the vertices of an equilateral triangle of side l. What is the force on a charge Q placed at the centroid of the triangle?

A. $\dfrac{3Qq}{4\pi\varepsilon_0 l^2}$

B. $\dfrac{2Qq}{4\pi\varepsilon_0 l^2}$

C. $\dfrac{Qq}{2\pi\varepsilon_0 l^2}$

D. zero

Answer: D

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31. The force per unit charge is known as

A. electric flux

B. electric field

C. electric potential

D. electric current

Answer: B

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32. Electrical as well as gravitational affects can be thought to be caused by fields. Which of the following is true of an electrical or gravitational field?

A. The field concept is often used to describe contact forces.

B. Gravitational or electric field does not exist in the space around an object.

C. Fields are useful for understanding forces acting through a distance.

D. There is no way to verify the existence of a force field since it is just a concept.

Answer: C

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33. The Electric field at a point is

A. always continuous

B. continuous if there is no charge at that point

C. discontinuous if there is a charge at that point

D. both (b) and (c) are correct

Answer: D

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34. The dimensional formula of electric intensity is

A. $\left[M^1L^1T^3A^{-1}\right]$

B. $\left[ML^{-1}T^{-3}A^1\right]$

C. $\left[M^1L^1T^{-3}A^{-1}\right]$

D. $\left[M^1L^2T^1A^1\right]$

Answer: C

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35. If the charge on an object is doubled then electric field becomes

A. half

B. double

C. unchanged

D. thrice

Answer: B

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36. A force of 2.25 N acts on a charge of $15 \times 10^{-4} C$. The intensity of electric field at that point is

A. $150 NC^{-1}$

B. $15 NC^{-1}$

C. $1500 NC^{-1}$

D. $1.5 NC^{-1}$

Answer: C

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37. A conducting sphere of radius 10 cm has unknown charge. If the electric field at a distance 20 cm from the centre of the sphere is $1.2 \times 10^3 NC^{-1}$ and points radially inwards. The net charge on the sphere is

A. $-4.5 \times 10^{-9} C$

B. $4.5 \times 10^9 C$

C. $-5.3 \times 10^{-9} C$

D. $5.3 \times 10^9 C$

Answer: C

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38. A particle of mass 10^{-3}kg and charge $5\mu C$ is thrown at a speed of $20ms^{-1}$ against a uniform electric field of strength $2 \times 10^{5} NC^{-1}$. The distance travelled by particle before coming to rest is

A. 0.1 m

B. 0.2 m

C. 0.3 m

D. 0.4 m

Answer: B

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39. An electron initially at rest falls a distance of 1.5 cm in a uniform electric field of magnitude $2 \times 10^4 N/C$. The time taken by the electron to fall this distance is

A. $1.3 \times 10^2 s$

B. $2.1 \times 10^{-12} s$

C. $1.6 \times 10^{-10} s$

D. $2.9 \times 10^{-9} s$

Answer: D

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40. The electric field that can balance a charged particle of mass 3.2×10^{-27}kg is (Given that the charge on the particle is $1.6 \times 10^{-19} C$)

A. $19.6 \times 10^{-8} NC^{-1}$

B. $20 \times 10^{-6} NC^{-1}$

C. $19.6 \times 10^{8} NC^{-1}$

D. $20 \times 10^{6} NC^{-1}$

Answer: A

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41. An oil drop of 10 excess electron is held stationary under a consatnt electric field of $3.6 \times 10^{4} NC^{-1}$ in Millikan's oil drop experiment. The density of oil is $1.26 gcm^{-3}$.

Radius of the oil drop is

(Take, $g = 9.8 ms^{-2}, e = 1.6 \times 10^{-19} C$)

A. $1.04 \times 10^{-6} m$

B. $4.8 \times 10^{-5} m$

C. $4.8 \times 10^{-18} m$

D. $1.13 \times 10^{-18} m$

Answer: A

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42. In question number 45, what will be the electric field at centre O, if the charge from one of the corners (say A) is removed?

A. $\frac{q}{4\pi\varepsilon_0 r^2}$ along OA

B. $\frac{2q}{4\pi\varepsilon_0 r^2}$ along OB

C. $\frac{q^2}{4\pi\varepsilon_0 r^2}$ along OC

D. $\frac{2q}{4\pi\varepsilon_0 r^2}$ along OA

Answer: A

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43. In question number 45, what will be the electric field at O if the charge q at A is replaced by -q?

A. $\frac{q}{4\pi\varepsilon_0 r^2}$ along OB

B. $\frac{2q}{4\pi\varepsilon_0 r^2}$ along OA

C. $\frac{4q}{4\pi\varepsilon_0 r^2}$ along OC

D. zero

Answer: B

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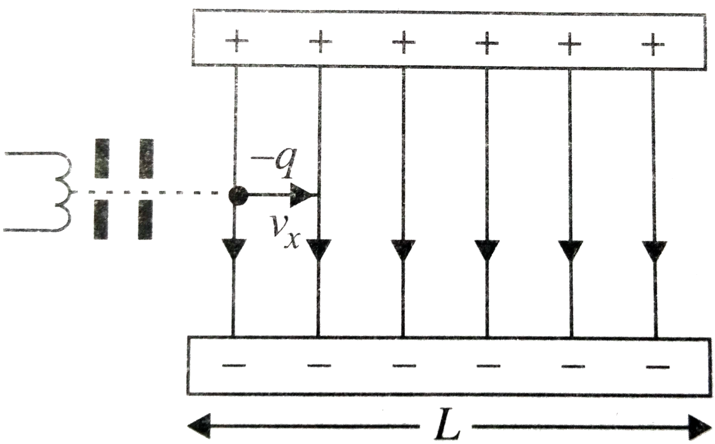
44. A particle of mass m and charge -q enters the region between the two charged plates initially moving along x-axis with speed v_x as shown in figure. The length of plate is L and a uniform electric field E is maintained between the plates. The vertical deflection of the particle at the far edge of the plate is



A. $\dfrac{qEL^2}{2mv_x^2}$

B. $\dfrac{qEL^2}{2mv_x}$

C. $\dfrac{2mv_x^2}{qEL^2}$

D. $\dfrac{2mv_x}{qE^2L}$

Answer: A

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45. Take the particle in question number 49, an electron projected with velocity $v_x = 4 \times 10^6 ms^{-1}$. If electric field between the plates separated by $1cm$ is $8.2\times 10^{2}NC^{-1}$, then the electron will strike the upper plate if the length of plate is (Take $m_{e}=9.1\times 10^{-31}kg$)

A. 2.14cm

B. 3.9cm

C. 1.23cm

D. 3.3cm

Answer: D

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46. Electric field lines provide information about

A. field strength

B. direction

C. nature of charge

D. all of these

Answer: D

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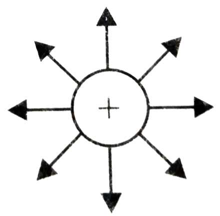
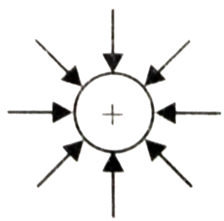
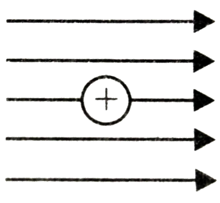
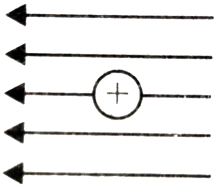
47. Which of the following figures represents the electric field lines due to a single positive charge ?

A. 

B. 

C. 

D. 

Answer: A

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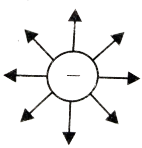
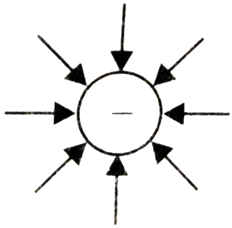
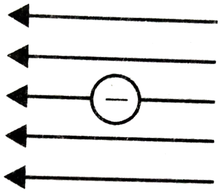
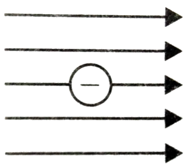
48. Which of the following figure represents the field lines due to a single negative charge ?

A. 

B. 

C. 

D. 

Answer: B

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49. In question 55, which charge has the largest magnitude?

A. A

B. B

C. C

D. B and C have equal magnitude

Answer: C

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50. In question 55, which region or regions of the figure could the electric field be zero?

A. Near A

B. Near B

C. Near C

D. Now here

Answer: A

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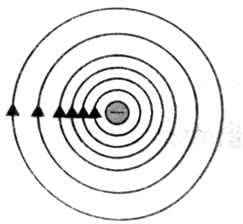
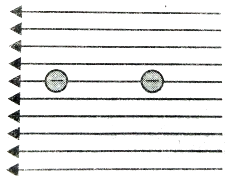
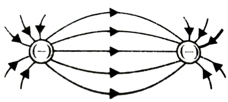
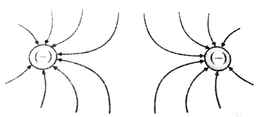
51. Which of the following represent the electric field lines dut to a combinations of two negative charges?

A. 

B. 

C. 

D. 

Answer: D

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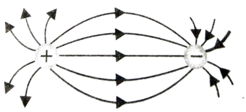
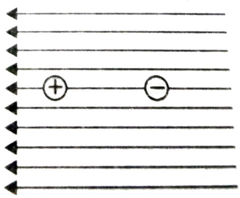
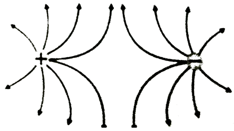
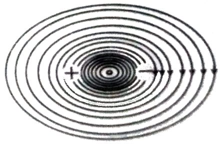
52. Which of the following figure represents the electronic field lines due to a combination of the one positive and one negative charge?

A. 

B. 

C. 

D. 

Answer: A

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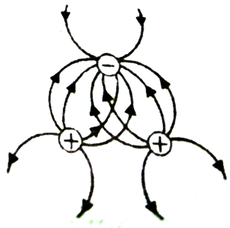
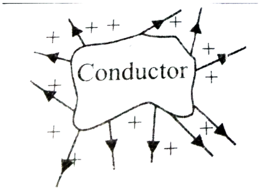
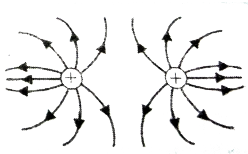
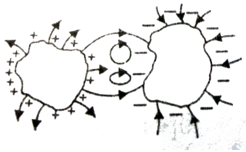
53. Which of the following curves represent electrostatic field lines correctly?

A. 

B. 

C. 

D. 

Answer: C

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54. Which of the following statements is not true about electric field lines?

A. Electric field lines start from positive charge and end at negative charge.

B. Two electric field lines can never cross each other.

C. Electrostatic field lines do not form any closed loops.

D. Electric field lines cannot be taken as continuous curve.

Answer: D

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55. The SI unit of electric flux is

A. $NC^{-1}m^2$

B. NCm^{-2}

C. $NC^{-2}m^2$

D. $NC^{-1}m^{-2}$

Answer: A

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56. The dimensional formula of electric flux is

A. $\left[M^{1}L^{1}T^{-2}\right]$

B. $\left[M^{1}L^{3}T^{-3}A^{-1}\right]$

C. $\left[M^{2}L^{2}T^{-2}A^{-2}\right]$

D. $\left[M^{1}L^{-3}T^{3}A^{1}\right]$

Answer: B

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57. A circular plane sheet of radius 10 cm is placed in a uniform electric field of $5 \times 10^5 NC^{-1}$, making an angle of 60° with the field. Calculate electric flux through the sheet.

