PHYSICS

BOOKS - TARGET PHYSICS (MARATHI ENGLISH)

ELECTROSTATICS

Excercise

1. Electrostatic means study of

A. electric charge in motion

B. elctric charges at rest

C. electric current through a conductor

D. dynamic current

Answer:

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2. Which of the following is NOT an example of static electricity?

A. Hearing crackle when we take off synthetic clothes in dry weather.

B. Lightening in the sky during thunderstorms

C. Plastic comb is electrified when it is rubbed with dry hair

D. Seeing spark in an elctrical switch when we remove fuse

Answer:

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3. What will happen if a glass rod is rubbed on a silk cloth?

A. a glass rod acquires positive charge and silk cloth acquires equal negative charge

B. there is no tranfer of charge

C. a glass rod acquires negative charge and silk cloth acquires equal positive charge

D. glass rod acquires positive charge and silk cloth becomes neutral

Answer:

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4. Frictional electricity is produced on the two objects due to

A. loss of electrons by one object

B. loss of protons by one object

C. loss of electrons by one object and equal number of protons gained by other

object

D. loss of protons by one object and equal number of electrons gained by other object

Answer:

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5. The property of attraction or repulsion acquired by the material body when it is rubbed with aonther body is _____.

A. charge

B. mass

C. resistance

D. inductance

Answer:

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6. When any physical quantity exists in the form of discrete packets it is said to be _____.

A. magnetised

B. polarised

C. quantized

D. electrolysed

Answer:

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7. For the following raction, which is correct?

$_{92}U^{238} \rightarrow {}_{90}Th^{234} + {}_{2}He^{4}$

A. Net charge is conserved

B. net momentum is conserved

C. heat is lost

D. heat is gained

Answer:

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8. Coulomb's law is applicable for stationary point charges and not for the extended bodies. This statement is _____.

A. 1

B. often true

C.

D. unpredictable

Answer:

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9. The force between two electrons separated by a distance 'r' is proportional to

A. r^3

B. $r^{\frac{1}{2}}$

C. $r^{-\frac{1}{2}}$

D. r^{-2}

Answer:

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10. When the distanc ebetween the charged particles is halved the force between them becomes

A. $\frac{1}{4}$times

B. $\frac{1}{2}$ times

C. 2 times

D. 4 times

Answer:

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11. There are two charges +1 micro coulomb and +3 micro coulomb. The ratio of the forces acting on them will be

A. $1:5$

B. $1:1$

C. $5:1$

D. $1:25$

Answer:

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12. A charge q_1 exerts some force on a second charge q_2. If third charge q_3 is brought near charge q_1, the force of q_1 exerted on q_2

A. decreases

B. increases

C. remains unchanged

D. increases if q_3 is of the same sign as q_1 and decreases if q_3 is of opposite sign.

Answer:

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13. The dimensions of ε_0 are

A. $\left[M^0L^0T^0I^0\right]$

B. $\left[M^3L^{-2}T^2I^3\right]$

C. $\left[M^{-1}L^{-3}T^4I^2\right]$

D. $\left[M^{-1}L^{-3}T^3I^2\right]$

Answer:

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14. S.I. unit of permittivity is

A. $\frac{Nm^2}{C^2}$

B. $\frac{C^2}{Nm^2}$

C. $\frac{C}{Nm}$

D. $\frac{Nm}{C}$

Answer:

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15. Dielectric constant of a medium is also known as _____.

A. relative permeability

B. permeability

C. permittivity

D. relative permittivity

Answer:

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16. The relation between permittivity of medium, permittivity of vaccum and dielectric constant given as _____.

A. $k = \frac{\varepsilon_0}{\varepsilon}$

B. $\varepsilon_0 = \frac{\varepsilon}{k}$

C. $k\varepsilon_0 = \varepsilon$

D. $\frac{\varepsilon}{\varepsilon_0} = \frac{1}{k}$

Answer:

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17. The ratio of the forces between two small spheres with constant charge 'a' in air and 'b' in a medium of dieletric constant k is

A. $1:k$

B. $k:1$

C. $1:k^2$

D. $k^2:1$

Answer:

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18. Force between two charges, when placed in free space is 10 N. if they are in a medium of

relative permittivity 5, the force between them will be

A. $2N$

B. $50N$

C. $0.5N$

D. $10N$

Answer:

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19. In a hydrogen atom, the distance between proton and electron is $5.3 \times 10^{-11} m$. The electrical force of attraction between them will be

A. $6.3 \times 10^{-8} N$

B. $8.2 \times 10^{-8} N$

C. $9.6 \times 10^{-8} N$

D. $12.2 \times 10^{-8} N$

Answer:

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20. How many electrons will constitute a charge of one coulomb?

A. 6.25×10^{18}

B. 6.25×10^{19}

C. 5.25×10^{18}

D. 5.25×10^{19}

Answer:

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21. 4×10^{16} electrons are removed from a conductor. The conductor acquires a charge of

A. $-6.4mC$

B. $+6.4mC$

C. $-2.5mC$

D. $+2.5mC$

Answer:

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22. If 6.24×10^{18} electrons carry a total charge of 1 coulomb then how many electrons would carry a total charge of 96500 C?

