PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

ELECTROSTATICS

Multiple Choice Questions

1. The branch of physics which deals with the study of static charges is

A. electrostatics

B. current electricity

C. electronics

D. modern physics

Answer: A

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2. The static electricity is produced due to

A. conduction

B. friction

C. induction

D. all of these

Answer: D

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3. A body gains 25×10^{18} electrons, by rubbing, it with another body. Find the charge on the body.

A. charge

B. mass

C. resistance

D. inductance

Answer: A

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4. The bodies gets charged when rubbed with each other due to transfer of

A. photons

B. atoms

C. molecules

D. electrons

Answer: D

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5. The smallest quantity of electricity called as electrostatic unit of charge is present on

A. photon

B. α - particle

C. electron and proton

D. none of these

Answer: C

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6. Which of the following is a scalar quantity ?

A. charge

B. velocity

C. force

D. electric intensity

Answer: A

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7. Like charges repel each other and unlike charges attract each other was proved by

A. Coulomb

B. Gilbert

C. Faraday

D. Franklin

Answer: B

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8. The positive and negative names of the charges were given by

A. Coulomb

B. Gilbert

C. Aristotle

D. Franklin

Answer: D

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9. Electric charge on a body at rest produces

A. electric field

B. magnetic field

C. deficiency of electrons

D. both 'a' and 'b'

Answer: A

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10. An electrical charge is a

A. scalar quantity

B. vector quantity

C. vector quantity (radial)

D. none of these

Answer: A

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11. The fact that electric charges are integral multiples of the fundamental electronic charge was proved experimentally by

A. α - particle

B. proton

C. electron

D. a hydrogen ion

Answer: C

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12. The electric change in unform motion produces

A. electric field

B. magnetic field

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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13. The magnitude of electrostatic unit of charge in S.I. system is

A. $1.602 \times 10^{-19} C$

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

C. $3 \times 10^{8} C$

D. $3 \times 10^{-19} C$

Answer: A

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14. Which of the following phenomena follows law of conservation of charge ?

A. Electrification by friction

B. Electrification by induction

C. Nuclear reactions

D. All of these

Answer: D

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15. When a glass rod is rubbed with silk, it

A. positive charge

B. negative charge

C. can not be charged

D. none of these

Answer: A

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16. An ebonite rod is rubbed with fur or wool. What type of charges do they acquire ?

A. positive charge

B. negative charge

C. can not be charged

D. none of these

Answer: B

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17. If an isolated merallic conductor is positively charged, then its mass will

A. increase

B. decrease

C. remain same

D. reduce to half of its original mass.

Answer: B

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18. If a glass rod is rubbed with silk, it acquires a positive charge because :

A. protons are added to it

B. protons are removed from it

C. electrons are added to it

D. electrons are removed from it

Answer: C

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

A. decreases

B. increases

C. remains unchanged

D. noting can be predicted

Answer: B

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20. A positively charged glass rod is brought near an uncharged pith ball penduium. What happens to the pith ball ?

A. attracted towards the rod

B. repelled away from the rod

C. not affected by the rod

D. attracted towards the rod, touches it and is then thrown away from it

Answer: D

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

A. 2.5×10^{12} from wool to polythene

B. 1.5×10^{12} from polythene to wool

C. 2.56×10^{-15} from wool to polythene

D. 10^{-13} from wool to polythene.

Answer: A

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22. When a body is charged by induction the body

A. becomes neutral

B. does not lose any charge

C. loses whole of the charge on it

D. lose part of the charge on it

Answer: B

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23. When a piece of polythene is rubbed with wool, a charge of $-2 \times 10^{-7} C$ is developed on polythene. What is the amount of mass, which is transferred to polythene.

A. 569×10^{-19} kg

B. 6.25×10^{-19} kg

C. 9.63×10^{-19} kg

D. 11.38×10^{-19} kg

Answer: D

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24. A conductor has been given a charge $-3 \times 10^{-7} C$ by transferring electron. Mass increase (in kg) of the conductor and the number of electrons added to the conductor are respectively

A. $2.4 \times 10^{-16} C$

B. $4.4 \times 10^{-16} C$

C. $5.5 \times 10^{-16} C$

D. $6.6 \times 10^{-16} C$

Answer: A

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25. The unit of charge is :

A. Faraday

B. Ampere

C. Coulomb

D. Coulomb / Volt

Answer: C

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

A. Ohm's law

B. Ampere's law

C. Faraday's law

D. Coulomb's law

Answer: D

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

A. r^3

B. $r^{1/2}$

C. $r^{-1/3}$

D. r^{-2}

Answer: D

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28. Coulomb's law is restricted to charged rods and balls only. This statement is

A. $true$

B. $false$

C. often true

D. unpredictable

Answer: B

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

A. decreases

B. increases

C. becomes zero

D. remains constant

Answer: D

30. When the distance between two charged particles is halved, the force between them will become

A. one-third

B. one-half

C. four times

D. five times

Answer: C

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31. In a hydrogen atom, the distance between the electron and proton is $2.5 \times 10^{-11} m$. The electricl force of attraction between then 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: B

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32. The force of attraction between two charges $+30 \times 10^{-9} C$ and $-20 \times 10^{-9} C$ seperated by a distance of 020m is found to be $5 \times 10^{-5} N$. Find the relative permittivity of the medium.

A. 2 N

B. 50 N

C. 0.5 N

D. 10 N

Answer: A

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33. Two point charges $q_1 = 2 \times 10^{-3} C$ and $q_2 = -3 \times 10^{-6} C$ are separated by a distance $x = 10$ cm. Find the magnitude and nature of the force between the two charges.