A. $1.36 \times 10^2 Nm^2C^{-1}$

B. $1.36 \times 10^4 Nm^2C^{-1}$

C. $0.515 \times 10^2 Nm^2C^{-1}$

D. $0.515 \times 10^4 Nm^2C^{-1}$

Answer: B

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58. A uniform electric field $E = 2 \times 10^3 NC^{-1}$ is acting along the positive x-axis. The flux of this field through a square of 10 cm on a side whose plane is parallel to the yz plane is

A. $20NC^{-1}m^2$

B. $30NC^{-1}m^2$

C. $10NC^{-1}m^2$

D. $40NC^{-1}m^2$

Answer: A

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59. In the question number 66, the flux through the same square if the line normal to its plane makes a 60° angle with the x-axis is

A. $30NC^{-1}m^2$

B. $10NC^{-1}m^2$

C. $20NC^{-1}m^2$

D. $25NC^{-1}m^2$

Answer: B

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60. Which of the following statements about dipole moment is not true?

A. The dimensions of dipole moment is [L T A].

B. The unit of dipole moment is C m.

C. Dipole moment is vector quantity and directed from negative to positive charge.

D. Dipole moment is a scalar quantity and has magnitude charge equal to the potential of separation between charge.

Answer: D

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61. Define electric dipole moment. Write its SI unit ?

A. newton

B. coulomb

C. farad

D. debye

Answer: D

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62. Consider a region inside which there are various types of charges but the total charge is zero ,,At points outside the region

A. the electric field is necessarily zero.

B. the electric field is due to the dipole moment of the charge distribution only.

C. the dominant electric field is inversely proportional to `r^(3), for large r (distance from origin).

D. the work done to move a charged particle along a closed path, away from the region will not be zero.

Answer: C

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63. Two point charges of $1\mu C$ and $-1\mu C$ are separated by a distance of 100 Å. A point P is at a distance of 10 cm from the midpoint and on the perpendicular bisector of the line joining the two charges. The electric field at P will be

A. $9NC^{-1}$

B. $0.9NC^{-1}$

C. $90NC^{-1}$

D. $0.09NC^{-1}$

Answer: D

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64. An electric dipole is placed at an angle of 30° with an electric field intensity $2 \times 10^5 N/C$. It experiences a torque equal to $4Nm$. The charge on the dipole, if the dipole is length is $2cm$, is

A. 8 mC

B. 4 mC

C. 6 mC

D. 2 mC

Answer: D

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65. In a certain region of space, electric field is along the z-direction throughout. The magnitude of electric field is , however, not constant but increases uniformly along the positive z-direction. At the rate of $10^5 NC^{-1}m^{-1}$. What are the force and torque experienced by system having a total dipole moment equal to 10^{-7}Cm in the negative z-direction?

A. $-10^{-2}N$

B. $10^{-2}N$

C. $10^{-4}N$

D. $-10^{-4}N$

Answer: A

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66. In the question number 74, torque experienced by the system is

A. $10^2 N$

B. $10^{-2} N$

C. zero

D. $10^3 N$

Answer: C

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67. A uniformly charged conducting sphere of 4.4 m diameter has a surface change density of $60\mu Cm^{-2}$. The charge on the sphere is

A. $7.3 \times 10^{-3} C$

B. $3.7 \times 10^{-6} C$

C. $7.3 \times 10^{-6} C$

D. $3.7 \times 10^{-3} C$

Answer: D

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68. In the question number 78, the surface charge density on the outer surface is

A. $\frac{-q}{4\pi R_1^2}$

B. $\frac{q}{4\pi R_2^2}$

C. $\frac{q^2}{4\pi R_1^2}$

D. $\frac{2q}{4\pi R_2^2}$

Answer: B

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69. The surface considered for Gauss's law is called

A. Closed surface

B. Sphereical surface

C. Gaussian surface

D. Plane surface

Answer: C

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70. If $\oint_s E.\,ds = 0$ Over a surface, then

A. the electric field inside the surface and on it is zero.

B. the electric field inside the surface is necessarily uniform.

C. all charges must necessarily be outside the surface.

D. all of these.

Answer: C

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71. If there were only one type of charge of the universe then

A. $\oint_s \vec{E} \cdot d\vec{s} \neq 0$ on any surface

B. $\oint_s \vec{E} \cdot d\vec{s} = 0$ if the charge is outside the surface

C. $\oint_s \vec{E} \cdot d\vec{s} = \frac{q}{\varepsilon_0}$ if charges of magnitude q were inside the surface

D. both (b) and (c) are correct

Answer: D

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72. A sphere encloses an electric dipole withon it. The total flux across the sphere is

A. zero

B. half that due to a single charge

C. double that due to a single charge

D. dependent on the position of dipole.

Answer: A

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73. A point charge $4\mu C$ is at the centre of a cubic Gaussian surface 10 cm on edge. Net electric flux through the surface is

A. $2.5 \times 10^5 Nm^2C^{-1}$

B. $4.5 \times 10^5 Nm^2C^{-1}$

C. $4.5 \times 10^6 Nm^2C^{-1}$

D. $2.5 \times 10^6 Nm^2C^{-1}$

Answer: B

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74. Which of the following statements is not true about Gauss's law?

A. Gauss's law is true for any closed surface.

B. The term q on the ringht side of Gauss's law includes the sum of all charges enclosed by the surface.

C. Gauss's law is not much useful in calculating electrostatic field when the system has some symmetry.

D. Gauss's law is based on the inverse square dependence on distance contained in the coulomb's law.

Answer: C

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75. A rod of length 2.4 m and radius 4.6 mm carries a negative charge of $4.2 \times 10^{-7} C$ spread uniformly over it surface. The electric field near the mid-point of the rod, at a point on its surface is

A. $-8.6 \times 10^{5} NC^{-1}$

B. $8.6 \times 10^{4} NC^{-1}$

C. $-6.7 \times 10^{5} NC^{-1}$

D. $6.7 \times 10^{4} NC^{-1}$

Answer: C

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76. Two parallel infinite line charges $+\lambda$ and $-\lambda$ are placed with a separation distance R in free space. The net electric field exactly mid-way between the two line charges is

A. zero

B. $\frac{2\lambda}{\pi\varepsilon_0 R}$

C. $\frac{\lambda}{\pi\varepsilon_0 R}$

D. $\dfrac{\lambda}{2\pi\varepsilon_0 R}$

Answer: B

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77. Two infinite plane parallel sheets, separated by a distance d have equal and opposite uniform charge densities σ. Electric field at a point between the sheets is

A. $\dfrac{\sigma}{2\varepsilon_0}$

B. $\frac{\sigma}{\varepsilon_0}$

C. zero

D. depends on the location of the point

Answer: B

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78. Two large, thin plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and of magnitude $16 \times 10^{-22} Cm^{-2}$.

The electric field between the plates is

A. $1.8 \times 10^{-10} NC^{-1}$

B. $1.9 \times 10^{-10} NC^{-1}$

C. $1.6 \times 10^{-10} NC^{-1}$

D. $1.5 \times 10^{-10} NC^{-1}$

Answer: A

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79. Consider a thin spherical shell of radius R consisting of uniform surface charge density σ. The electric field at a point of distance x from its centre and outside the shell is

A. inversely proportional to σ

B. directly proportional to x^2

C. directlr proportional to R

D. inversely proportional to x^2

Answer: D

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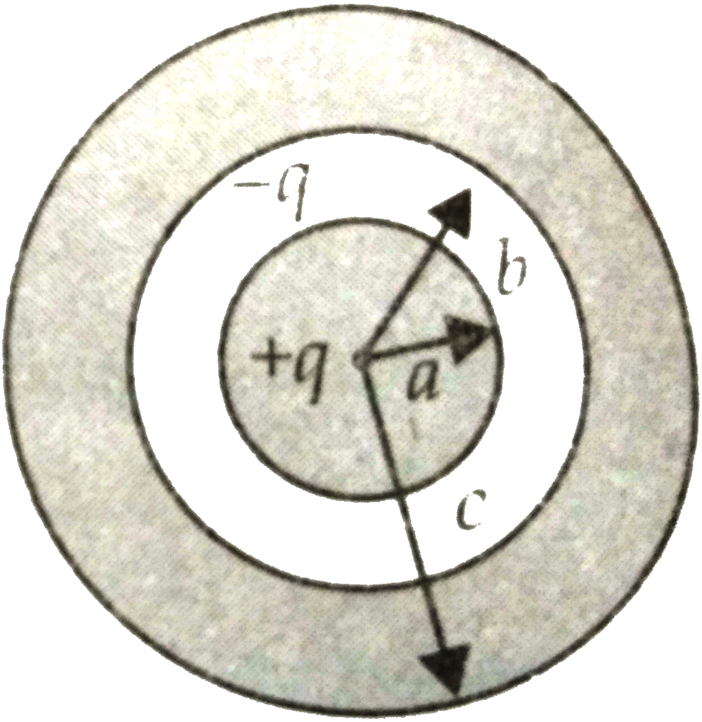
80. A non conducting sphere of radius a has a net charge +q uniformly distributed throughout its volume. A spherical conducting shell having inner and outer radii b and c and net charge -q is concentric with the sphere (see the figure).



Read the following statements

(i) The electric field at a distance r from the centre of the sphere for r lt a is $\frac{1}{4\pi\varepsilon_0}\frac{qr}{a^3}$

(ii) The electric field at distance r for a lt r lt b is 0

(iii) The electric field at distance r for b lt r lt c

is 0

(iv) The charge on the inner surface of the

spherical shell is - q

(v) The charge on the outer surface of the

spherical shell is + q

Which of the above statements are true?

A. (i), (ii) and (v)

B. (i), (iii) and (iv)

C. (ii), (iii) and (iv)

D. (ii), (iii) and (v)

Answer: B

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81. There is a solid sphere of radius R having uniformly distributed charge throughout it. What is the relation between electric field E and distance r from the centre (r is less than R) ?

A. $E \propto r^{-2}$

B. $E \propto r^{-1}$

C. $E \propto r$

D. $E \propto r^2$

Answer: C

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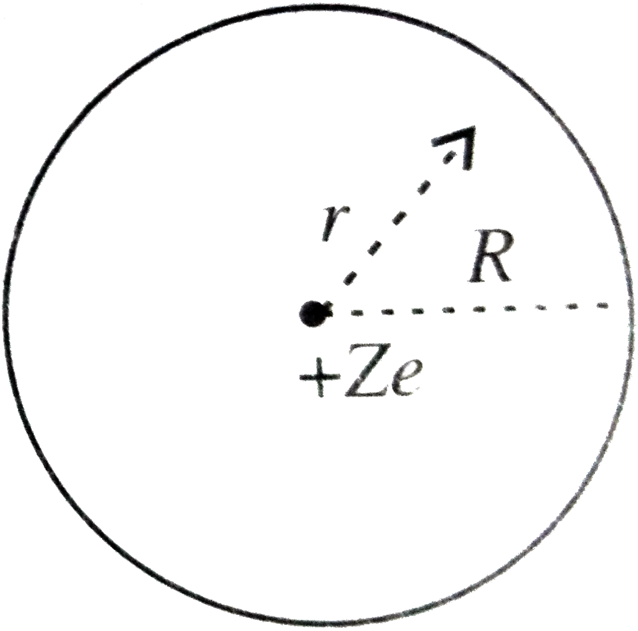
82. An early model for an atom considered it to have a positively charged point nucleus of charge Ze, surrounded by a uniform density of negative charge upto a radius R. The atom as a whole is neutral. The electric field at a distance r from the nucleus is (r < R)



A. $\dfrac{Ze}{4\pi\varepsilon_0}\left[\dfrac{1}{r^2}-\dfrac{r}{R^3}\right]$

B. $\dfrac{Ze}{4\pi\varepsilon_0}\left[\dfrac{1}{r^3}-\dfrac{r}{R^2}\right]$

C. $\dfrac{Ze}{4\pi\varepsilon_0}\left[\dfrac{r}{R^3}-\dfrac{1}{r^2}\right]$

D. $\dfrac{Ze}{4\pi\varepsilon_0}\left[\dfrac{r}{R^3}+\dfrac{1}{r^2}\right]$

Answer: A

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Assertion Reason

1. Assertion : When bodies are charged through friction, there is a transfer of electric charge from one body to another, but no creation or destruction of charge.

Reason : This follows from conservation of electric charges.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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2. Assertion : When we rub a glass rod with silk, the rod gets positively charged and the silk gets negatively charged.