A. 6.03×10^{23}

B. 1.6×10^{19}

C. 6.02×10^{18}

D. both (A) and (B)

Answer:

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23. The superposition of forces is a method to find force on a charge when

A. only a single charge is present

B. no charges are present

C. multiple charges are interacting

D. only two charges are interacting

Answer:

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24. Conduction electrons are almost uniformly distributed within a conducting plate. When placed in an electrostatic field E_1 the electric field within the plate

A. is zero

B. is infinite

C. depends upon E

D. depends upon the atomic numbers of the conducting elements

Answer:

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25. The electric field inside a spherical shell of uniform surface charge density is

A. zero

B. constant but less than zero

C. directly proportional to the distance from the centre

D. inversely proportional to the distance from centre

Answer:

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26. The unit of electric field is NOT equivalent to

A. $\frac{N}{C}$

B. $\frac{J}{C}$

C. $\frac{V}{m}$

D. $\frac{J}{Cm}$

Answer:

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27. Intensity of an electric field E due to a dipole, depends on distance 'r' as

A. $E \propto \frac{1}{r^4}$

B. $E \propto \frac{1}{r^3}$

C. $E \propto \frac{1}{r^2}$

D. $E \propto \frac{1}{r}$

Answer:

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

A. $m \geq$

B. $\frac{mg}{e}$

C. $\frac{e}{mg}$

D. $\frac{gR^2}{m^2}$

Answer:

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29. The intensity of electric field required to balance a proton of mass 1.7×10^{-27} kg and charge 1.6×10^{-19} C is nearly

A. $10^{-7}\frac{V}{m}$

B. $10^{5}\frac{V}{m}$

C. $10^7 \frac{V}{m}$

D. $10^{-5} \frac{V}{m}$

Answer:

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30. The acceleration of a particle of charge of 0.5 C and 500g mass kept in an electric field of intensity $200 \frac{N}{C}$ is

A. $2000 \frac{m}{s^2}$

B. $200\frac{m}{s^2}$

C. $500\frac{m}{s^2}$

D. $20\frac{m}{s^2}$

Answer:

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31. The distance between a proton and an electron both having a charge 1.6×10^{-19} coulomb of a hydrogen atom is 10^{-10} metre.

The value of intensity of electric field produced on the electron due to proton will be

A. $2.304 \times 10^{-10} \frac{N}{C}$

B. $14.4 \frac{V}{m}$

C. $16 \frac{V}{m}$

D. $1.44 \times 10^{11} \frac{N}{C}$

Answer:

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32. Two charges $+4e$ and $+e$ are at a distance x apart. At what distance a charge q must be placed from charge `+e1 so that it is in equilirium?

A. $\frac{x}{2}$

B. $\frac{2x}{3}$

C. $\frac{x}{3}$

D. $\frac{x}{6}$

Answer:

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33. When electric field intensity $\vec{E}$ at any point in the electric field is directed towards or away from the same fixed point then the field is

A. circular electric field

B. uniform electric field

C. radial electric field

D. all of these

Answer:

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34. Figure shows the electric lines of force emerging from a charged body. If the electric field at A and B are E_A and E_B respectively and if the displacement between A and B is r then

A. $E_A > E_B$

B. $E_A < E_B$

C. $E_A = \frac{E_B}{r}$

D. $E_A = \frac{E_B}{r^2}$

Answer:

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35. An electric line of force is

A. a straight line joining any two charges

B. a path along which a free negative charge moves

C. a path along which a free test charge moves in an electric field

D. a ray of electric field emitted by a charge

Answer:

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36. Which of the following is NOT true about electric lines of forces?

A. they never intersect with each other

B. they are parallel to each other and equally placed in a uniform field

C. they pass through conductor but do not pass through insulator

D. they do not pass through conductor but pass through insulator

Answer:

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37. Electric lines of force about a negative point charge are

A. circular and anticlockwise

B. circular and clockwise

C. radial and inward

D. radial and outward

Answer:

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38. When electric field intensity $\vec{E}$ at any point in the electric field is directed towards or away from the same fixed point then the field is

A. circular electric field

B. uniform electric field

C. radial electric field

D. tangential electric field

Answer:

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39. The figure represents electric lines of force originating from charge q_1 and q_2. We can conclude that

A. q_1 is negative, q_2 is positive

B. q_1 is positive, q_2 is negative

C. q_1 ,q_2 are both positive

D. q_1 ,q_2 are both negative

Answer:

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40. The S.I. unit of electric flux is

A. weber

B. newton per coulomb

C. volt x metre

D. joule per coulomb

Answer:

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41. The total number of tubes of induction passing normally through a surface situated in an electric field is called _____.

A. normal electric induction

B. total normal electric induction

C. electric flux

D. all of these

Answer:

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42. The T.N.E.I. is independent of the

A. position of charge density inside a closed surface only

B. charges outside the closed surface only

C. both (A) and (B)

D. neither (A) nor (B)

Answer:

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43. Gauss' law should be invalid if

A. there were magnatic monopoles

B. the inverse square law were not exactly true

C. the velocity of light were not a universal constant

D. none of these

Answer:

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44. Electric intensity at a place due to a charge is a _____ quantiy.

A. vector

B. scalar

C. unitless

D. dimensionless

Answer:

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45. Gauss' law is true only if force due to a charge varies as

A. r^{-1}

B. r^{-2}

C. r^{-3}

D. r^{-4}

Answer:

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46. In vector form dipole moment can be expressed as

A. $\vec{p} = 2\vec{q} \cdot \vec{l}$

B. $\vec{p} = q \times 2\vec{l}$

C. $\vec{p} = \vec{q} \times 2\vec{l}$

D. $\vec{p} = \vec{q} \times \vec{l}$

Answer:

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47. The SI unit and dimensions of dipole moment repectively are

A. $\frac{C}{m}, \left[M^1L^0T^1I^1\right]$

B. $\frac{C}{m}, \left[M^1L^1T^1I^1\right]$

C. $Cm^2, \left[M^0L^1T^1I^1\right]$

D. $Cm, \left[M^0L^1T^1I^1\right]$

Answer:

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48. Which of the following charges can form an electric dipole?