A. 4 N

B. 5 N

C. 9 N

D. 13 N

Answer: C

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34. SI unit of permittivity is

A. Nm^2C^{-2}

B. $Nm^{-2}C^{-1}$

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

D. Am^{-1}

Answer: C

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35. If the distance between two equal point charges is doubled and their individual charges are also doubled, what would happen to the force between them?

A. halved

B. remain same

C. doubled

D. becomes zero

Answer: B

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36. In 1820, concept of electric field was introduced by

A. Faraday

B. Maxwell

C. Coulomb

D. Gilbert

Answer: A

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37. Which one of the following statements is correct ? The space surrounding a charge in uniform motion has

A. gravitational field

B. electric field

C. magnetic field

D. none of these

Answer: B

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38. The quantitative (i.e. both in magnitude and direction) study of an electric field by grouping the electric lines of force was first done by

A. Faraday

B. Maxwell

C. Gilbert

D. Franklin

Answer: B

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39. The force experienced by a unit positive test charge placed at a point is called

A. magnetic force

B. electric intensity

C. electromotive force

D. electric permittivity

Answer: B

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40. Electric intensity at a place due to a charge is

A. vector quantity

B. scalar quantity

C. unitless quantity

D. dimensionless quantity

Answer: A

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41. STATEMENT -1: Electric field at a point is always inversely proportional to $(dis\tan ce)^2$.

STATEMENT -2: Electric field due to a line charge at a point inversely proportional to distance .

A. charge

B. size of the charge

C. distance of the point charge

D. square of the distance from the charge

Answer: D

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42. In S.I. system, unit of electric intensity is

A. NC^{-1}

B. Vm^{-1}

C. Nm

D. both 'a' and 'b'

Answer: D

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43. The force exerted on a 3 C of charge placed at a point in an electric field is 9 N. Calculate the electric field strength at the point.

A. $375N/C$

B. $1500N/C$

C. $1666N/C$

D. $2000N/C$

Answer: B

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44. An electron experiences a force equal to its weight, when placed in an electric field. The intensity of the field will be

A. $4.36 \times 10^{-11} N/C$

B. $5.573 \times 10^{-11} N/C$

C. $6.67 \times 10^{-11} N/C$

D. $9.86 \times 10^{-11} N/C$

Answer: B

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45. What is electric field intensity at a point at a distance r meter from q coulomb of a charge in free space ?

A. $1.125 \times 10^9 V/m$

B. $2.125 \times 10^9 V/m$

C. $1.525 \times 10^9 V/m$

D. $2.525 \times 10^9 V/m$

Answer: A

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46. Two point charges Q and $-Q/4$ placed along the x - axis are separated by a distance r. Take $-Q/4$ as origin and it is placed at the right of Q. Then the potential is zero.

A. $(2/3)a$

B. $a/2$

C. $3a/2$

D. none of these

Answer: A

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

A. e/mg

B. mg/e

C. mge

D. can not be found

Answer: B

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48. In going from the surface of a charged conducting sphere towards the centre of the sphere the electric field

A. increases

B. decreases

C. remains the same as on the surface

D. remains zero at every place

Answer: D

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49. An electron and a proton are freely situated in an electric field. Will the electric forces on them be equal? Will their acceleration be equal? Explain with reason.

A. zero

B. unity

C. ratio of the mass of proton and electron

D. ratio of the mass of electron and proton

Answer: C

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50. Magnetic field at a distance r from an infinitely long straight conductor carrying steady varies as

A. a point charge

B. an electric dipole

C. a plane infinite sheet of charge

D. a line charge for infinite length

Answer: D

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51. Who observed that a material named Amber is rubbed with wool, acquires the property of attracting light bodies ?

A. Edison

B. Franklin

C. Coulomb

D. Thales

Answer: D

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52. The net charge of electrified glass rod silk system, ebonite rod-wool system is

A. zero

B. positive

C. negative

D. none of these

Answer: A

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53. Electricity on the moist day

A. increases

B. decreases

C. leaks

D. spreads

Answer: C

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54. The work done in bringing a unit positive charge from infinity to the given point against the direction of electric intensity is

A. electric potential

B. magnetic potential

C. gravitational potential

D. none of these

Answer: A

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55. The strength of electric field at a point is represented by a scalar, called as

A. electric intensity

B. electric potential

C. gravitational intensity

D. none of these

Answer: B

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56. The work require to displace charge q from infinity to given point is W, then electric potential at that point is

A. W / q

B. Wq

C. q / W

D. $q^2 W$

Answer: A

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57. Electric potential is a .... Quantity and its units are ....

A. scalar quantity

B. vector quantity

C. unitless quantity

D. dimensionless quantity

Answer: A

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58. Which of the following is a volt :

A. joule / coulomb

B. erg / coulomb

C. coulomb / joule

D. coulomb / erg

Answer: A

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59. An equipotential surface is that surface on which each and every point has

A. same potential

B. zero potential

C. negative potential

D. different potential

Answer: A

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60. Two plates are $2cm$ apart, a potential difference of 10 volt is applied between them, the electric field between the plates is

A. $400N/C$

B. $600N/C$

C. $1000N/C$

D. $800N/C$

Answer: C

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61. The neagative gradient of potential at any point in electric field is

A. electric intensity

B. electric flux

C. electric dipole moment

D. none of these

Answer: A

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62. Electric intensity is directed along the direction at which electric potential

A. increases

B. decreases

C. remains same

D. cannot be found

Answer: B

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63. When a charge is moved against the Coulomb's force of an electric field, then

A. work is done by the electric field

B. energy of the system is decreased

C. strength of the field is decreased

D. energy is used from some outside source

Answer: D

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64. In bringing an electron towards another electron, the electrostatic potential energy of the system

A. decreases

B. increases

C. becomes zero

D. remains same

Answer: B

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65. The correct relation between electric intensity E and electric potential V is

A. $V \times \Delta r$

B. $-\dfrac{\Delta r}{\Delta V}$

C. $-\dfrac{\Delta V}{\Delta r}$

D. $\left(\dfrac{\Delta V}{\Delta r}\right)^2$

Answer: C

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66. Statement I: If electric potential in certain region is constant, then the electric field must be zero in this region.