Reason : On rubbing, electrons from silk cloth move to the glass rod.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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3. Assertion : The charge on any body can be increased or decreased in terms of e.

Reason : Quantisation of charge means that the charge on a body is the integral multiple of e.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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4. Assertion : When a body acquires negative charge, its mass decreases.

Reason : A body acquires negative charge when it loses electrons.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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5. Assertion. When charges are shared between any two bodies, no charge is really lost but some loss of energy does occur.

Reason. Some energy disappears in the from of heat, sparking etc.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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6. Assertion : Coulomb force and gravitational force follow the same inverse-square law.

Reason : Both laws are same in all aspects.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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7. Assertion: If there exists coulombic attracation between two bodies both of them may not be charged.

Reason: In coulombic attraction two bodies are oppositely charged.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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8. Assertion :The force with which two charges attract or repel each other are not affected by the presence of a third charge.

Reason : Force on any charge due to a number of other charges is the vector sum of all the forces on that charge due to other charges, taken one at a time.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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9. Assertion : The electric field due to a discrete charge configuration is not defined at the locations of the discrete charges.

Reason : For a surface charge distribution, electric field is discontinuous across the surface.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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10. Assertion : Protons carrying positive charges are compactly residing inside the nucleus.

Reason : Electrostatic repulsive force between protons is very weak.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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11. Assertion : In a uniform electric field electrons move in the opposite direction of electric field.

Reason : This is because of the negative charge of an electron.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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12. Assertion : Electrostatic field lines start at positive charges and end at negative charges.

Reason : Field lines are continuous curves without any breaks and they form closed loop.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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13. Assertion : Surface charge density of an irregularly shaped conductor is non-uniform.

Reason : Surface density is defined as charge per unit area.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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14. Assertion: The whole charge of a conductor cannot be transferred to another isolated conductor. Reason: The total transfer of charge from one to another is not possible.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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15. Assertion : Total flux through a closed surface is zero if no charge is enclosed by the surface.

Reason : Gauss law is true for any closed surface, no matter what its shape or size is.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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Electric Charges

1. There are two types of electric charges positive charges and negative charges. The property which differentiates the two types of charges is

A. field of charge

B. amount of charge

C. strength of charge

D. polarity of charge

Answer: D

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2. What will happen when we rub a glass rod with silk cloth?

A. Some of the electrons from the glass rod are transferred to the silk cloth.

B. The glass rod gets positive charge and silk cloth gets negative charge.

C. New charge is created in the process of rubbing.

D. both (a) and (b) are correct.

Answer: D

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3. When s person combs his hair, static electricity is sometimes generated by what process?

A. Contact between the comb and hair results in a charge.

B. Friction between the comb and hair results in a charge.

C. Deduction between the comb and hair.

D. Induction between the comb and hair.

Answer: B

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4. Object may acquire an excess or deficiency of charge by

A. electric force

B. heating

C. shaking

D. by rubbing

Answer: D

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5. The charge on an electron was calculated by

A. Faraday

B. J.J. Thomson

C. Millikan

D. Einstein

Answer: C

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Charging By Induction

1. A method for charging a conductor without bringing a charged body in contact with it is called

A. Magnetization

B. Electrification

C. Electrostatic induction

D. Electromagnetic induction

Answer: C

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2. An object is charged when it has a charge imbalance, which means the

A. object contains no protons

B. object contains no electrons

C. object contains equal number of electrons and protons

D. object contains unequal number of electrons and protons

Answer: D

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3. A conducting sphere is negatively charged. Which of the following statements is true?

A. The charge is uniformly distributed throughout the entire volume.

B. The charge is located at the center of the sphere.

C. The charge is located at the bottom of the sphere because of gravity.

D. The charge is uniformly distributed on the surface of the sphere.

Answer: D

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Basic Properties Of Electric Charge

1. The number of electrons present in -1 C of charge is

A. 6.25×10^{18}

B. 1.6×10^{19}

C. 6×10^{19}

D. 1.6×10^{18}

Answer: A

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2. A cup contains 250 g of water. Find the total positive charge present in the cup of water.

A. $1.34 \times 10^{19} C$

B. $1.34 \times 10^{7} C$

C. $2.43 \times 10^{19} C$

D. $2.43 \times 10^{7} C$

Answer: B

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3. A polythene piece rubbed with wool is found to have a negative charge of $6 \times 10^{-7} C$. The number of electrons transferred to polythene from wool is

A. 3.75×10^{10}

B. 9.6×10^{10}

C. 9.6×10^{12}

D. 3.75×10^{12}

Answer: D

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4. If 10^9 electrons move out of a body to another body every second, then the time required to get a total charge of 1 C on the other body is

A. 250 years

B. 100 years

C. 198 years

D. 150 years

Answer: C

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5. The number of electrons that must be removed from an electrically neutral silver dollar to give it a charge of +2.4C is

A. 2.5×10^{19}

B. 1.5×10^{19}

C. 1.5×10^{-19}

D. 2.5×10^{-19}

Answer: B

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6. A coin is made up of Al and weighs 0.75 g. It has a square shape and its diagonal measures 17 mm. It is electrically neutral and contains equal amounts of positive and negative charges. The magnitude of these charges is (Atomic mass of Al = 26.98 g)

A. $3.47 \times 10^4 C$

B. $3.47 \times 10^2 C$

C. $1.67 \times 10^{20} C$

D. $1.67 \times 10^{22} C$

Answer: A

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7. If an object of mass 1 kg contains 4×10^{20} atoms. If one electron is removed from every atom of the solid, the charge gained by the solid in 1 g is

A. 2.8 C

B. $6.4 \times 10^{-2} C$

C. $3.6 \times 10^{-3} C$

D. $9.2 \times 10^{-4} C$

Answer: B

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Force Between Multiple Charges

1. Two charges q and $-3q$ are placed fixed on x-axis separated by distance d. Where should a third charge $2q$ be placed such that it will not experience any force ?

A. $\dfrac{d-\sqrt{3}d}{2}$

B. $\dfrac{d+\sqrt{3}d}{2}$

C. $\dfrac{d+3d}{2}$

D. $\dfrac{d-3d}{2}$

Answer: B

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2. Consider the charges q,q and -q placed at the vertices of an equilateral triangle of each side l. What is the force on each charge ?

A. $\dfrac{q^2}{4\sqrt{2}\pi\varepsilon_0 l^2}$

B. $\dfrac{-q^2}{4\pi\varepsilon_0 l^2}$

C. $\dfrac{q^2}{4\pi\varepsilon_0 l^2}$

D. zero

Answer: D

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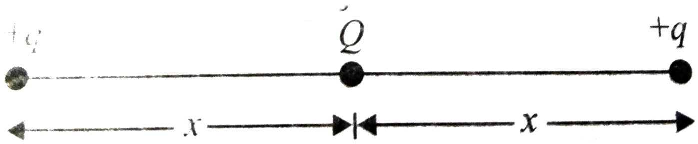
3. A charge Q is placed at the centre of the line joining two point charges +q and +q as shown in figure. The ratio of charges Q and q is



A. 4

B. $1/4$

C. -4

D. $-1/4$

Answer: D

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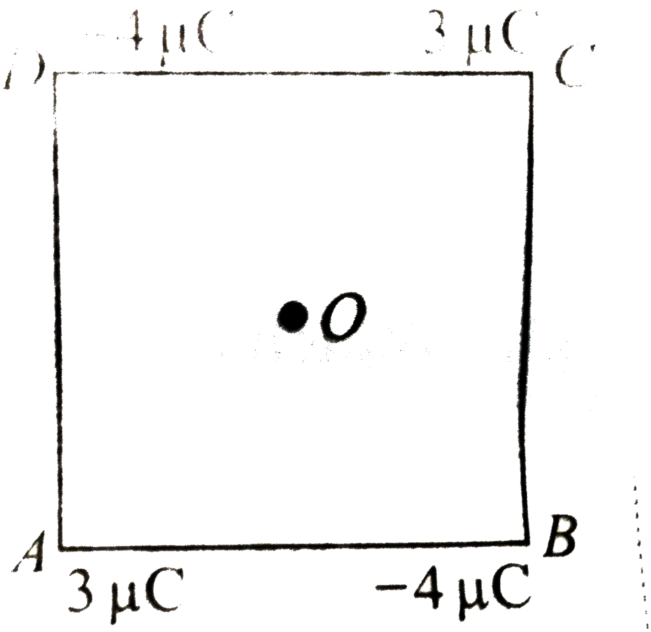
4. Four point charges are placed at the corners of a square ABCD of side 10 cm, as shown in figure. The force on a charge of $1 \mu C$ placed at the centre of square is



A. 7 N

B. 8 N

C. 2 N

D. zero

Answer: D

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5. Consider three charges q_1, q_2 and q_3 each equal to q, at the vertices of an equilateral triangle of side l. What is the force on a charge

Q placed at the centroid of the triangle?

A. $\dfrac{3Qq}{4\pi\varepsilon_0 l^2}$

B. $\dfrac{2Qq}{4\pi\varepsilon_0 l^2}$

C. $\dfrac{Qq}{2\pi\varepsilon_0 l^2}$

D. zero

Answer: D

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Electric Field

1. The force per unit charge is known as

A. electric flux

B. electric field

C. electric potential

D. electric current

Answer: B

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2. Electrical as well as gravitational affects can be thought to be caused by fields. Which of the following is true of an electrical or gravitational field?

A. The field concept is often used to describe contact forces.

B. Gravitational or electric field does not exist in the space around an object.

C. Fields are useful for understanding forces acting through a distance.

D. There is no way to verify the existence of a force field since it is just a concept.

Answer: C

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3. The Electric field at a point is

A. always continuous

B. continuous if there is no charge at that point

C. discontinuous if there is a charge at that point

D. both (b) and (c) are correct

Answer: D

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4. The dimensional formula of electric intensity is

A. $\left[M^{1}L^{1}T^{3}A^{-1}\right]$

B. $\left[ML^{-1}T^{-3}A^{1}\right]$

C. $\left[M^{1}L^{1}T^{-3}A^{-1}\right]$

D. $\left[M^{1}L^{2}T^{1}A^{1}\right]$

Answer: C

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5. If the charge on an object is doubled then electric field becomes

A. half

B. double

C. unchanged

D. thrice

Answer: B

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6. A force of 2.25 N acts on a charge of $15 \times 10^{-4} C$. The intensity of electric field at that point is

A. $150NC^{-1}$

B. $15NC^{-1}$

C. $1500NC^{-1}$

D. $1.5NC^{-1}$

Answer: C

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7. A conducting sphere of radius 10 cm has unknown charge. If the electric field at a distance 20 cm from the centre of the sphere is $1.2 \times 10^3 NC^{-1}$ and points radially inwards.