A. $+1\mu C, \ -1mC$

B. $+5 \times 10^{-3}C, \ -2 \times 10^{-3}C$

C. $+10^{-3}mC, \ -1\mu C$

D. $-1C, \ -1C$

Answer:

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49. Two charges $+3.2 \times 10^{-19} C$ and $-3.2 \times 10^{-19} C$ are placed $2.4A$ apart from an electric dipole.it is placed in a uniform electric field of intensity $4 \times 10^5 \frac{V}{m}$. The electric dipole moment is

A. $15.36 \times 10^{-29} Cm$

B. $15.36 \times 10^{-19} Cm$

C. $7.68 \times 10^{-29} Cm$

D. $7.86 \times 10^{-29} Cm$

Answer:

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50. The region surrounding a stationary electric dipole has

A. magnetic field only

B. electric field only

C. both electric and magnetic field

D. no electric and magnetic fields

Answer:

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51. An electric dipole is kept in non-uniform electric field. It experiences

A. a force and a torque

B. a force but not a torque

C. a torque but not a force

D. neither a force nor a torque

Answer:

52. When axis of electric dipole lies along the direction of field then torque acting on dipole is

A. zero

B. pE

C. $\frac{pE}{2}$

D. $-pE$

Answer:

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53. The moment of couple acting on an electric field is maximum when

A. axis of electric dipole is parallel to uniform field

B. axis of electric dipole is perpendicular to uniform field

C. field is non-uniform

D. axis of electric dipole is inclined at an angle 45° to the field

Answer:

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54. An electric dipole consisting of two opposite charges of 2×10^{-6} each separated by a distance of 3 cm is placed in all electric field of 2×10^{5} newton/coulomb. The maximum torque acting on the dipole in S.I. unit will be

A. $12 \times 10^{-1} Nm$

B. $12 \times 10^{-3} Nm$

C. $24 \times 10^{-1} Nm$

D. $24 \times 10^{-3} Nm$

Answer:

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55. The magnitude (minimum) of charge that a particle can have is

A. $1C$

B. $1.6 \times 10^{-19} C$

C. $0.8 \times 10^{-19} C$

D. $3.2 \times 10^{-19} C$

Answer:

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56. When the charge is not accumulated in some part of a conductor but spread evenly then it is called a _____.

A. non-uniform charge distribution

B. irregular charge distribution

C. uniform charge distribution

D. radial charge distribution

Answer:

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57. We can define the term charge density when distribution of charge is _____.

A. non-uniform

B. uniform

C. zero

D. unit

Answer:

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58. Linear charge density for a circle of radius r is

A. $\frac{Q}{2\pi r}$

B. $\frac{Q}{\pi r}$

C. $\frac{Q}{\pi r^2}$

D. $\frac{Q}{2\pi r^2}$

Answer:

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59. $10\mu C$ charge is uniformly distributed along a wire of length 5m. Its linear charge density is

A. $2 \times 10^{-6} \frac{C}{m}$

B. $5 \times 10^{-6} \frac{C}{m}$

C. $10 \times 10^{-6} \frac{C}{m}$

D. $3 \times 10^{-6} \frac{C}{m}$

Answer:

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60. Charge per unit area is called as _____.

A. linear charge density

B. volume charge density

C. surface charge density

D. unit charge density

Answer:

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61. The SI unit of surface charge density is

A. $\frac{C}{m}$

B. $\frac{C}{m^2}$

C. $\frac{C}{m^3}$

D. C

Answer:

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62. Asphere of radius 10 cm is given a charge of $20\mu C$ on its surface. The surface charge density of sphere is

A. $3.18 \times 10^{-4} \frac{C}{m^2}$

B. $2 \times 10^{-6} \frac{C}{m^2}$

C. $3 \times 10^{-9} \frac{C}{m^2}$

D. $1.59 \times 10^{-4} \frac{C}{m^2}$

Answer:

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63. Volume charge density is

A. one dimensional

B. two dimensional

C. three dimensional

D. dimensionless

Answer:

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64. A charge of magnitude $2\mu C$ is distributed uniformly throughout the soild metal sphere of radius 1 cm, them volume charge density of sphere is

A. $0.48\frac{C}{m^3}$

B. $0.56\frac{C}{m^3}$

C. $0.2\frac{C}{m^3}$

D. $0\frac{C}{m^3}$

Answer:

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65. Two identical conductors of copper and aluminium are placed in an identical electric

fields. The magnitude of induced charge in aluminium will be _____.

A. zero

B. greater than in copper

C. equal to that in copper

D. less than in copper

Answer:

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66. Assertion : When charges are shared between two bodies, there occurs no loss of charge. Howevr, there is a loss in electrical energy. Reason : Electrostatic potential energy does not come under the perview of the conservation law of energy.

A. Assertion is True, Reason is True, Reason is a correct explanation of Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation of Assertion

C. Assertion is True, Reason is False

D. Assertion is False, Reason is True

Answer:

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67. Four charged balls numbered 1 to 4 are suspended using separate threads. Pairs (1,2) and (1,3) show repulsion, while pair (2,4) shows attraction. If ball 4 is now brought near balls 1 and 3, it will be respectively

A. repelled, repelled

B. attracted, attracted

C. repelled, attracted

D. attracted, repelled

Answer:

68. Which among the following is a sure test of electrification?

A. Attraction

B. Induction

C. Repulsion

D. Conduction

Answer:

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69. When a body is connected to the earth, electrons from the earth flow into the body. This means the body is _____.