Statement II: $\overrightarrow{E} = -\frac{dV}{dr}\hat{v}$.

A. can only be zero throughout the region

B. can only be uniform throughout the region

C. can be zero or uniform throughout the region

D. can bot be uniform throughout the region

Answer: C

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67. If a unit positive charge is taken from one point to another over an equipotential surface ,then

A. work is done on the charge

B. no work is done

C. work done is constant

D. work is done by the charge

Answer: B

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68. Assertion(A): In bringing an electron towards a proton electrostatic potential energy of the system increases

Reason (R) :Potential due to proton is positive.

A. increases

B. decreases

C. remain unchanged

D. becomes zero

Answer: A

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69. Can a body have charge and still be at zero potential

A. yes, always

B. yes, but not always

C. never

D. depends upon the nature of charge

Answer: B

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70. Can a body have electric potential and still be uncharged

A. yes, always

B. yes, but not always

C. never

D. depends upon the type of potential

Answer: B

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71. If an electron moves from rest from a point at which potential is 50 volt to another point at which potential is 70 volt, then its kinetic energy in the final state will be

A. joule

B. erg

C. electron-volt

D. newton

Answer: C

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72. Two equal and opposite charges separated by a finite distance is

A. electric dipole

B. electric torque

C. electric dipole moment

D. none of these

Answer: A

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73. The product of positive charge and distance between the two charges is

A. electric dipole

B. electric dipole moment

C. electric flux

D. electric intensity

Answer: B

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74. In S.I. system, coulomb-meter is unit of

A. electric intensity

B. electric potential

C. electric flux

D. electric dipole moment

Answer: D

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75. The torque acting on an electric dipole of moment p held at an angle θ with an electric field E is ....

A. $pE \sin \theta$

B. $pE \cos \theta$

C. $pE \tan \theta$

D. $pE \sec \theta$

Answer: A

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76. An electric dipole in a uniform electric field experiences (When it is placed at an angle θ with the field)

A. force only

B. torque only

C. both force and torque

D. neither a force nor a torque

Answer: B

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77. An electric dipole consists of two opposite charges of magnitude $1\mu C$ separated by a distance of $2cm$.The dipole is placed in an electric filled $10^{-5}Vm^{-1}$.The maximum torque that the field exert on the dipole is

A. $0.2 \times 10^{-3}Nm$

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

C. $2 \times 10^{-3}Nm$

D. $4 \times 10^{-3}Nm$

Answer: C

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78. What is the anle between the electric dipole moment and the elcetric field strength due to it on the equatorial line

A. 0°

B. 90°

C. 180°

D. none of these

Answer: A

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79. When a negative charge is taken at a height from earth's surface, then its potential energy

A. decreases

B. increases

C. remains unchanged

D. will become infinity

Answer: B

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80. The electric field at a point due to a point charge is $20NC^{-1}$ and electric potential at that point is $10JC^{-1}$. Calculate the distance of the point from the charge and the magnitude of the charge.

A. 2500 V

B. 22500 V

C. 2000 V

D. 20500 V

Answer: B

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81. If E = 0 at all points on a closed surface

A. electric flux through the surface is zero

B. the total charge enclosed by the surface is zero

C. no charge resides on the surface

D. all of these

Answer: D

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82. A particle having positive charge is released from rest in the electric field and moves under the influence of both electric field and gravity. The quantity connected with the charged particle that increases continuously with time is

A. electric charge

B. kinetic energy

C. electric potential energy

D. gravitational potential energy

Answer: B

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83. The path traced by a unit positive charge in an electric field is

A. electric line of force

B. magnetic line of force

C. both 'a' and 'b'

D. neuther 'a' nor 'b'

Answer: A

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84. Electric lines of force about negative point charge are

A. circular, anticlockwise

B. circular, clockwise

C. radial inward

D. radial outward

Answer: C

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85. Which of the following statement is correct in case of lines of charge ?

A. they originate from positive charge and end at negative charge

B. they do not pass through conductor

C. they exhibit longitudinal tension and lateral pressure

D. all of these

Answer: D

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86. Give two properties of electric lines of force. Sketch them for an isolated positive point charge and an electric dipole.

A. positive charge

B. neutral charge

C. negative charge

D. none of these

Answer: C

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87. The electric lines of force do not passes through

A. metals

B. conductors

C. semiconductors

D. all of these

Answer: D

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88. The electric field intensity on the surface of a charged conductor is

A. zero

B. maximum

C. infinity

D. $\in E$

Answer: A

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89. There is force of repulsion between two like charges, because electric lines of force

A. exert lateral pressure on one another

B. exert normal pressure on one another

C. exert no pressure on one another

D. none of these

Answer: A

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90. There is force of attraction between two unlike charges because lines of force have tendency

A. to shrink along their length and they are under tension

B. to intersect each other

C. to elongate along their length

D. none of these

Answer: A

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91. The properties of electric lines of force, tubes of force and tubes of induction are

A. never similar

B. approximately similar

C. exactly similar

D. none of these

Answer: C

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92. The line of force are always

A. perpendicular to the surface of charged body

B. parallel to the surface of charged body

C. inclined to the surface of charged body

D. none of these

Answer: A

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93. Assetrion: Electric lines of force never cross each other.