The net charge on the sphere is

A. $-4.5 \times 10^{-9} C$

B. $4.5 \times 10^9 C$

C. $-5.3 \times 10^{-9} C$

D. $5.3 \times 10^9 C$

Answer: C

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8. A particle of mass 10^{-3}kg and charge $5\mu C$ is thrown at a speed of $20ms^{-1}$ against a uniform electric field of strength $2 \times 10^5 NC^{-1}$. The distance travelled by particle before coming to rest is

A. 0.1 m

B. 0.2 m

C. 0.3 m

D. 0.4 m

Answer: B

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9. An electron initially at rest falls a distance of 1.5 cm in a uniform electric field of magnitude $2 \times 10^4 N/C$. The time taken by the electron to fall this distance is

A. $1.3 \times 10^2 s$

B. $2.1 \times 10^{-12} s$

C. $1.6 \times 10^{-10} s$

D. $2.9 \times 10^{-9} s$

Answer: D

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10. The electric field that can balance a charged particle of mass 3.2×10^{-27}kg is (Given that the charge on the particle is $1.6 \times 10^{-19} C$)

A. $19.6 \times 10^{-8} NC^{-1}$

B. $20 \times 10^{-6} NC^{-1}$

C. $19.6 \times 10^{8} NC^{-1}$

D. $20 \times 10^6 NC^{-1}$

Answer: A

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11. An oil drop of 10 excess electron is held stationary under a consatnt electric field of $3.6 \times 10^4 NC^{-1}$ in Millikan's oil drop experiment. The density of oil is $1.26 gcm^{-3}$. Radius of the oil drop is

(Take, $g = 9.8 ms^{-2}, e = 1.6 \times 10^{-19} C$)

A. $1.04 \times 10^{-6} m$

B. $4.8 \times 10^{-5} m$

C. $4.8 \times 10^{-18} m$

D. $1.13 \times 10^{-18} m$

Answer: A

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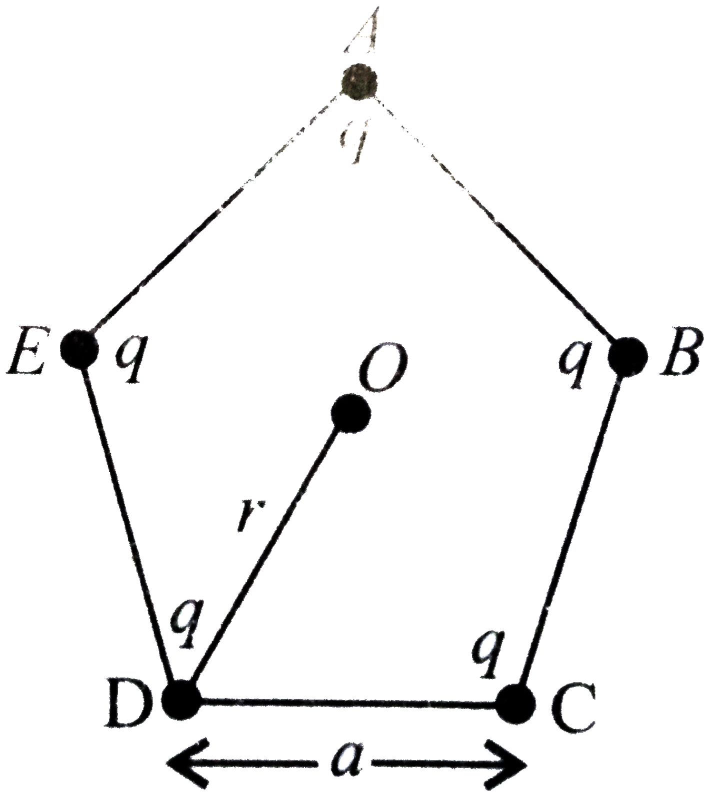
12. Five equal charges each of value q are placed at the corners of a regular pentagon of side a. The electric field at the centre of the pentagon is



A. $\dfrac{q}{4\pi\varepsilon_0 r^2}$

B. $\dfrac{q^2}{4\pi\varepsilon_0 r^2}$

C. $\dfrac{2q}{4\pi\varepsilon_0 r^2}$

D. zero

Answer: D

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13. In question number 45, what will be the electric field at centre O, if the charge from one of the corners (say A) is removed?

A. $\frac{q}{4\pi\varepsilon_0 r^2}$ along OA

B. $\frac{2q}{4\pi\varepsilon_0 r^2}$ along OB

C. $\dfrac{q^2}{4\pi\varepsilon_0 r^2}$ along OC

D. $\dfrac{2q}{4\pi\varepsilon_0 r^2}$ along OA

Answer: A

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14. In question number 45, what will be the electric field at O if the charge q at A is replaced by -q?

A. $\dfrac{q}{4\pi\varepsilon_0 r^2}$ along OB

B. $\dfrac{2q}{4\pi\varepsilon_0 r^2}$ along OA

C. $\dfrac{4q}{4\pi\varepsilon_0 r^2}$ along OC

D. zero

Answer: B

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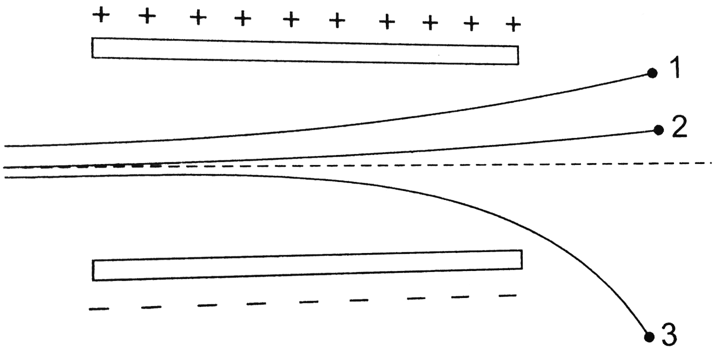
15. Figure shows tracks of three charged particles crossing a uniform electrostatic field with same velocities along horizontal. Give the sign of the three charges. Which particle has the highest charge to mass ratio?



A. 1

B. 2

C. 3

D. 1 and 2

Answer: C

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16. Take the particle in question number 49, an electron projected with velocity $v_x = 4 \times 10^6 ms^{-1}$. If electric field between the plates separated by $1cm$ is $8.2 \times 10^2 NC^{-1}$, then the electron will strike the upper plate if the length of plate is (Take $m_e = 9.1 \times 10^{-31} kg$)

A. 2.14cm

B. 3.9cm

C. 1.23cm

D. 3.3cm

Answer: D

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Electric Field Lines

1. Electric field lines provide information about

A. field strength

B. direction

C. nature of charge

D. all of these

Answer: D

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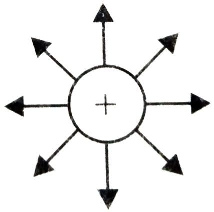
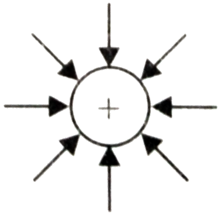
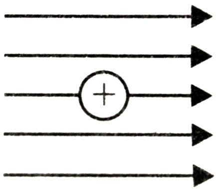
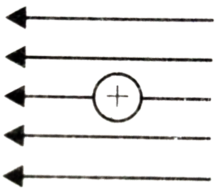
2. Which of the following figures represents the electric field lines due to a single positive charge ?

A. 

B. 

C. 

D. 

Answer: A

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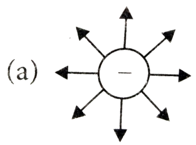
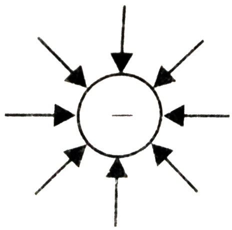
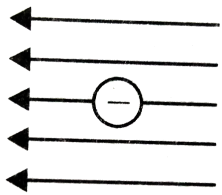
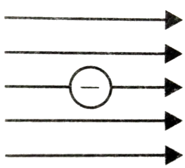
3. Which of the following figure represents the field lines due to a single negative charge ?

A. 

B. 

C. 

D. 

Answer: B

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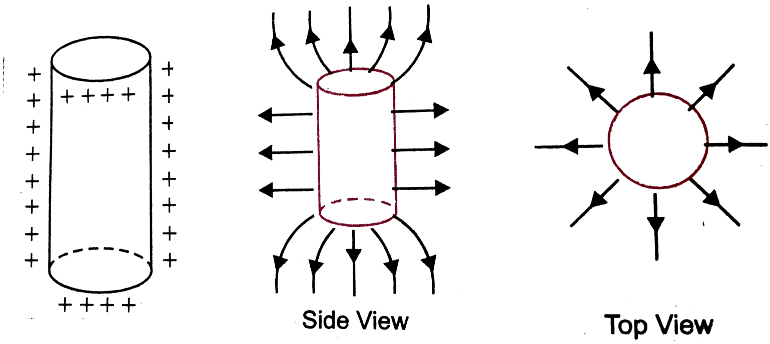
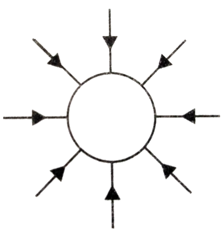
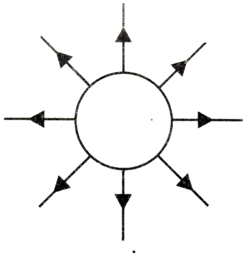
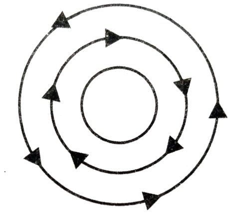
4. Sketch the electric field lines for a unifomly charged hollow cylinder shown in Fig.



A. 

B. 

C. 

D.

Answer: B

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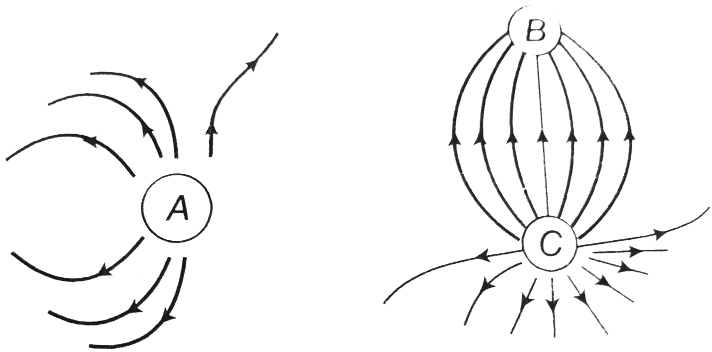
5. Figure shows the electric field lines around three point charges A, B and C. Which of the following charges are positive?



A. Only A

B. Only C

C. Both A and C

D. Both B and C

Answer: C

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6. In question 55, which charge has the largest magnitude?

A. A

B. B

C. C

D. B and C have equal magnitude

Answer: C

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7. In question 55, which region or regions of the figure could the electric field be zero?

A. Near A

B. Near B

C. Near C

D. Now here

Answer: A

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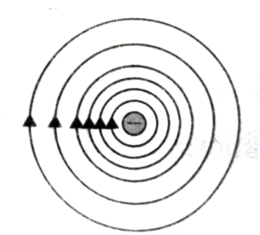
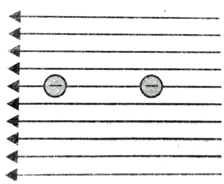
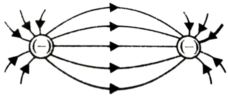
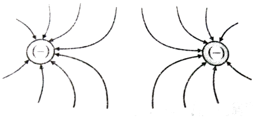
8. Which of the following represent the electric field lines dut to a combinations of two negative charges?

A. 

B. 

C. 

D. 

Answer: D

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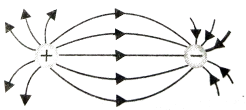
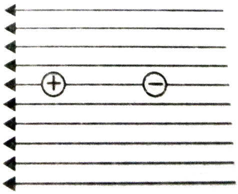
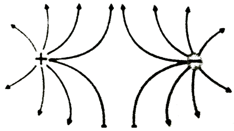
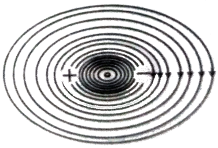
9. Which of the following figure represents the electronic field lines due to a combination of the one positive and one negative charge?

A. 

B. 

C. 

D. 

Answer: A

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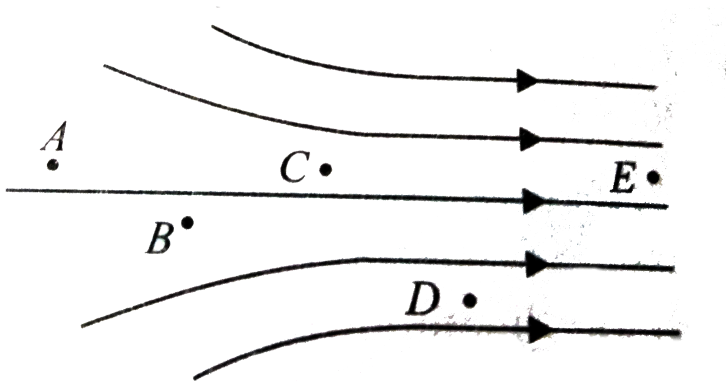
10. A non-uniform electric field is represented by the diagram. At which of the following points the electric field is greatest in magnitude?