A. uncharged

B. charged positively

C. charged negatively

D. an insulator

Answer:

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70. Which of the following is NOT true about dielectric constant?

A. it han no units

B. it depends on temperature and nature of medium

C. it is always constant

D. both (A) and (B)

Answer:

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71. A charge Q is divide into two charges q and $(Q-q)$. What should be thr relation between Q and q so that force between q and $(Q-q)$ is maximum?

A. $Q=\frac{1}{2}q$

B. $Q=2q$

C. $Q=q$

D. $Q=\frac{3}{2}q$

Answer:

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72. Two point charges repel each other with a force of 100 N. one of the charges is increased by 10% andother is reduced by 10%. The new force of repulsion at the same distance would be

A. 100 N

B. 121 N

C. 99 N

D. 90 N

Answer:

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73. Two fixed point charges $+4q$ and $+q$ units are separeted by a distance 'x'. Where should a third point charge- q_0 be placed for it to be in equilibrium?

A. Midway between the charges $+4q$ and $+q$

B. at a distance $2x$ from the charge $+4q$

C. at a distance $\frac{2x}{3}$ from the charge $+4q$

D. $atadis\tan cex/3\omega mthechar \geq +4q`$

Answer:

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74. Two positive points charges are 3 m apart and their combined charge is $20\mu C$. If the force between them is $0.075N$, then the charges are

A. $10\mu C$, $10\mu C$

B. $15\mu C$, $5\mu C$

C. $12\mu C$, $8\mu C$

D. $14\mu C$, $6\mu C$

Answer:

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75. Two point charges $+3\mu C$ and $+8\mu C$ repel each other with a force of 40 N. if a charge of

-5 is added to each of them, then the force between them will become

A. $-10N$

B. $+10N$

C. $+20N$

D. $-20N$

Answer:

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76. Two equally charged, identical metal spheres A and B rpepel each other with a force F. the spheres are kept fixed with a distance r between them. A third identical, but uncharged sphere C is brought in contact with A and then placed at the mid-point of thr line joining A and B. the magnitude of the net electric force on C is

A. F

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

C. $\frac{F}{2}$

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

Answer:

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77. Two charges q_1 and q_2 repel each other with a force of $0.1N$. What will be the force exerted by q_1 on q_2, when a third charge is placed near them?

A. less than $0.1N$

B. more than $0.1N$

C. $0.1N$

D. less than $0.1N$ if q_1 and q_2 are similar and more than $0.1N$ if q_1 and q_2 are dissimilar.

Answer:

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78. Three charges $4q$, Q and q are in a straight line in the position 0, $\frac{l}{2}$ and l respectively. The resultant force on q will be zero if Q is equal to

A. $-q$

B. $-2q$

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

D. $4q$

Answer:

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79. Two small spheres each having the charge $+Q$ are suspende by insulating threads of length L from a hook. This arrangement is taken in space where there is no gravitational effect then the angle between the two suspensions and the tension in each will be

A. $180^\circ, \frac{1}{4\pi\varepsilon_0} \cdot \frac{Q^2}{(2L)^2}$

B. $90^\circ, \frac{1}{4\pi\varepsilon_0} \cdot \frac{Q^2}{L^2}$

C. $180^\circ, \frac{1}{4\pi\varepsilon_0} \cdot \frac{Q^2}{2L^2}$

D. $180^\circ, \frac{1}{4\pi\varepsilon_0} \cdot \frac{Q^2}{L^2}$

Answer:

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80. ABC is a right angled triangle in which $AB = 3cm$ and $BC = 4cm$ and $\angle ABC = \frac{\pi}{2}$. The three charges $+15, +12, -20$ e.s.u are placed respectively on A, B and C. the force acting on B is

A. 125 dyne

B. 35 dyne

C. 25 dyne

D. zero

Answer:

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81. Electric charges of $1\mu C$, $-1\mu C$ and $2\mu C$ are placed in air at the corners A, B and C reepectively of an equilateral triangle ABC

having length of each side 10cm. The resultant force on the charge at C is

A. $0.9N$

B. $1.8N$

C. $2.7N$

D. $3.6N$

Answer:

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82. A charge q is placed at the centre of the line joining two equal charges Q. the system of the three charges will be in equilibrium if q is equal to

A. $-\frac{Q}{2}$

B. $-\frac{Q}{4}$

C. $+\frac{Q}{4}$

D. $+\frac{Q}{2}$

Answer:

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83. Equalc harges q are placed at four corners A, B, C and D of a square of length a. the magnitude of the force on the charge at B will be

A. $\frac{3q^2}{4\pi\varepsilon_0 a^2}$

B. $\frac{4q^2}{4\pi\varepsilon_0 a^2}$

C. $\left(\frac{1+2\sqrt{2}}{2}\right)\frac{q^2}{4\pi\varepsilon_0 a^2}$

D. $\left(2+\frac{1}{2\sqrt{2}}\right)\frac{q^2}{4\pi\varepsilon_0 a^2}$

Answer:

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84. Infinite number of spheres, each of mass m are placed on the X-axis at distances 1, 2, 4, 8, 16, ... meters from origin. The magnitude of the gravitational field at the origin is

A. $9000N$

B. $12000N$

C. $24000N$

D. $36000N$

Answer:

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85. The figure shows some of the electric field lines corresponding to an electric field. The figure suggests

A. $E_A > E_B > E_C$

B. $E_A = E_B = E_C$

C. $E_A = E_C > E_B$

D. $E_B = E_A < E_C$

Answer:

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86. What is the magnitude of a point charge due to which the electric field 30 cm away has the magnitude 2 newton / coulomb ? $\left[\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 \frac{Nm^2}{C^2}\right]$

A. $2 \times 10^{-11} C$

B. $3 \times 10^{-11} C$

C. $5 \times 10^{-11} C$

D. $9 \times 10^{-11} C$

Answer:

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87. The distance between the two charges $25 \mu C$ and $36 \mu C$ is 11 cm. at what point on the line joining the two, the intensity will be zero?