Reason: Electric field at a point superimpose to give one resultant electric field

A. intersect with each other

B. diverging

C. converging

D. parallel to each other

Answer: A

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94. If electric field is uniform, then the electric lines of forces are :

A. parallel and equally spaced

B. perpendicular and equally spaced

C. diverging

D. converging

Answer: A

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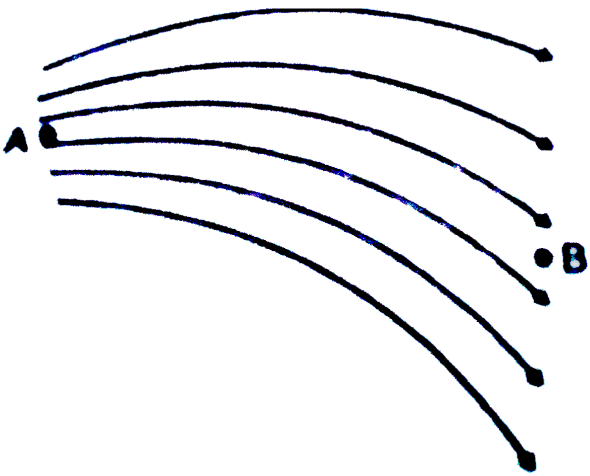
95. The figure shows the electric lines of force emerging from a charged body. If the electric fields at A and E_A and E_B respectively and if the the distance between A anf B is r, then



A. $E_A > E_B$

B. $E_A < E_B$

C. $E_A = E_B$

D. cannot be predicted

Answer: A

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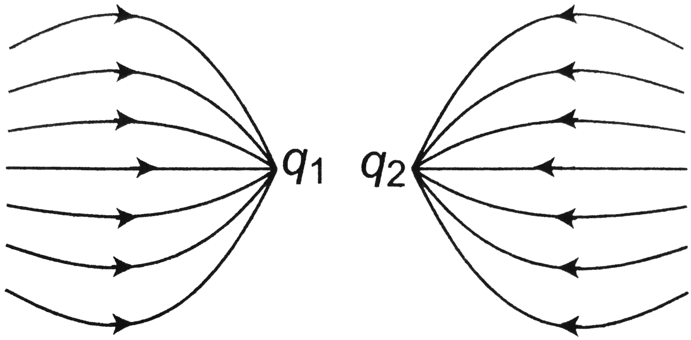
96. The given figure gives electric line of force due to two charges q_1 and q_2. What are the signs of the two charges ?



A. Both are positive

B. Both are negative

C. q_1 is positive but q_2 is negative

D. q_1 is negative but q_2 is positive

Answer: B

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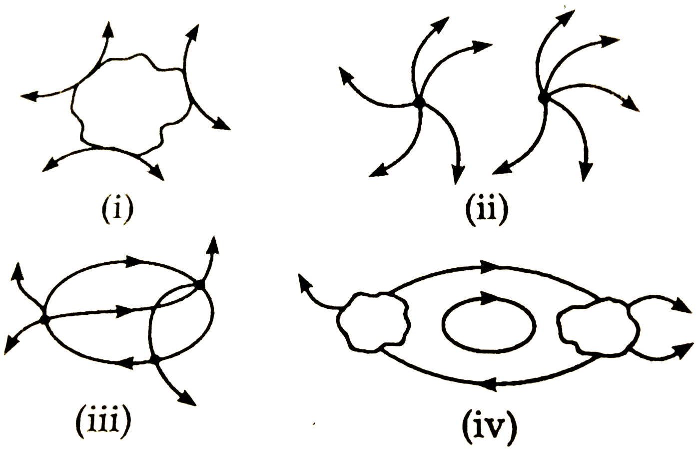
97. Which of the following figures cannot possibly represent electrostatic field lines



A. I, ii, iii, iv

B. I, ii, iii only

C. I, iii, iv only

D. ii, iii, iv only

Answer: C

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98. The number of electric lines of force passing normally through unit area is called

A. electric flux

B. magnetic flux

C. flux density

D. none of these

Answer: A

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99. The dot product of E and normal area ds, calculated over the closed surface, is

A. electric field

B. electric flux

C. electric potential

D. all of these

Answer: B

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100. Electric flux in an electric field $\overrightarrow{E}$ through area vector $\overrightarrow{ds}$ is given by

A. $\overrightarrow{E} \times \overrightarrow{ds}$

B. $\overrightarrow{E} \cdot \overrightarrow{ds}$

C. $\overrightarrow{E} / \overrightarrow{ds}$

D. $\overrightarrow{ds} / \overrightarrow{E}$

Answer: B

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101. A cylinder of radius R and length L is placed in a uniform electric field E parallel to the axis. The total flux for the surface of the cylinder is given by

A. $2\pi R^2 E$

B. $\pi R^2 E$

C. $\pi R E^2 / 2$

D. zero

Answer: D

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102. The number of electric lines of force passing normally through unit area is called

A. flux density

B. electric intensity

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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103. If the dielectric constant of a medium increases then the number of electric lines of force passing through that medium

A. decreases

B. increases

C. remains same

D. none of these

Answer: A

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104. Lines of force cut equipotential surface

A. obliquely

B. normally

C. tangentially

D. at 45°

Answer: B

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105. A charged particle is projected perpendicular to the direction of uniform electric field. It's path in the region of the field will be

A. elliptic

B. linear

C. circular

D. parabolic

Answer: D

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106. One electron volt is equal to

A. 1.6×10^{-12}erg

B. 4.8×10^{-10}erg

C. 300 erg

D. $1/300$ erg

Answer: A

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107. One giga electron volt (1 Gev) is equal to

A. 10^8 eV

B. 10^9 eV

C. 10^{10}eV

D. 10^{12} eV

Answer: D

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108. Mathematically, the electric flux (ϕ) through small area ds placed in electric field E is given by

A. $dsE\cos\theta$

B. $\overrightarrow{ds} \cdot \overrightarrow{E}$

C. $\overrightarrow{E} / \overrightarrow{ds}$

D. both 'a' and 'b'

Answer: D

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109. An arbitrary surface encloses a dipole. What is the electric flux through this surface ?