A. A

B. B

C. C

D. D

Answer: D

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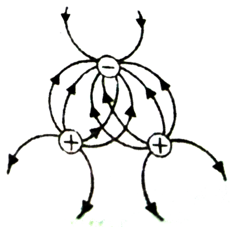
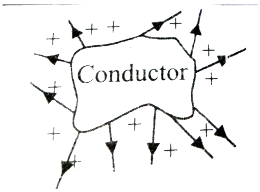
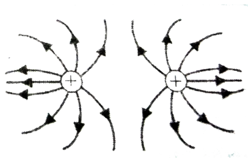
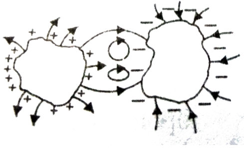
11. Which of the following curves represent electrostatic field lines correctly?

A. 

B. 

C. 

D. 

Answer: C

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12. Which of the following statements is not true about electric field lines?

A. Electric field lines start from positive charge and end at negative charge.

B. Two electric field lines can never cross each other.

C. Electrostatic field lines do not form any closed loops.

D. Electric field lines cannot be taken as continuous curve.

Answer: D

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Electric Flux

1. The SI unit of electric flux is

A. $NC^{-1}m^2$

B. NCm^{-2}

C. $NC^{-2}m^2$

D. $NC^{-1}m^{-2}$

Answer: A

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2. The dimensional formula of electric flux is

A. $\left[M^1L^1T^{-2}\right]$

B. $\left[M^1L^3T^{-3}A^{-1}\right]$

C. $\left[M^2L^2T^{-2}A^{-2}\right]$

D. $\left[M^1L^{-3}T^3A^1\right]$

Answer: B

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3. A circular plane sheet of radius 10 cm is placed in a uniform electric field of $5 \times 10^5 NC^{-1}$, making an angle of 60° with the field. Calculate electric flux through the sheet.

A. $1.36 \times 10^2 Nm^2C^{-1}$

B. $1.36 \times 10^4 Nm^2C^{-1}$

C. $0.515 \times 10^2 Nm^2C^{-1}$

D. $0.515 \times 10^4 Nm^2C^{-1}$

Answer: B

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4. A uniform electric field $E = 2 \times 10^3 NC^{-1}$ is acting along the positive x-axis. The flux of this field through a square of 10 cm on a side whose plane is parallel to the yz plane is

A. $20NC^{-1}m^2$

B. $30NC^{-1}m^2$

C. $10NC^{-1}m^2$

D. $40NC^{-1}m^2$

Answer: A

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5. In the question number 66, the flux through the same square if the line normal to its plane makes a 60° angle with the x-axis is

A. $30NC^{-1}m^2$

B. $10NC^{-1}m^2$

C. $20NC^{-1}m^2$

D. $25NC^{-1}m^2$

Answer: B

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Electric Dipole

1. Which of the following statements about dipole moment is not true?

A. The dimensions of dipole moment is [L T A].

B. The unit of dipole moment is C m.

C. Dipole moment is vector quantity and directed from negative to positive charge.

D. Dipole moment is a scalar quantity and has magnitude charge equal to the potential of separation between charge.

Answer: D

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2. Define electric dipole moment. Write its SI unit ?

A. newton

B. coulomb

C. farad

D. debye

Answer: D

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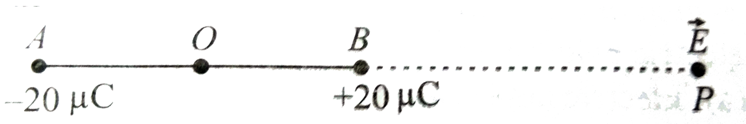
3. Two charges $+20\mu C$ and $-20\mu C$ are placed 10mm apart. The electric field at point P, on the axis of the dipole 10 cm away from its centre O on the side of the positive charge is



A. $8.6 \times 10^9 NC^{-1}$

B. $4.1 \times 10^6 NC^{-1}$

C. $3.6 \times 10^6 NC^{-1}$

D. $4.6 \times 10^5 NC^{-1}$

Answer: C

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4. Consider a region inside which there are various types of charges but the total charge is zero ,.At points outside the region

A. the electric field is necessarily zero.

B. the electric field is due to the dipole moment of the charge distribution only.

C. the dominant electric field is inversely proportional to `r^(3), for large r (distance from origin).

D. the work done to move a charged particle along a closed path, away from the region will not be zero.

Answer: C

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5. Two point charges of $1\mu C$ and $-1\mu C$ are separated by a distance of 100 Å. A point P is at a distance of 10 cm from the midpoint and on the perpendicular bisector of the line joining the two charges. The electric field at P will be

A. $9NC^{-1}$

B. $0.9NC^{-1}$

C. $90NC^{-1}$

D. $0.09NC^{-1}$

Answer: D

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Dipole In A Uniform External Field

1. An electric dipole is placed at an angle of 30° with an electric field intensity $2 \times 10^{5} N/C$. It experiences a torque equal to $4Nm$. The charge on the dipole, if the dipole is length is $2cm$, is

A. 8 mC

B. 4 mC

C. 6 mC

D. 2 mC

Answer: D

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2. In a certain region of space, electric field is along the z-direction throughout. The magnitude of electric field is , however, not constant but increases uniformly along the positive z-direction. At the rate of $10^5 NC^{-1}m^{-1}$. What are the force and torque experienced by system having a total dipole moment equal to 10^{-7}Cm in the negative z-direction?

A. $-10^{-2}N$

B. $10^{-2}N$

C. $10^{-4}N$

D. $-10^{-4}N$

Answer: A

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3. In the question number 74, torque experienced by the system is

A. $10^2 N$

B. $10^{-2} N$

C. zero

D. $10^3 N$

Answer: C

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Continuous Charge Distribution

1. Match the following and find the correct option.

Column I		Column II	
(A)	Linear charge density	(p)	$\frac{\text{Charge}}{\text{Volume}}$
(B)	Surface charge density	(q)	$\frac{\text{Charge}}{\text{Length}}$
(C)	Volume charge density	(r)	$\frac{\text{Charge}}{\text{Area}}$

A. A - q, B - r, C - p

B. A - p, B - r, C - p

C. A - r, B - p, C - q

D. A - r, B - q, C - p

Answer: A

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2. A uniformly charged conducting sphere of 4.4 m diameter has a surface change density of $60\mu Cm^{-2}$. The charge on the sphere is

A. $7.3 \times 10^{-3}C$

B. $3.7 \times 10^{-6}C$

C. $7.3 \times 10^{-6} C$

D. $3.7 \times 10^{-3} C$

Answer: D

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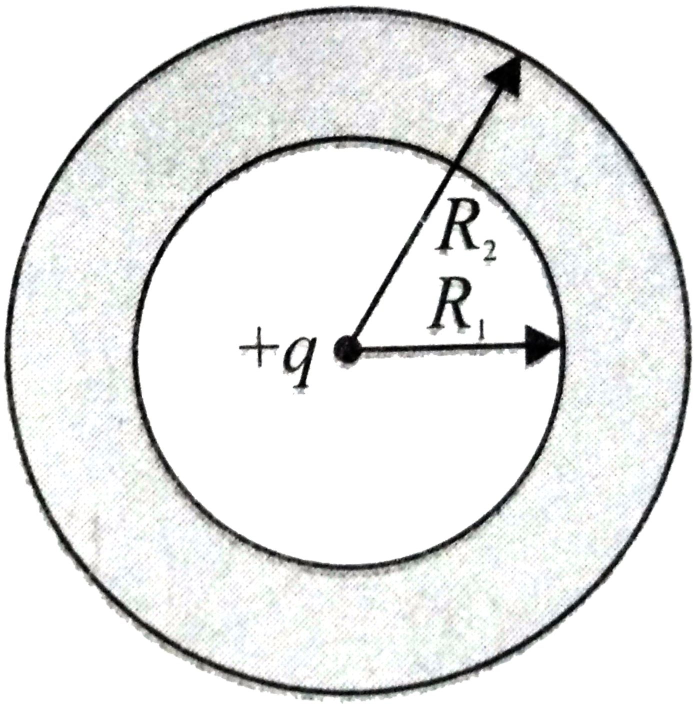
3. A metallic spherical shell has an inner radius R_1 and outer radius R_2. A charge is placed at the centre of the spherical cavity. The surface charge density on the inner surface is



A. $\dfrac{q}{4\pi R_1^2}$

B. $\dfrac{-q}{4\pi R_1^2}$

C. $\dfrac{q^2}{4\pi R_2^2}$

D. $\frac{q}{4\pi R_2^2}$

Answer: B

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4. In the question number 78, the surface charge density on the outer surface is

A. $\frac{-q}{4\pi R_1^2}$

B. $\frac{q}{4\pi R_2^2}$

C. $\frac{q^2}{4\pi R_1^2}$

D. $\frac{2q}{4\pi R_2^2}$

Answer: B

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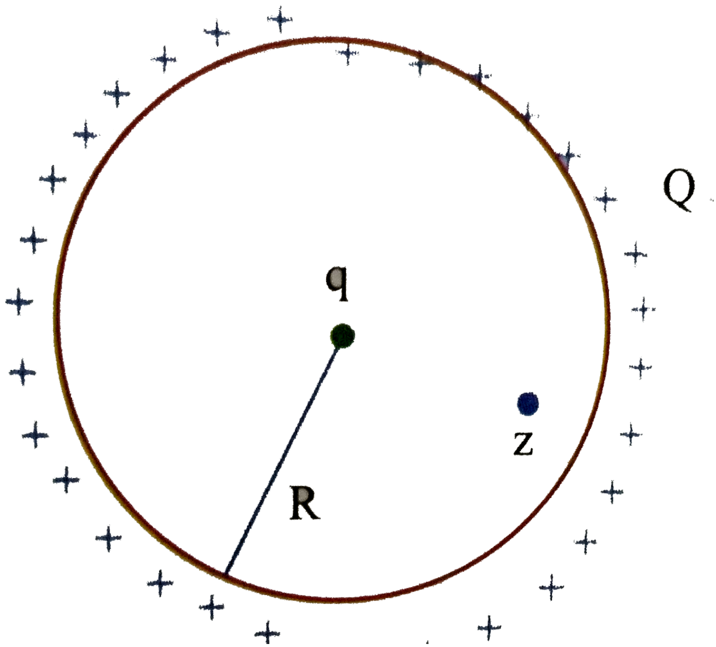
5. A positive charge Q is uniformly distributed along a circular ring of radius R.a small test charge q is placed at the centre of the ring

.The



A. if q > 0, and is displaced away from the centre in the plane of the ring, it will be pushed back towards the centre.

B. if $q < 0$ and is displaced away from the centre in the plane of the ring, it will never return to the centre and will continue moving till it hits the ring.