A. at a distance of 5 cm from $25\mu C$

B. at a distance of 5 cm from $36\mu C$

C. at a distance of 10 cm from $25\mu C$

D. at a distance of 11 cm from $36\mu C$

Answer:

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88. Two equal charges q are placed at the vertices A and B of an equilateral triangle ABC

of side a. the magnitude of electric field at the point C is

A. $\frac{q}{4\pi\varepsilon_0 a^2}$

B. $\frac{\sqrt{2}q}{4\pi\varepsilon_0 a^2}$

C. $\frac{\sqrt{3}q}{4\pi\varepsilon_0 a^2}$

D. $\frac{q}{2\pi\varepsilon_0 a^2}$

Answer:

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89. Which among the curves shown in figure below can possibly represent electrostatic field lines?

A.

B.

C.

D.

Answer:

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90. A conducting sphere of radius R= 20 cm is given a charge $Q = 16\mu C$. What is $\vec{E}$ at centre?

A. $3.6 \times 10^6 \frac{N}{C}$

B. $1.8 \times 10^6 \frac{N}{C}$

C. zero

D. $0.9 \times 10^6 \frac{N}{C}$

Answer:

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91. Charges $q, 2q, 3q, 4q$ are placed at the corners A, B, C and D of a square as shown in the following figure. The direction of electric field at the centre of the square is along

A. AB

B. CB

C. BD

D. AC

Answer:

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92. The insulation property of air breaks down at $E = 3 \times 10^6$ ' $\frac{volt}{metre}$. The maximum charge

that can be given to a sphere of diameter 5 m is approximately (in coulomb)

A. 2×10^{-2}

B. 2×10^{-4}

C. 2×10^{-3}

D. 2×10^{-5}

Answer:

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93. The number of electrons to be put on a sphreical conductor of radius 0.1 m to produce an electric field of $0.036\frac{N}{C}$ just above its surface is

A. 2.7×10^5

B. 2.6×10^5

C. 2.5×10^5

D. 2.4×10^5

Answer:

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94. If the magnitude of intensity of electric field at a distance x on axial line and at a distance y on equatorial line on a given dipole are equal, then $x : y$ is

A. $1 : 1$

B. $1 :$

C. $cube(\text{ root })(of)2 : 1$

D. $2 : 1$

Answer:

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95. One of the following is not a property of field lines

A. field lines are continous curves without any breaks

B. two field lines cannot cross each other

C. field lines cannot cross each other

D. they form closed loops

Answer:

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96. The wrong statement about electic lines of force is

A. these originate from positive charge and end on negative charge

B. they do not intersect each other at a point

C. they have the same form for a point charge and a sphere

D. they have physical existence

Answer:

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97. Assertion : electric flux represents the number of electric lines passing normally through the given surface in the electric field. Reason: electric flux thriugh a syrface is given as $\phi = \frac{q}{\varepsilon_0}$

A. Assertion is True, Reason is True, Reason is a correct explanation of Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation of Assertion

C. Assertion is True, Reason is False

D. Assertion is False, Reason is True

Answer:

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98. The electric flux coming out of one face of a cube is $\frac{4}{\varepsilon_0}$. The charge placed at the centre of the cube will be _____.

A. 24 C

B. 8 C

C. 16 C

D. 12 C

Answer:

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99. The flux entering and leaving a closed surface are 5×10^5 and 4×10^5 MKS units reapestively, then the charge inside the surface will be

A. $-8.85 \times 10^{-7} C$

B. $8.85 \times 10^{-7} C$

C. $8.85 \times 10^{7} C$

D. $-8.85 \times 10^{7} C$

Answer:

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100. A point charge $+q$ is placed at the centre of a cube of side L. the electric flux emerging from the cube is

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

B. zero

C. $\frac{6qL^2}{\varepsilon_0}$

D. $\frac{q}{6L^2\varepsilon_0}$

Answer:

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101. A metallic solid sphere is placed in a uniform electric field. The lines of force follow

the path(s) shown in figure as

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

102. What is T.N.E.I. through the surface A and B respectively?

A. $(q, 2q)$

B. $(-q, -2q)$

C. $(0, q)$

D. $(q, 0)$

Answer:

Watch Video Solution

103. Three charges $+5C, +7C, -4C$ are situated within a body and charges $-5C, -7C, +4C$ are situated outside the body. The T.N.E.I. over the closed surface is

A. $-8C$

B. 0

C. $+8C$

D. $10C$

Answer:

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104. A water molecule has an electric dipole moment $6.4 \times 10^{-30} Cm$ when it is in vapour state. The distance in metre between the centre of positive and negative charge of the molecule is

A. $4 * 10^{-10}$

B. $4 * 10^{-11}$

C. $4 * 10^{-12}$

D. $4 * 10^{-13}$

Answer:

Watch Video Solution

105. An electric dipole cosisting of two opposite charges of $2 \times 10^{-1} C$ each separated by a distance of 3 cm is placed in an electeric field of $2 \times 10^{5} \frac{N}{C}$. The maximum torque on the dipole will be

A. $12 \times 10^{-1} Nm$

B. $12 \times 10^{-3} Nm$

C. $24 \times 10^{-1} Nm$

D. $24 \times 10^{-3} Nm$

Answer:

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106. For a dipole $q = 2 \times 10^{-6} C$ and $d = 0.01m$. Calculate the maximum torque for this dipole if $E = 5 \times 10^{5} \frac{N}{C}$

A. $1 \times 10^{-3} Nm^{-1}$

B. $10 \times 10^{-3} Nm^{-1}$

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

D. $1 \times 10^{2} Nm^{2}$

Answer:

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107. A square is centred at origin having sides parallel to x-axis and y-axis . It has surface charge density $\sigma(x, y) = \sigma_0$ within its boundaries. The measure of charge of each

side 2a of square is Q. what is the total charge on the square?

A. $4\sigma_0 Q^2$

B. $2\sigma_0 a^3$

C. $\sigma_0 a^2$

D. zero

Answer:

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108. Four metal conductors having differnet shapes i. a sphere ii. Cylindrical iii. Pear iv. Lightening conductor are mounted on insulating stands and charged. The one which is best suited to retain the charges for a longer time is

A. i

B. ii

C. iii

D. iv

Answer:

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109. 64 small drops of mercury, each of radius r and charge q, coalesce to form a big drop. The ratio of the surface density of charge of each small drop that of the big drop is

A. $64:1$

B. $1:64$

C. $1:4$

D. $4:1$

Answer:

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110. A conducting sphere of radius 10 cm is charged to $10\mu C$. Another uncharged sphere of radius 20 cm is allowed to touch it for some time. After that, if the spheres are separated , then surface density of charges on the spheres will be in the ratio of

A. $1:4$

B. $1:3$

C. $2:1$

D. $1:1$

Answer:

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111. Electric charges $q, q, -2q$ are placed at the corners of an equilateral triangle ABC of

side l. the magnitude of electric dipole moment of the system is

A. ql

B. $2ql$

C. $\sqrt{3}ql$

D. $4ql$

Answer:

Watch Video Solution

112. Infinite charges of magnitude q each are lying at $x = 1, 2, 4, 8 \ldots\ldots$ metre on x-axis. The value of intensity of electric field at point $x = 0$ due to these charges will be

A. $12 \times 10^9 q \frac{N}{C}$

B. zero

C. $6 \times 10^9 q \frac{N}{C}$

D. $4 \times 10^9 q \frac{N}{C}$

Answer:

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113. If a charge is moved against the coulomb force of an electric field, then

A. work is done by the electric field

B. enegy is used from some outside source

C. the strength of the field is decreased

D. the energy of the system is decreased

Answer:

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114. Two indentical conducting balls A and B have positive charges q_1 and q_2 respectively. But $q_1 \neq q_2$. The balls are brought together so that they touch each other and then kept in their original positions. The force between them is

A. zero

B. same as that before the balls touched

C. greater that that before the balls touched

D. less than that before the balls touched

Answer:

Watch Video Solution

115. Two identical metallic spheres A and B of exactly equal masses m are taken. A is given a +ve charge of q coulomb and B is given an equal negative charge. If m_A and m_B are the mass of A and B after charging then

A. mass of A and mass of B still remain equal

B. mass of A increases

C. mass of B decreases

D. mass of B increases

Answer:

Watch Video Solution

116. A soap bubble is given a negative charge, then its radius

A. decreases

B. increases

C. remains unchanged

D. nothing can be predicted as information is insufficient

Answer:

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117. Two copper balls, each weighing 10 g are kept in air 10 cm apart. If one electron from every 10^6 atoms is transferred from one ball to the other, the Coulomb force between them is (atomic weight of copper is 63.5)

A. $2.0 \times 10^{10} N$

B. $2.0 \times 10^{4} N$

C. $2.0 \times 10^{8} N$

D. $2.0 \times 10^{6} N$

Answer:

Watch Video Solution

118. Two particles of equal mass m and charge q are placed at a distance of 16 cm. they do not experience any force. The value of $\frac{q}{m}$ is

A. 1

B. $\sqrt{\frac{\pi\varepsilon_0}{G}}$

C. $\sqrt{(4\pi\varepsilon_0)G}$

D.

Answer:

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119. Five balls numbered 1 to 5 are suspended using separate threads. Pairs (1,2), (2,4) and (4,1) show electrostatic attraction whilt pairs (2,3), (4,5) show repulsion. Therefore, ball 1 must be

A. neutral

B. metallic

C. positively charged

D. negatively charged

Answer:

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120. Two spheres carrying charges $+6\mu C$ and $+9\mu C$, separated by a distance d, experiences a force of repulsion F. when a charge of $-3\mu C$ is given to both the spheres and kept at the

same distance as before, the new force of repulsion is

A. $\frac{F}{3}$

B. F

C. $\frac{F}{9}$

D. $3F$

Answer:

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121. A charge of 0.8 coulomb is divided into two charges Q_1 and Q_2. These are kept at a separation of 30 cm. the force on Q_1 is maximum when

A. $Q_1 = Q_2 = 0.4C$

B. $Q_1 \approx 0.8C$, Q_2 NEGLIGIBLE

C. Q_1 negligible, $Q_2 \approx 0.8C$

D. $Q_1 = 0.2C, Q_2 = 0.6C$

Answer:

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122. The elctric force acting between two point charges kept at a certain distance invaccum is 16 N. If the same two charges are kept at the same distance in a medium of dielectric constant 8, the electric force acting between them is _____N.