A. zero

B. positive

C. negative

D. infinite

Answer: A

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110. A plane area of $100cm^2$ is placed in uniform electric field of $100N/C$ such that the angle between area vector and electric field is 60°. The electric flux over the surface is

A. $1Nm^2/C$

B. $2Nm^2/C^2$

C. $3Nm^2/C^2$

D. $0.5Nm^2/C$

Answer: D

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111. A point charge of 10^{-7}C is situated at the centre of a cube of side 1m. Calculate the electric flux through its surface.

A. $113 \times 10^4 Nm^2 / C$

B. $11.3 \times 10^4 Nm^2 / C$

C. $1.13 \times 10^4 Nm^2 / C$

D. $22 \times 10^4 Nm^2 / C$

Answer: C

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112. The product of small area element and normal component of electric intensity is

A. electric flux

B. flux density

C. electric potential

D. charge density

Answer: A

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113. The total electric flux ϕ through the entire area of a closed surface is given by

A. $\phi = \oint \overrightarrow{E} \times \overrightarrow{ds}$

B. $\phi = \oint \overrightarrow{E} \cdot \overrightarrow{ds}$

C. both 'a' and 'b'

D. none of these

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114. The concept of electric tubes of force was decveloped by

A. Faraday

B. Maxwell

C. Gilbert

D. Coulomb

Answer: B

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115. The group of limited number of lines of force forming a tube like structure in air medium is

A. tube of force

B. tube of induction

C. tube of charge

D. none of these

Answer: A

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116. The group of limited number of lines of force forming a tube like structure in dielectric medium is

A. tube of force

B. tube of induction

C. tube of air

D. none of these

Answer: B

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117. The total number of tubes of force passing normally through the given area is called as

A. electric flux

B. flux density

C. electric intensity

D. both 'b' and 'c'

Answer: A

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118. The total number of tubes of force passing normally through the given area is called as

A. electric flux

B. flux density

C. electric intensity

D. both 'b' and 'c'

Answer: D

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119. The number of tubes of induction originating from a unit positive charge is

A. 1

B. $q/\in_0$

C. $q\in_0$

D. $\in_0$

Answer: A

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120. The number of tubes of force originating from a charge of magnitude q are

A. $\frac{q}{\in_0 k}$

B. $\frac{q}{\in_0}$

C. $q \in_0 k$

D. $\frac{\in_0 k}{q}$

Answer: A

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121. The tubes of induction that originate from a charge q are

A. $\in$

B. q

C. $q / \in_0$

D. $q / \in_0 k$

Answer: B

Watch Video Solution

122. The number of tubes of force emerging normally through unit area of sphere's surface drawn around a charge q in medium of permittivity $\in$ is $\frac{q}{4\pi \in r^2}$. It is also called as

A. electric intensity

B. coulomb's force

C. electric potential

D. none of these

Answer: A

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123. The number of tubes originating from a point charge of $8.85 \times 10^{-9} C$ in a medium of dielectric constant 5 are

A. 100

B. 200

C. 300

D. 400

Answer: B

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124. A cubical Gaussian surface encloses electric flux of $30C$ per unit permittivity of a charge ,the electric flux through each face of the cube per unit permittivity is

A. 30 C

B. 5 C

C. 1 C

D. 0.5 C

Answer: B

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125. The total number of tubes of force passing normally through the given area is called as

A. normal electric induction

B. total normal electric induction

C. electric potential

D. electric power

Answer: A

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126. The product of electric intensity and permittivity constant of a dielectric medium is called

A. total normal electric induction

B. normal electric induction

C. electric potential

D. electric energy

Answer: B

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127. The product of N.E.I. and given surface area of the closed surface is called as

A. total normal electric induction

B. normal electric induction

C. electric potential

D. electric energy

Answer: A

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128. The total number of tubes of induction passing normally through the given area is called as

A. normal electric induction

B. total normal electric induction

C. electric potential

D. electric power

Answer: B

View Text Solution

129. If a charge q is placed at the centre of imaginary sphere of radius r then the N.E.I. at a point on such a sphere is

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

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

C. $\in_0 kE$

D. both 'b' and 'c'

Answer: D

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130. The product of permittivity ($\in_0 k$) of a medium the normal component of electric intensity $(E \cos \theta)$ and the given small area (ds) is called as

A. T. N. E. I. over small area ds

B. T. N. E. I. over entire area of a closed surface

C. electrostatic potential energy

D. all of these

Answer: A

View Text Solution

131. A point charge of 3 mC is situated in air at the centre of a sphere of radius 10 cm. Find the T.N.E.I. through a portion of the surface of the sphere which subtends an angle of $\pi/2$ steradian at its centre.

A. 0.375 mC

B. 0.573 mC

C. 0.735 mC

D. 0.473 mC

Answer: A

Watch Video Solution

132. Two ball bearings, one having a radius of 2 mm and a surface charge density equal to $5\mu C/m^2$ and another having a radius of 1mm and a surface density of charge equal to

$-2\mu C / m^2$ are situated inside a closed surface. The T.N.E.I. over the closed surface is

A. $1.262 \times 10^{-10} C$

B. $1.262 \times 10^{-8} C$

C. $2.262 \times 10^{-8} C$

D. $2.262 \times 10^{-10} C$

Answer: D

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133. Which of the following law gives a relation between the electric flux through any closed surface and the charge enclosed by the surface ?