C. if $q < 0$ it will perform SHM for small displacement along the axis.

D. all of the above

Answer: D

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Gauss Law

1. The surface considered for Gauss's law is called

A. Closed surface

B. Sphereical surface

C. Gaussian surface

D. Plane surface

Answer: C

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2. If $\oint_s E.\, ds = 0$ Over a surface, then

A. the electric field inside the surface and on it is zero.

B. the electric field inside the surface is necessarily uniform.

C. all charges must necessarily be outside the surface.

D. all of these.

Answer: C

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3. If there were only one type of charge of the universe then

A. $\oint_s \overrightarrow{E}.d\overrightarrow{s} \neq 0$ on any surface

B. $\oint_s \overrightarrow{E}.d\overrightarrow{s} = 0$ if the charge is outside the surface

C. $\oint_s \overrightarrow{E} . d\overrightarrow{s} = \frac{q}{\varepsilon_0}$ if charges of magnitude q were inside the surface

D. both (b) and (c) are correct

Answer: D

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4. A sphere encloses an electric dipole withon it. The total flux across the sphere is

A. zero

B. half that due to a single charge

C. double that due to a single charge

D. dependent on the position of dipole.

Answer: A

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5. A point charge $4\mu C$ is at the centre of a cubic Gaussian surface 10 cm on edge. Net electric flux through the surface is

A. $2.5 \times 10^{5} Nm^{2} C^{-1}$

B. $4.5 \times 10^{5} Nm^{2} C^{-1}$

C. $4.5 \times 10^{6} Nm^{2} C^{-1}$

D. $2.5 \times 10^{6} Nm^{2} C^{-1}$

Answer: B

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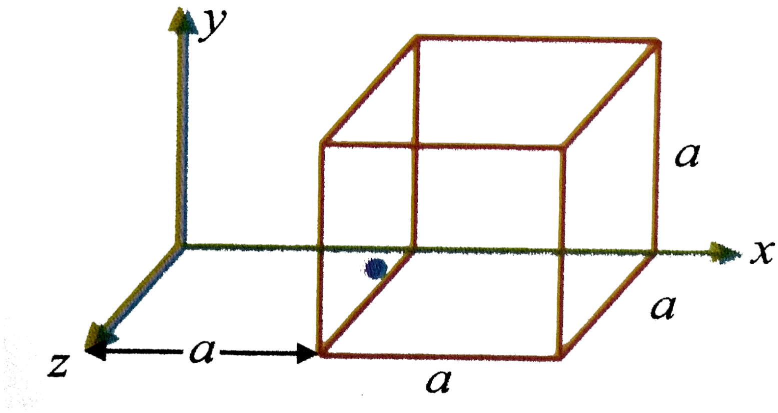
6. The electric components in the figure are $E_x = \alpha x^{1/2}, E_y = 0, E_z = 0$ where $\alpha = 800 N/m^2$ if $a = 0.1m$ is the side of cube then the charge with in the cube is



A. $9.27 \times 10^{-12} C$

B. $9.27 \times 10^{12} C$

C. $6.97 \times 10^{-12} C$

D. $6.97 \times 10^{12} C$

Answer: A

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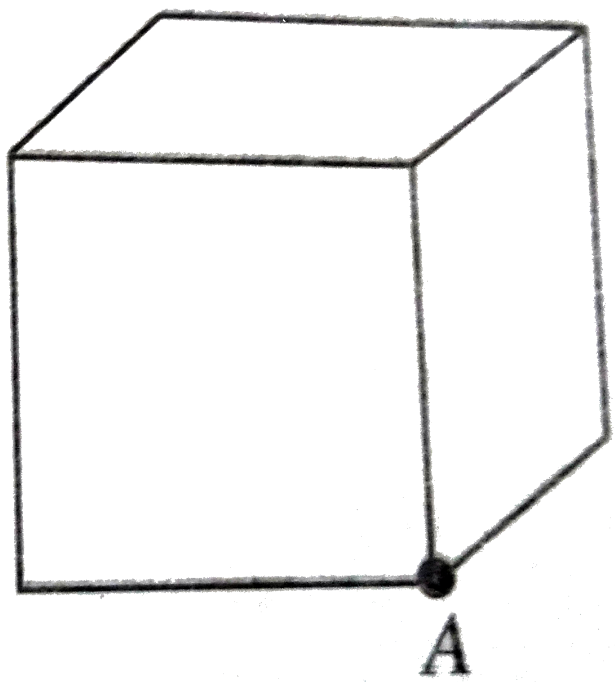
7. The total flux through the faces of the cube with side of length a if a charge q is placed at corner A of the cube is



A. $\frac{q}{8\varepsilon_0}$

B. $\frac{q}{4\varepsilon_0}$

C. $\frac{q}{2\varepsilon_0}$

D. $\frac{q}{\varepsilon_0}$

Answer: A

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8. Which of the following statements is not true about Gauss's law?

A. Gauss's law is true for any closed surface.

B. The term q on the ringht side of Gauss's law includes the sum of all charges enclosed by the surface.

C. Gauss's law is not much useful in calculating electrostatic field when the system has some symmetry.

D. Gauss's law is based on the inverse square dependence on distance contained in the coulomb's law.

Answer: C

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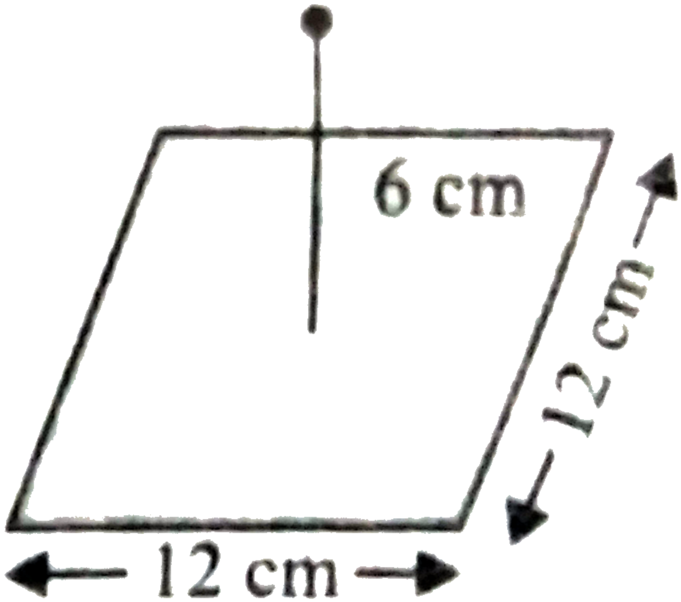
9. A point charge `+20muC is at a distance 6 cm directly above the centre of a square of side 12 cm as shown is figure. The magnitude of electric flux through the square is



A. $2.5 \times 10^6 Nm^2C^{-1}$

B. $3.8 \times 10^5 Nm^2C^{-1}$

C. $4.2 \times 10^5 Nm^2C^{-1}$

D. $2.9 \times 10^6 Nm^2C^{-1}$

Answer: B

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Application Of Gauss Law

1. A rod of length 2.4 m and radius 4.6 mm carries a negative charge of $4.2 \times 10^{-7} C$ spread uniformly over it surface. The electric field near the mid-point of the rod, at a point on its surface is

A. $-8.6 \times 10^5 NC^{-1}$

B. $8.6 \times 10^4 NC^{-1}$

C. $-6.7 \times 10^5 NC^{-1}$

D. $6.7 \times 10^4 NC^{-1}$

Answer: C

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2. Two parallel infinite line charges $+\lambda$ and $-\lambda$ are placed with a separation distance R in free space. The net electric field exactly mid-way between the two line charges is

A. zero

B. $\dfrac{2\lambda}{\pi\varepsilon_0 R}$

C. $\dfrac{\lambda}{\pi\varepsilon_0 R}$

D. $\dfrac{\lambda}{2\pi\varepsilon_0 R}$

Answer: B

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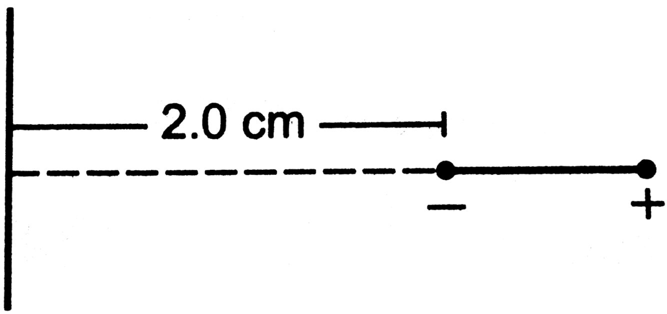
3. An electric dipole consists of charges $\pm 2.0 \times 10^{-8} C$ separated by a distance of 2.0×10^{-3} m. It is placed near a long line charge of linear charge density $4.0 \times 10^{-4} Cm^{-1}$ as shown in figure (30-W4), Such that the negative charge is at a distance of `2.0 cm from the line charge. Find the force acting on the dipole.



A. 7.2 N towards the line charge

B. 6.6 N away from the line charge

C. 0.6 N away from the line charge

D. 0.6 N towards the line charge.

Answer: D

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4. Two infinite plane parallel sheets, separated by a distance d have equal and opposite uniform charge densities σ. Electric field at a point between the sheets is

A. $\frac{\sigma}{2\varepsilon_0}$

B. $\frac{\sigma}{\varepsilon_0}$

C. zero

D. depends on the location of the point

Answer: B

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5. Two large, thin plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and of magnitude $16 \times 10^{-22} Cm^{-2}$. The electric field between the plates is

A. $1.8 \times 10^{-10} NC^{-1}$

B. $1.9 \times 10^{-10} NC^{-1}$

C. $1.6 \times 10^{-10} NC^{-1}$

D. $1.5 \times 10^{-10} NC^{-1}$

Answer: A

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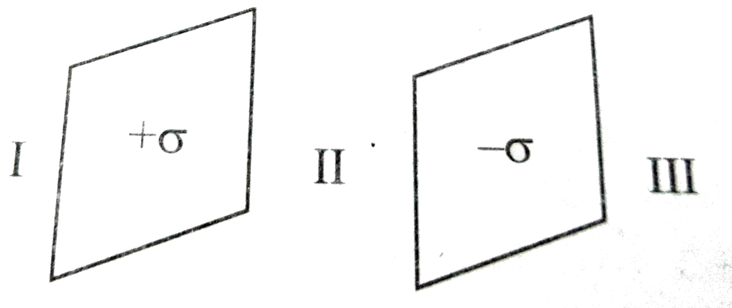
6. Two large thin metal plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and magnitude $27 \times 10^{-22} Cm^{-2}$. The electric field $\overrightarrow{E}$ in region II in between the plates is



A. $4.25 \times 10^{-8} NC^{-1}$

B. $6.28 \times 10^{-10} NC^{-1}$

C. $3.05 \times 10^{-10} NC^{-1}$

D. $5.03 \times 10^{-10} NC^{-1}$

Answer: C

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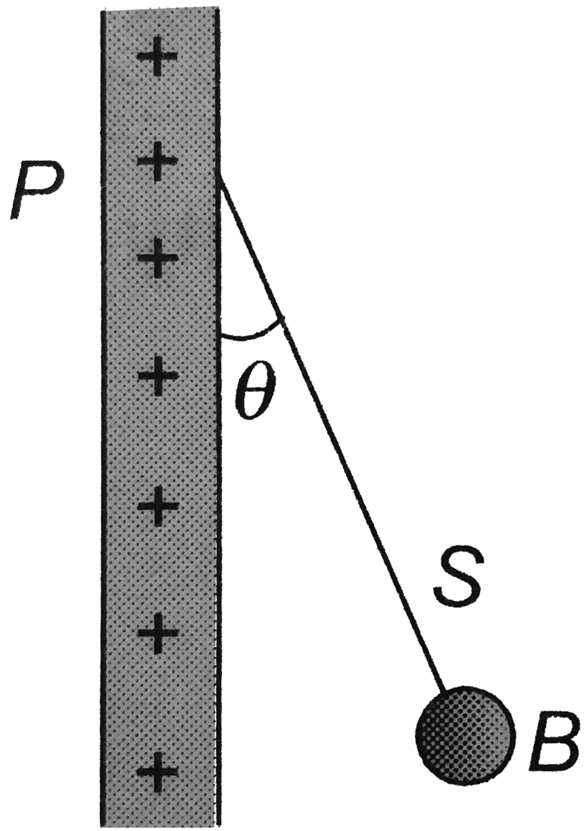
7. A charged ball B hangs from a silk thread S, which makes an angle θ with a large charged conducting sheet P, as shown in the figure.

The surface charge density σ of the sheet is proportional to



A. $\cos\theta$

B. $\cot\theta$

C. $\sin\theta$

D. $\tan\theta$.

Answer: D

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8. Consider a thin spherical shell of radius R consisting of uniform surface charge density σ. The electric field at a point of distance x from its centre and outside the shell is

A. inversely proportional to σ

B. directly proportional to x^2

C. directlr proportional to R

D. inversely proportional to x^2

Answer: D

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9. There is a solid sphere of radius R having uniformly distributed charge throughout it. What is the relation between electric field E and distance r from the centre (r is less than R) ?