A. 1024

B. 128

C. 16

D. 2

Answer:

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123. Two point charges A and B, having charges $+Q$ and $-Q$ respectively, are placed at certain distance apart and force acting between them is F. If 25% charge of A is transferred to B, then force between the charges becomes:

A. $\frac{16F}{9}$

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

C. F

D. $\frac{9F}{16}$

Answer:

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124. The force of repulsion between two identical positive charges when kept with aseparation r in air is F. half the gap between the two charges is filled by a dielectric slab of

dielectric constant = 4. thenthe new force of repulsion between those two charges becomes

A. $\frac{F}{3}$

B. $\frac{F}{2}$

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

D. $\frac{4F}{9}$

Answer:

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125. Charges Q are placed at the ends of a diagonal of a square and charges q are placed at the other two corners. The conditions for the net electric force on Q to be zero is

A. $Q = -2\sqrt{2}q$, being-ve

B. $Q = -\frac{q}{2}$, q being -ve

C. $Q = 2\sqrt{2}q$,q being -ve

D. $Q = 2q$, q being -ve

Answer:

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126. Three identical charges are placed on three vertices of a square. If the force acting between q_1 and q_2 is F_{12} and between q_1 and q_3 is F_{13} then $\frac{F_{13}}{F_{12}} =$ _____.

A. $\frac{1}{2}$

B. 2

C. $\frac{1}{\sqrt{2}}$

D. $\sqrt{2}$

Answer:

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127. Along cylindrical shell carries positive surface charges σ in the upper half and negative surface charge $-\sigma$ in the lower half. The electric field lines around the cylinder will look like figure given in

A.

B.

C.

D.

Answer:

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128. 4×10^{10} electrons are removed from a neutral metal sphere of diameter 20 cm placed in air. The magnitude of the electric field (in NC^{-1}) at a distance of 20 cm from its centre is

A. 640

B. 5760

C. zero

D. 1440

Answer:

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129. What is the magnitude of a point charge due to which the electric field 30 cm away has the magnitude 2 newton / coulomb ? $\left[\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 \frac{Nm^2}{C^2}\right]$

A. $2 \times 10^{-11} C$

B. $3 \times 10^{-11} C$

C. $5 \times 10^{-11} C$

D. $9 \times 10^{-11} C$

Answer:

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130. When a $10\mu C$ charge is enclosed by a closed surface, the flux passing through the surface is ϕ. Now another 10μ charge is placed inside the closed surface, then the flux passing through the surface is _____.

A. 4ϕ

B. ϕ

C. 2ϕ

D. zero

Answer:

 Watch Video Solution

131. A charge q is placed at one corner of a cube. The electric flux through any of the three faces adjacent to the charge is zero. The flux through any one of the other three faces is

A. $\frac{q}{3\varepsilon_0}$

B. $\frac{q}{6\varepsilon_0}$

C. $\frac{q}{12\varepsilon_0}$

D. $\frac{q}{24\varepsilon_0}$

Answer:

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132. If the electric flux entering and leaving an enclosed surface are ϕ_1 and ϕ_2 respectively,

then the electric charge inside the surface will be

A. $(\phi_2 - \phi_1) * \varepsilon_0$

B. $\frac{\phi_1 + \phi_2}{\varepsilon_0}$

C. $\frac{\phi_1 - \phi_2}{\varepsilon_0}$

D. $\varepsilon_0(\phi_1 + \phi_2)$

Answer:

Watch Video Solution

133. When a $10\mu C$ charge is enclosed by a closed surface, the flux passing through the surface is ϕ. Now another 10μ charge is placed inside the closed surface, then the flux passing through the surface is _____.

A. 4ϕ

B. ϕ

C. 2ϕ

D. zero

Answer:

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134. What is the nature of Gaussian surface involved in Gauss law of electrostatics?

A. scalar

B. electrical

C. magnetic

D. vector

Answer:

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135. The angle between the dipole moment and electric field at any point on the equatorial plane is

A. 180°

B. 0°

C. 45°

D. 90°

Answer:

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136. If $\vec{E}_{ax}$ and $\vec{E}_{eq}$ represent electric field at a point on the axial and equatorial line of dipole. If points are at a distance r from the centre of the dipole, for $r \rangle a$

A. $\vec{E}_{ax} = \vec{E}_{eq}$

B. $\vec{E}_{ax} = -\vec{E}_{eq}$

C. $\vec{E}_{ax} = -2\vec{E}_{eq}$

D. $\vec{E}_{ax} = 2\vec{E}_{eq}$

Answer:

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137. Electric field on the axis of a small eletric dipole at a distance r is E_1 and at a distance of $2r$ on its perpendicular bisector, the electric field is E_2 . Then the ratio $E_2 : E_1$ is

A. $1:4$

B. $1:16$

C. $1:8$

D. $1:2$

Answer:

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138. Three point charges of $+2q,\ +2q,\ -4q$ are placed at the corners A, B and C of an equilateral triangle ABC of side x. the magnitude of the electric dipole moment of this system is

A. $2qx$

B. $3\sqrt{2}qx$

C. $3qx$

D. $2\sqrt{3}qx$

Answer:

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139. When 10^{19} electrons are removed from a neutral metal plate, the elctric charge on it is

A. $-1.6C$

B. $+1.6C$

C. $10^{+}19C$

D. $10^{-19}C$

Answer:

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140. a copper sphere of mass 2 g contains about 2×10^{22} atoms. The charge on the nucleus of each atom is 29e. What fraction of

the electrons must be removed from the sphere to give it a charge of $+2\mu C$?