A. Coulomb's law

B. Charle's law

C. Newton's law

D. Gauss's law

Answer: D

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134. Gauss's law helps in

A. determination of electric field due to symmetric charge distribution

B. determination of electric potential due to symmetric charge distribution

C. determination of electric flux

D. situations where Coulomb's law fails

Answer: A

View Text Solution

135. Gauss's theorem is

A. $\phi = \frac{\pi \in_0}{q}$

B. $\phi = \frac{q}{\in_0}$

C. $\phi = 4\pi \in_0 \rho$

D. $\phi = 4\pi \in_0$

Answer: B

Watch Video Solution

136. A Gaussian surface enclosed no charge. Which of the following is true for a point inside it ?

A. electric field must be zero

B. electric potential must be zero

C. both electric potential and intensity must be zero

D. none of these

Answer: A

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137. Gauss's theorem

A. does not hold, if the closed surface enclosed a discrete distribution of charges

B. does not hold, if the closed surface encloses, a line, a surface or a volume charge distribution

C. holds, if the surface encloses a point charge only

D. holds irrespective of the form in which charges are enclosed by the closed surface.

Answer: D

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138. The total normal electric induction over a closed surface is equal to the algebraic sum of the charges enclosed by the surface' is the statement of

A. Gauss's theorem

B. Coulomb's theorem

C. Loop theorem

D. Junction theorem

Answer: A

Watch Video Solution

139. If the charge lies outside the closed surface then by Gauss's theorem, T.N.E.I. over that surface will be

A. zero

B. positive

C. $\sum_{i=1}^{n} qi$

D. 2 q

Answer: A

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140. Gauss's theorem is true for any point charge situated any where

A. outside the surface

B. inside the surface

C. on the surface

D. none of these

Answer: B

Watch Video Solution

141. If negative charge is enclosed by the surface, then the T. N. E. I. over the surface will be

A. directed outwards and considered positive

B. directed inwards and considered positive

C. directed outwards and considered negative

D. directed inwards and considered negative

Answer: D

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142. The solid angle substended at any point inside the surface due to small area ds is given by

A. $\frac{ds \cos \theta}{r^2}$

B. $\frac{dsr^2}{\cos\theta}$

C. $ds\cos\theta r^2$

D. $\frac{r^2}{ds\cos\theta}$

Answer: A

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143. The electric charges of +9C, -10C and -8C are enclosed anywhere by a closed surface. T.N.E.I. through that surface is

A. $-9C$

B. $+9C$

C. $5C$

D. $4C$

Answer: A

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144. If infinite parallel plane sheet of a metal is charged to charge density σ coulomb per square metre in a medium of dielectric constant K. Intensity of electric field near the metallic surface will be

A. $E = \frac{\sigma}{\in_0 k}$

B. $E = \frac{\sigma}{2 \in_0 k}$

C. $E = \sigma^2 2 \in_0 k$

D. $E = \sigma$

Answer: B

Watch Video Solution

145. Electric intensity at a point near a charged sphere of charge q is given by

A. $E = \frac{1}{4\pi \in_0 K} \cdot \frac{q}{r^2}$

B. $E = \frac{1}{2\pi \in_0 K} \cdot \frac{q}{r}$

C. $E = \frac{\sigma}{\in_0 k}$

D. none of these

Answer: A

Watch Video Solution

146. A cylinder of length L has a charge of magnitude q. The electric intensity at a point at a distance r from the axis of the cylinder is

A. $E = \frac{1}{4\pi \in_0 K} \cdot \frac{q}{r^2}$

B. $E = \frac{1}{2\pi \in_0 k} \cdot \frac{q}{rL}$

C. $E = \sigma / \in_0 k$

D. none of these

Answer: B

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147. The electric intensity at a point near a charged conductor of surface charge density σ is

A. $E = \sigma / \in_0 k$

B. $E = \sigma \in_0 k$

C. $E = \sigma / 2 \in_0 k$

D. $E = \sigma^2$

Answer: A

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148. A sphere of radius R has a charge density σ. The electric intensity at a point at a distance r from its centre is

A. $E = \dfrac{\sigma R^2}{\in_0 kr^2}$

B. $E = \dfrac{\sigma}{\in_0 k}$

C. $E = R^2$

D. $E = \in_0 kr^2 \sigma^2$

Answer: A

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149. A charge +q is placed at the mid point of a cube of side L. The electric flux emerging from cube is

A. $\frac{q}{\in_0}$

B. $\frac{q}{6L^2 \in_0}$

C. $\frac{6qL^2}{\in_0}$

D. zero

Answer: A

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150. The electric flux through a hemispherical surface of radius R placed in a uniform electric field E parallel to the axis of the circular plane is

A. $(2\pi R)E$

B. $(\pi R^2)E$

C. $\left(\frac{4}{3}\pi R^3\right)E$

D. $\left(\frac{2}{3}\pi R^3\right)E$

Answer: B

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151. Electric field intensity at a point is inversely proportional to cube of its distance due to

A. a point charge

B. an infinite line charge

C. an electric dipole

D. an infinite plane sheet of charge

Answer: C

Watch Video Solution

152. Electric intensity at a point due to a charged cylinder of infinite length is inversely proportional to its

A. distance

B. square of distance

C. cube of distance

D. none of these

Answer: A

Watch Video Solution

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

A. zero

B. uniform

C. non uniform

D. proportional to distance from the centre

Answer: A

Watch Video Solution

154. As one penetrates uniformly charged conducting sphere,what happens to the electric field strength

A. increases

B. decreases

C. remains the same as at the surface

D. is zero at all points

Answer: D

Watch Video Solution

155. Inside a hollow charged spherical conductor, the potential

A. increases with distance

B. is a constant

C. decreases with distance from centre

D. is zero

Answer: B

Watch Video Solution

156. A hollow metal ball carrying an electric charge produces no electric field at points

A. interior point

B. outer point

C. beyond 2 m

D. beyond 10 m

Answer: A

Watch Video Solution

157. A hollow metal sphere of radius $5cm$ is charged so that the potential on its surface is $10V$. The potential at the centre of the sphere is