A. $E \propto r^{-2}$

B. $E \propto r^{-1}$

C. $E \propto r$

D. $E \propto r^{2}$

Answer: C

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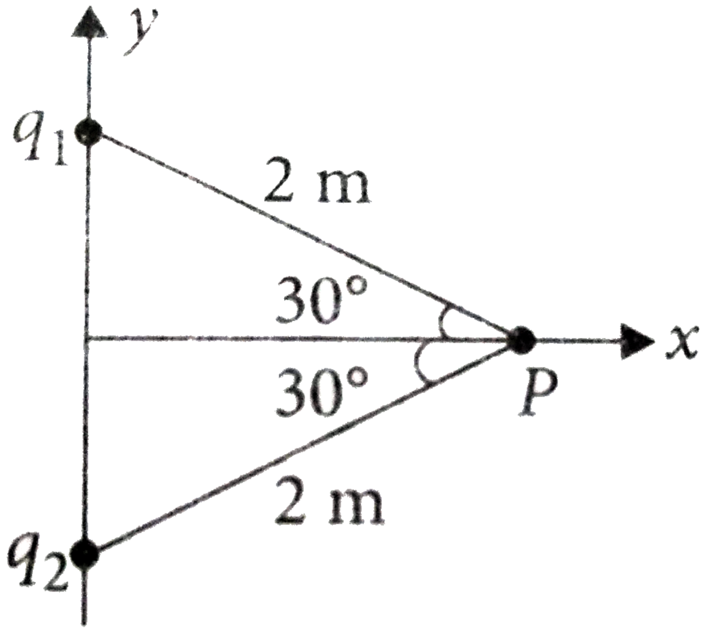
Hots

1. Two point charges $q_1 = -4\mu C$ and $q_2 = 8\mu C$ are lying on the y-axis. They are equidistant from the point P, which lies on the x-axis. A small object of charge $q_0 = 8\mu C$ and mass m = 12 g is placed at P. When it is released, which is its acceleration in ms^{-2}?

(Neglect the effect of gravity)



A. $3\sqrt{3}\hat{i} + 9\hat{j}$

B. $9\hat{i} + 3\sqrt{3}\hat{j}$

C. $3\hat{i} + 3\sqrt{3}\hat{j}$

D. $3\sqrt{3}\hat{i} + 3\hat{j}$

Answer: A

Watch Video Solution

2. Two spherical conductors B and C having equal radii and cayying equal charges on them repel each other with a force F when kept apart at some distance. A third spherical conductor having same radius as that B but uncharged is brought in contact with B, then brought in contact with C and finally removed away from both. The new force of repulsion between B and C is

A. $\frac{F}{4}$

B. $\frac{3F}{4}$

C. $\frac{F}{8}$

D. $\frac{3F}{8}$

Answer: D

Watch Video Solution

3. A very long, straight, thin wire carries $-3.60nCm^{-1}$ of fixed negative charge. The wire is to be surrounded by a uniform cylinder of positive charge, radius 1.50 cm, coaxial with the wire. The volume charge density ρ of the cylinder is to be selected so that the net electric field outside the cylinder is zero. Calculate the required positive charge density ρ (in μCm^{-3}).

A. 6

B. 7

C. 5

D. 3

Answer: C

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4. A system consits of a uniformly charged sphere of radius R and a surrounding medium filled by a charge with the volume density $\rho = \frac{\alpha}{r}$, where α is a positive constant and r is the distance from the centre of the sphere.

Find the charge of the sphere for which the electric field intensity E outside the sphere is independent of R.

A. $\frac{\alpha}{2\varepsilon_0}$

B. $\frac{2}{\alpha\varepsilon_0}$

C. $2\pi\alpha R^2$

D. None of these

Answer: C

Watch Video Solution

5. A charge is distributed with a linear density λ over a rod of the length L placed along radius vector drawn from the point where a point charge q is located. The distance between q and the nearest point on linear charge is R. The electrical force experienced by the linear charge due to q is

A. $\dfrac{q\lambda L}{4\pi\varepsilon_0 R^2}$

B. $\dfrac{q\lambda L}{4\pi\varepsilon_0 R(R+L)}$

C. $\dfrac{q\lambda L}{4\pi\varepsilon_0 RL}$

D. $\dfrac{q\lambda L}{4\pi\varepsilon_0 L^2}$

Answer: B

Watch Video Solution

6. When a charge of amount Q is given to an isolated metal plate X of surface area A, its surface charge density becomes σ_1. When an isolated identical plate Y is brought close to X the surface charge density on X becomes σ_2. When Y is earthed the surface charge density on X becomes σ_3. Choose the incorrect option.

A. $\sigma_1 = \frac{Q}{A}$

B. $\sigma_1 = \frac{Q}{2A}$

C. $\sigma_1 = \sigma_2$

D. $\sigma_3 = \frac{Q}{A}$

Answer: A

Watch Video Solution

7. Let $\rho(r) = \frac{Qr}{\pi R^4}$ be the charge density distribution for a soild sphere of radius R and total charge Q. For a point P inside the sphere

at a distance r_1 from the centre of the sphere,

the magnitude of electric field is

A. $\dfrac{Q}{4\pi\varepsilon_0 r_1^2}$

B. $\dfrac{Qr_1^2}{4\pi\varepsilon_0 R^4}$

C. $\dfrac{Qr_1^2}{3\pi\varepsilon_0 R^4}$

D. zero

Answer: B

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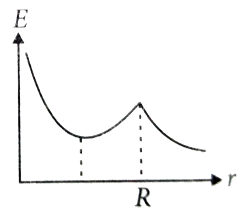
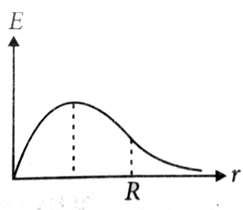
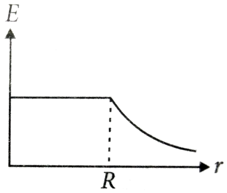
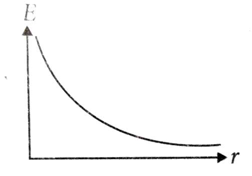
8. A spherical insulator of radius R is charged uniformly with a charge Q throughout its volume and contains a point charge $\frac{Q}{16}$ located at its centre. Which of the following graphs best represents qualitatively, the variation of electric field intensity E with distance r from the centre?

A. 

B. 

C. 

D. 

Answer: A

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Higher Order Thinking Skills

1. Two spherical conductors B and C having equal radii and cayying equal charges on them repel each other with a force F when kept apart at some distance. A third spherical conductor having same radius as that B but uncharged is brought in contact with B, then brought in contact with C and finally removed away from both. The new force of repulsion between B and C is

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D. $\frac{3F}{8}$

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D. 3

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C. $2\pi\alpha R^2$

D. None of these

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Watch Video Solution

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B. $\frac{q\lambda L}{4\pi\varepsilon_0 R(R+L)}$

C. $\frac{q\lambda L}{4\pi\varepsilon_0 RL}$

D. $\frac{q\lambda L}{4\pi\varepsilon_0 L^2}$

Answer: B

Watch Video Solution

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B. $\sigma_1 = \frac{Q}{2A}$

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Answer: A

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C. $\dfrac{Qr_1^2}{3\pi\varepsilon_0 R^4}$

D. zero

Answer: B

Watch Video Solution

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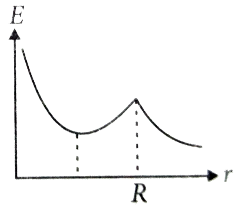
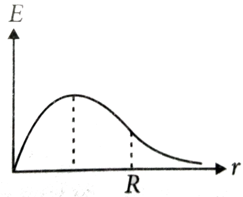
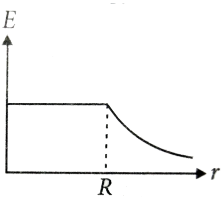
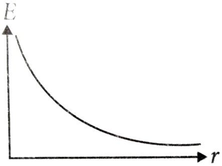
A. 

B. 

C. 

D. 

Answer: A

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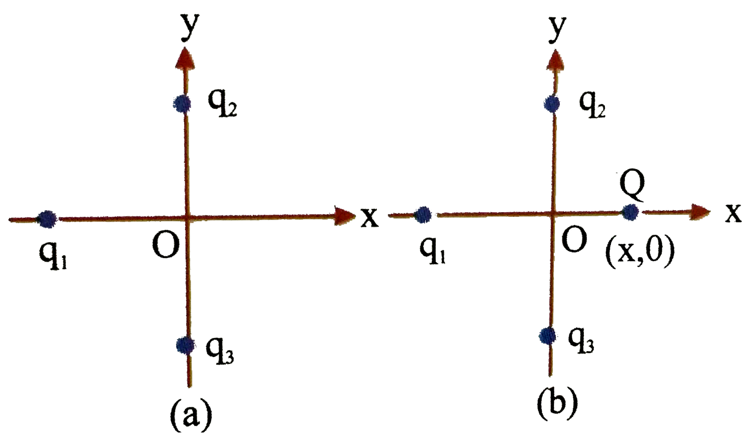
Ncert Exemplar

1. In figure two positive charges q_2 and q_3 fixed along the y-axis ,exert a net electric force in the $+x$ direction on a charge q_1 fixed along the x-axis if a positive charge Q is added at

$(x, 0)$ the force on q_1



A. shall increase along the positive x-axis.

B. shall decrease along the positive x-axis.

C. shall point along the negative x-axis.

D. shall increase but the direction changes because of the intersection of Q with q_2 and q_3.

Answer: A

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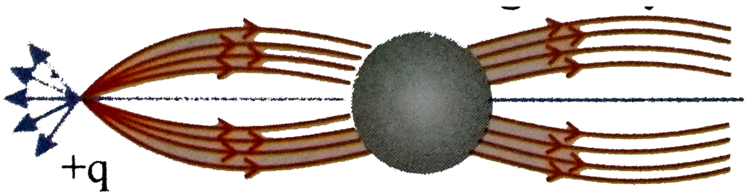
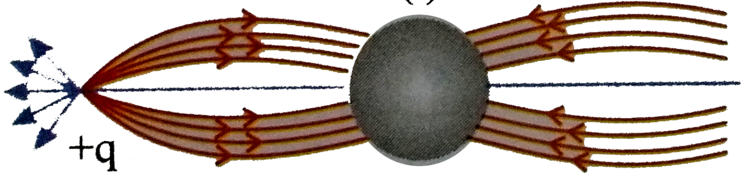
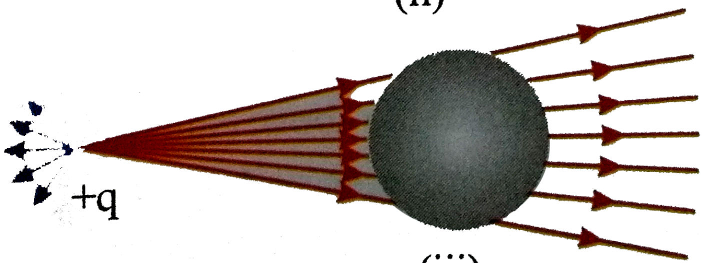
2. A point positive charge is brought near an isolated conducting sphere as shown in figure the electric field is best given by



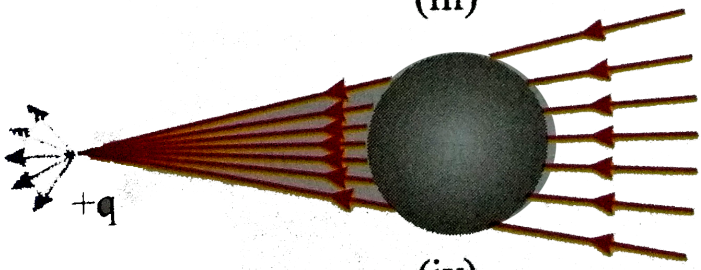
(i)



(ii)



(iii)



(iv)