A. 1.08×10^{-11}

B. 2.16×10^{-11}

C. 3.24×10^{-11}

D. 4.32×10^{-11}

Answer:

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141. Two metal spheres, one of radius R and the other of radius 2 R respectively have the same surface charge density σ. They are brought in contact and separated. What will be the new surface charge densities on them?

A. $\sigma_1 = \frac{5}{3}\sigma, \sigma_2 = \frac{5}{6}\sigma$

B. $\sigma_1 = \frac{5}{6}\sigma, \sigma_2 = \frac{5}{2}\sigma$

C. $\sigma_1 = \frac{5}{2}\sigma, \sigma_2 = \frac{5}{6}\sigma$

D. $\sigma_1 = \frac{5}{2}\sigma, \sigma_2 = \frac{5}{3}\sigma$

Answer:

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142. An electron of mass m, charge e falls through a distance h metre in a uniform electric field E. Then time of fall

A. $t = \sqrt{\frac{2hm}{eE}}$

B. $t = \frac{2hm}{eE}$

C. $t = \sqrt{\frac{2eE}{hm}}$

D. $t = \frac{2eE}{hm}$

Answer:

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143. Pick out the statement which is incorrect.

A. A negative test charge experiences a force opposite to the direction of the field

B. the tangent drawn to a line of force represents the direction of electric field

C. field lines never intersect

D. the electric field lined forms closed loop

Answer:

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144. The angle between the dipole moment and electric field at any point on the equatorial plane is

A. 180°

B. 0°

C. 45°

D. 90°

Answer:

Watch Video Solution

145. If a proton is brought towards another proton, the electrical potential energy of the system

A. becomes zero

B. increases

C. remains unchanged

D. decreases

Answer:

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146. Electric charges $\frac{3}{2}q, \frac{3}{2}q, -3q$ are placed at the corners of an equilateral triangle ABC of side l. the magnitude of electric dipole moment of the system is

A. ql

B. $\frac{3\sqrt{3}}{2}ql$

C. $\sqrt{3}ql$

D. $4ql$

Answer:

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147. Consider a charged conductor resting on an insulating stand a shown below. At point X, value of the charge density is σ, the potential is V and the field strenght is E. what will be the values of same respectively at Y?

A. $< \sigma, V, < E$

B. $\sigma, > V, > E$

C. $< \sigma, < V, E$

D. $> \sigma, V, E$

Answer:

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148. A proton falls through a small distance in a uniform electric field of magnitude $1.8 \times 10^5 \frac{N}{C}$. The direction of the field is

reversed keeping the magnitude unchanged and an electron falls through the same distance. The time of fall will be

A. same in both cases

B. more in the case of an electron

C. more in the case of proton

D. independent of charge

Answer:

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149. The potential gradient along the length of a uniform wire is 12 volt per mtre. B and C are two points at 28 cm and 52 cm on a metre scale along the wire. The potential difference between B and C will be

A. 3 volt

B. 0.46 volt

C. 2.88 volt

D. 4.22 volt

Answer:

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150. Assertion : the net work done by an electrostatic field on a charge whilr moving it from one point to another is independent of path. Reason: the net work done by an electrostatic force on a charge in it moving along a closed loop is zero.

A. Assertion is True, Reason is True, Reason is a correct explanation of Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation of Assertion

C. Assertion is True, Reason is False

D. Assertion is False, Reason is True

Answer:

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151. Choose the incorrect statement.

A. charge cannot exist without mass

B. charge is independent of velocity of charged particle

C. quatization of charge is microscopic phenomenon

D. inducing charge can be lesser or equal to induced charge

Answer:

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152. If q is the charge per unit area on the surface of a conductor, then the electric field intensity at a point on the surface is

A. $\left(\frac{q}{\varepsilon_0}\right)$ normal to surface

B. $\left(\frac{q}{2\varepsilon_0}\right)$ normal to surface

C. $\left(\frac{q}{\varepsilon_0}\right)$ tangential to surface

D. `(q/(2epsi_0))tangential to surface

Answer:

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153. For a dipole $q = 2 \times 10^{-6} C$ and $d = 0.01m$. Calculate the maximum torque for this dipole if $E = 5 \times 10^{5} \frac{N}{C}$

A. $1 \times 10^{-3} Nm^{-1}$

B. $10 \times 10^{-3} Nm^{-1}$

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

D. $1 \times 10^{2} Nm^{2}$

Answer:

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154. The surface charge density of an irregular shaped conductor is _____.

A. zero

B. infinity

C. constant

D. different at different points

Answer:

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155. The charges on two sphere are $+7\mu C$ and $-5\mu C$ respectively. They experience a force F. If each of them is given an additional charge of $-2\mu C$, the new force of attraction will be

A. F

B. $\frac{F}{2}$

C. $\frac{F}{\sqrt{3}}$

D. $2F$

Answer:

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156. If the magnitude of intensity of electric field at a distance x on axial line and at a distance y on equatorial line on a given dipole are equal, then $x : y$ is

A. $1 : 1$

B. $1 : \sqrt{2}$

C. $1 : 2$

D. $\sqrt[3]{2} : 1$

Answer:

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