A. 0 V

B. 10 V

C. same as at a point 5 cm away from the surface

D. same as at a point 25 cm away from the surface

Answer: B

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158. A spherical shell of radius R has a charge +q units. The electric field due to the shell at a point

A. inside is zero and varies as r^{-1} outside it

B. inside is constant and varies as r^{-2}

C. inside is zero and varies as r^{-2} outside it

D. inside is constant and varies as r^{-1} outside it

Answer: C

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159. The intensity of electric field at a point due to charged conductor of any shape or plane charged sheet is

A. independent of distance of that point

B. depends on distance of that point

C. independent of charge density and surrounding medium

D. none of these

Answer: A

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160. The charge deposited per unit area of the surface is called

A. linera charge density

B. surface charge density

C. charge density

D. all of these

Answer: B

Watch Video Solution

161. If σ is surface density of charge on the charged cylinder of radius R, then electric intensity E at outer point at a distance r from its axis is

A. $\frac{\sigma R}{\in_0 kr}$

B. $\frac{\sigma r}{\in_0 kR}$

C. $\frac{\sigma}{\in_0 k}$

D. $\frac{\sigma^2 R}{\in_0 kr}$

Answer: A

Watch Video Solution

162. The charge deposited per unit length of cylinder is called as

A. linear charge density

B. surface charge density

C. charge density

D. all of these

Answer: A

Watch Video Solution

163. The charge density on the surface of a conducting sphere is $64 \times 10^{-7} C/m^2$ and the electric intensity at a distance of 2 m from the centre of the sphere is $4\pi \times 10^4 N/C$. The radius of the sphere is

A. 0.83 m

B. 0.4 m

C. 0.6 m

D. 0.38 m

Answer: A

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164. An isolated conducting sphere of radius 0.1m placed in vacuum carries a positive charge of $0.1\mu C$. Find the electric intensity at a point at a distance 0.2 m from the centre of the sphere.

A. $2.25 \times 10^2 N / C$

B. $2.25 \times 10^4 N / C$

C. $2.52 \times 10^2 N / C$

D. $2.52 \times 10^4 N/C$

Answer: B

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165. A conductor having a charge density of $120 \mu C/m^2$ is surrounded by a medium of dielectric constant 4. The electric intensity at a point very near the charged conductor is

A. $9.33 \times 10^6 N/C$

B. $3.39 \times 10^8 N / C$

C. $9.33 \times 10^8 N / C$

D. $3.389 \times 10^6 N / C$

Answer: D

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166. A metal sphere of radius 5 cm is charged to 100 V. Electric intensity at a point on its surface is

A. $20kV/m$

B. $0.2kV/m$

C. $2kV/m$

D. $100kV/m$

Answer: C

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167. The electric intensity at a point distant 1 m from the centre of a sphere of radius 25 cm in air is $10^4 N/C$. The surface density of the charge on the surface of sphere is

A. $1.416 \mu C/m^2$

B. $2.416 \mu C/m^2$

C. $1.446 \mu C/m^2$

D. $2 \mu C/m^2$

Answer: A

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168. A charged of $8 \times 10^{-6} C$ is given to a metallic sphere of radius 5 cm placed in a medium of dielectric constant 5. The surface charge density of sphere is

A. $2.547 \times 10^{-4} C / m^2$

B. $5.248 \times 10^{-4} C / m^2$

C. $25.48 \times 10^{-4} C / m^2$

D. $52.48 \times 10^{-4} C / m^2$

Answer: A

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169. A charge of $5 \times 10^{-10} C$ is given to a metal cylinder of length 10 cm, placed in air. The electric intensity due to the cylinder at a distance of 0.2 m from its axis is

A. $150 V / m$

B. $250 V / m$

C. $350 V / m$

D. $450 V / m$

Answer: D

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170. The electric intensity due to a charged conducting cylinder of radius 0.1 m at a distance of 1 m from the axis of the cylinder of charge density $1.77\mu C/m$ in a dielectric medium of dielectric constant 2 is

A. $2 \times 10^5 V/m$

B. $1.5 \times 10^4 V/m$

C. $2.59 \times 10^5 V / m$

D. $4 \times 10^5 V / m$

Answer: B

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171. A metal cylinder of length 2 km is charged with $2 \times 10^{-2} C$. The linear charge density of the cylinder is

A. $10 \mu C / m$

B. $20\mu C / m$

C. $5\mu C / m$

D. $30\mu C / m$

Answer: A

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172. A charged cylinder of radius 2 cm has surface density of charge $8.85 \times 10^{-9} C / m^2$. It is placed in a medium of dielectric constant

5. The electric intensity at a point at a distance of 4 m from its axis is

A. $5V/m$

B. $4V/m$

C. $3V/m$

D. $1V/m$

Answer: D

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173. The surface density of charge on a conductor situated in air, is $2 \times 10^{-4} C / m^2$. The electric intensity at a point very near to its surface is

A. $2.259 \times 10^7 N / C$

B. $2.261 \times 10^9 N / C$

C. $3.321 \times 10^7 N / C$

D. $3.321 \times 10^9 N / C$

Answer: A

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174. An electric cable of diameter 10 cm runs under water for a distance of 5 km. If the cable carries a charge of 0.01 C on its surface then its linear charge density is