A. Figure (i)

B. Figure (ii)

C. Figure (iii)

D. Figure (iv)

Answer: A

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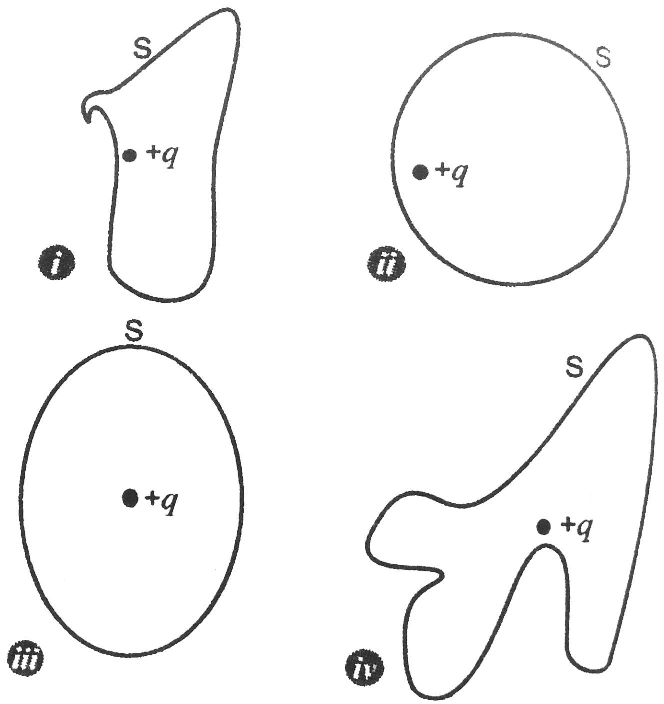
3. The electric flux through the surface



A. in figure (iv) is the largest

B. in figure (iii) is the least

C. in the figure (ii) is same as in figure (iii) but is smaller than figure (iv)

D. is the same for all the figures

Answer: D

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4. A point charge +q, is placed at a distance d from an isolated conducting plane. The field at a point P on the other side of the plane is

A. directed perpendicular to the plane and away from the plane.

B. directed perpendicular to the plane but towards the plane.

C. directed radially away from the point charge.

D. directed radially towards the point charge.

Answer: A

Watch Video Solution

5. A hemispherical shell is uniformly charge positively .the electric field at point on a diameter away from the centre is directed

A. perpendicular to the diameter

B. parallel to the diameter

C. at an angle tilted towards the diameter

D. at an angle tilted away from the diameter

Answer: A

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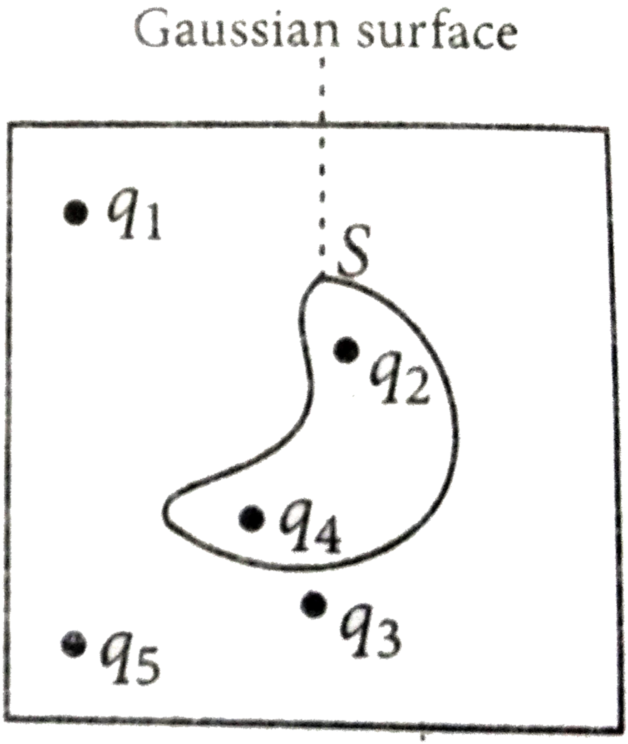
Exemplar Problems

1. Five charges q_1, q_2, q_3, q_4 and q_5 are fixed at their positions as shown in figure. S is Gaussian surface. The Gauss's law is given by $\oint_S \overrightarrow{E} \cdot \overrightarrow{ds} = \frac{q}{\varepsilon_0}$. Which of the following statements is correct?



A. $\vec{E}$ on the LHS of the above equation will have a contribution from q_1, q_5 and q_3

while q on the RHS will have a

contribution from q_2 and q_4 only.

B. $\overrightarrow{E}$ on the LHS of the above equation will

have a contribution from all charges

while q on the RHS will have a

contribution from $q_2,$ and q_4 only.

C. $\overrightarrow{E}$ on the LHS of the above equation will

have a contribution from all charges

while q on the RHS will have a

contribution from q_1, q_3 and q_5 only.

D. Both $\overrightarrow{E}$ on the LHS and q on the RHS will have a contributions from q_2 and q_4 only.

Answer: B

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2. Figure shows electric field lines in which an electric dipole $\overrightarrow{P}$ is placed as shown. Which of the following statements is correct?

A. The dipole will not experience any force.

B. The dipole will experience a force towards right.

C. The dipole will experience a force towards left.

D. The dipole will experience a force upwards.

Answer: C

Watch Video Solution

3. A point charge +q, is placed at a distance d from an isolated conducting plane. The field at a point P on the other side of the plane is

A. directed perpendicular to the plane and away from the plane.

B. directed perpendicular to the plane but towards the plane.

C. directed radially away from the point charge.

D. directed radially towards the point charge.

Answer: A

Watch Video Solution

4. A hemispherical shell is uniformly charge positively .the electric field at point on a diameter away from the centre is directed

A. perpendicular to the diameter

B. parallel to the diameter

C. at an angle tilted towards the diameter

D. at an angle tilted away from the diameter

Answer: A

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Assertion And Reason

1. Assertion : When bodies are charged through friction, there is a transfer of electric charge from one body to another, but no creation or destruction of charge.

Reason : This follows from conservation of electric charges.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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2. Assertion : When we rub a glass rod with silk, the rod gets positively charged and the silk gets negatively charged.

Reason : On rubbing, electrons from silk cloth move to the glass rod.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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3. Assertion : The charge on any body can be increased or decreased in terms of e.

Reason : Quantisation of charge means that the charge on a body is the integral multiple of e.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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4. Assertion : When a body acquires negative charge, its mass decreases.

Reason : A body acquires negative charge when it loses electrons.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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5. Assertion. When charges are shared between any two bodies, no charge is really lost but some loss of energy does occur.

Reason. Some energy disappears in the from of heat, sparking etc.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

6. Assertion : Coulomb force and gravitational force follow the same inverse-square law.

Reason : Both laws are same in all aspects.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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7. Assertion: If there exists coulombic attracation between two bodies both of them may not be charged.

Reason: In coulombic attraction two bodies are oppositely charged.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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8. Assertion :The force with which two charges attract or repel each other are not affected by the presence of a third charge.

Reason : Force on any charge due to a number of other charges is the vector sum of all the forces on that charge due to other charges, taken one at a time.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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9. Assertion : The electric field due to a discrete charge configuration is not defined at the locations of the discrete charges.

Reason : For a surface charge distribution, electric field is discontinuous across the surface.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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10. Assertion : Protons carrying positive charges are compactly residing inside the nucleus.

Reason : Electrostatic repulsive force between protons is very weak.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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11. Assertion : In a uniform electric field electrons move in the opposite direction of electric field.

Reason : This is because of the negative charge of an electron.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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12. Assertion : Electrostatic field lines start at positive charges and end at negative charges.

Reason : Field lines are continuous curves without any breaks and they form closed loop.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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13. Assertion : Surface charge density of an irregularly shaped conductor is non-uniform.

Reason : Surface density is defined as charge per unit area.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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14. Assertion: The whole charge of a conductor cannot be transferred to another isolated conductor. Reason: The total transfer of charge from one to another is not possible.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

Watch Video Solution

15. Assertion : Total flux through a closed surface is zero if no charge is enclosed by the surface.

Reason : Gauss law is true for any closed surface, no matter what its shape or size is.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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Others

1. State Coulomb's law of electric force between two charged bodies.

A. proportional to the sum of the charges

B. inversely proportional to the distance between charges

C. proportional to the product of the charges and inversely proportional to the distance

D. proportional to the product of the charges and inversely proportional to the square of distance.

Answer: D

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2. Which of the following statements is true about electrical forces?

A. Electrical forces are produced by electrical charges.

B. Like charges attract, unlike charges repel.

C. Electric forces are weaker than gravitational forces.

D. Positive and negative charges can combine to produce a third type of charge.

Answer: A

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3. In coulomb's law, on what factors does the value of electrostatic force constant K depend ?

A. nature of medium

B. system of units

C. intensity of charge

D. both (a) and (b)

Answer: A

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4. Which of the following statement is not a similarity between electrostaic and gravitational forces?

A. Both forces obey inverse square law.

B. Both forces operate over very large distances.

C. Both forces are conservative in nature.

D. Both forces are attractive in nature always.

Answer: D

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5. The unit of permittivity of free space ε_0 is:

A. Farad

B. Weber

C. $C^2N^{-1}m^{-2}$

D. $C^2N^{-1}m^{-1}$

Answer: C

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6. The force between two small charged spheres having charges of $1 \times 10^{-7} C$ and $2 \times 10^{-7} C$ placed 20 cm apart in air is

A. $4.5 \times 10^{-2} N$

B. $4.5 \times 10^{-3} N$

C. $5.4 \times 10^{-2} N$

D. $5.4 \times 10^{-3} N$

Answer: B

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7. The nucleus of helium atom contains two protons that are separated by distance $3.0 \times 10^{-15} m$. The magnitude of the electrostatic force that each proton exerts on the other is

A. 20.6 N

B. 25.6 N

C. 15.6 N

D. 12.6 N

Answer: B

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8. Two insulated charged metallic spheres P and Q have their centres separated by a distance of 60 cm. The radii of P and Q are negligible compared to the distance of separation. The mutual force of electrostatic repulsion if the charge on each is $3.2 \times 10^{-7} C$ is

A. $5.2 \times 10^{-4} N$

B. $2.56 \times 10^{-3} N$

C. $1.5 \times 10^{-3} N$

D. $3.5 \times 10^{-4} N$

Answer: B

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9. Two point charges of $+3\mu C$ and $+4\mu C$ repel each other with a force of 10 N. If each is given an additional charge of $-6\mu C$, the new force is

A. 2 N

B. 4 N

C. 5 N

D. 7.5 N

Answer: D

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10. The ratio of magnitude of electrostatic force and gravitational force for an electron and a proton is

A. 6.6×10^{39}

B. 2.4×10^{39}

C. 6.6×10^{29}

D. 2.4×10^{29}

Answer: B

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11. The electrostatic attracting froce on a small sphere of charge $0.2\mu C$ due to another small sphere of charge $-0.4\mu C$ in air is 0.4N. The distance between the two spheres is

A. $43.2 \times 10^{-6}m$

B. $42.4 \times 10^{-3}m$

C. $18.1 \times 10^{-3}m$

D. $19.2 \times 10^{-6}m$

Answer: B

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12. Under the action of a given coulombic force the acceleration of an electron is $2.5 \times 10^{22} ms^{-1}$. Then, the magnitude of the acceleration of a proton under the action of same force is nearly

A. $1.6 \times 10^{-19} ms^{-2}$

B. $9.1 \times 10^{31} ms^{-2}$

C. $1.5 \times 10^{19} ms^{-2}$

D. $1.6 \times 10^{27} ms^{-2}$

Answer: C

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13. The acceleration for electron and proton due to electrical force of their mutual attraction when they are 1 Å apart is

A. $3.1 \times 10^{22} ms^{-2}, 1.3 \times 10^{19} ms^{-2}$

B. $3.3 \times 10^{28} ms^{-2}, 3.2 \times 10^{16} ms^{-2}$

C. $2.5 \times 10^{22} ms^{-2}, 1.4 \times 10^{19} ms^{-2}$

D. $2.5 \times 10^{18} ms^{-2}, 1.3 \times 10^{16} ms^{-2}$

Answer: C

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