A. $2\mu C / m$

B. $0.5\mu C / m$

C. $4\mu C / m$

D. $1.5\mu C / m$

Answer: A

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175. A circular metal plate of radius 10 cm is given a charge of $20\mu C$ on its surface. The charge density of the plate is

A. $3.185 \times 10^{-6} C/m^2$

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

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

D. $3.184 \times 10^{-4} C/m^2$

Answer: D

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176. The surface density of charge on the earth's surface is $2.65 \times 10^{-9} C / m^2$. If the radius of the earth is 6400 km then the charge carried by the earth is

A. $1.363 \times 10^6 C$

B. $1.364 \times 10^9 C$

C. $3.364 \times 10^6 C$

D. $2.396 \times 10^6 C$

Answer: A

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177. The mechanical force acting on a unit area of a charged conductor is

A. $f = \dfrac{\sigma^2}{2 \in_0 k}$

B. $f = \dfrac{\sigma}{2 \in_0 k}$

C. $f = \dfrac{\sigma^2}{\in_0 k}$

D. $f = \frac{\sigma}{\in_0 k}$

Answer: A

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178. The mechanical stress of a charged conductor is directly proportional to

A. square of surface charge density

B. square of electric intensity

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

View Text Solution

179. A metal surface of area $1m^2$ is charged with $\sqrt{8.85}\mu C$ in air. The mechanical force acting on it is

A. 1 N

B. 0.5 N

C. 10 N

D. 50 N

Answer: B

Watch Video Solution

180. In an electron gun, the electrons are accelerated by the potential V. If the e is the charge and m is the mass of the electron, then the maximum velocity of these electrons will be

A. $\sqrt{\frac{eV}{m}}$

B. $\sqrt{\frac{e}{Vm}}$

C. $\sqrt{\frac{2eV}{m}}$

D. none of these

Answer: C

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181. A charged conductor of area ds is placed in electric field of strength E. The force acting on unit area of the conductor is

A. $\frac{\in_0 kE^2}{2}$

B. $\frac{\in_0 k}{2E}$

C. $\frac{E^2}{2 \in_0 k}$

D. $\in_0 kE^2$

Answer: A

View Text Solution

182. The mechanical stress of a charged conductor of charge density σ is always directed outwards because

A. σ^2 is always negative

B. σ^2 is always positive

C. σ is zero

D. none of these

Answer: B

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183. A metal sphere of radius 10 cm is given a charge of $12\mu C$. The force acting on unit area of its surface is

A. $5.151 \times 10^2 N / m^2$

B. $5.15 \times 10^3 N / m^2$

C. $515 \times 10^{-2} N / m^2$

D. $5.15 \times 10^{-3} N / m^2$

Answer: A

Watch Video Solution

184. Inside a hollow charged spherical conductor, the potential

A. is constant

B. varies directly as the distance from the centre

C. varies inversely as the distance from the centre

D. varies inversely as the square of the distance from the centre

Answer: B

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185. The energy per unit volume of a dielectric medium is directly proportional to square of

A. relative permittivity

B. charge

C. electric intensity

D. both 'a' and 'b'

Answer: C

Watch Video Solution

186. The energy density of air medium is $44.25 \times 10^{-8} J/m^3$. The intensity of the electric field in the medium is

A. $300 N/C$

B. $3 N/C$

C. $305 N/C$

D. $316.2 N/C$

Answer: D

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187. The energy density of a medium of dielectric constant k surrounding the charged conductor is

A. $\frac{\sigma^2}{2 \in_0 k}$

B. $\frac{1}{2} \in_0 kE^2$

C. $\frac{\sigma}{\in_0 k}$

D. both 'a' and 'b'

Answer: D

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188. Calculate the energy per unit volume of a medium of dielectric constant 3, if the intensity of the electric field is $100V/m$.

A. $1.328 \times 10^{-8} J/m^3$

B. $4.2 \times 10^{-8} J/m^3$

C. $13.28 \times 10^{-8} J/m^3$

D. $42 \times 10^{-8} J/m^3$

Answer: C

Watch Video Solution

189. The electrostatic energy stored in the 1 litre volume of air when it is placed in uniform electric field of intensity $10^3 V/m$ is

A. $44.25 \times 10^{-9} J$

B. $4.425 \times 10^{-9} J$

C. $44.25 \times 10^{-6} J$

D. $44.25 \times 10^{-5} J$

Answer: B

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190. A potential difference of 50 V is maintained between the two plates of a parallel plate condenser, separated by 5 mm of air. The energy stored in unit volume of air between the plates of the condenser is

A. $4.425 \times 10^{-4} J/m^3$

B. $2.425 \times 10^{-4} J/m^3$

C. $8.425 \times 10^{-4} J/m^3$

D. $6.425 \times 10^{-4} J/m^3$

Answer: A

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191. A cube of marble of each side 5m long is placed in electric field of intensity of $3kV/m$. The amount of electrostatic energy stored in marble of dielectric constant 8 is

A. $39.82 \times 10^{-3} J$

B. $4.982 \times 10^{-2} J$

C. $9.832 \times 10^{-3} J$

D. $8.392 \times 10^{-3} J$

Answer: A

Watch Video Solution

192. A small sphere carries a charge of $20\mu C$. The energy density of electric field at a point 25 cm away from the centre of the sphere in air is

A. $0.367J/m^3$

B. $3.67J/m^3$

C. $36.7J/m^3$

D. $3.76J/m^3$

Answer: C

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193. Due to polarisation the electric field inside a dielectric is

A. decreased

B. increased

C. remains same

D. may increase or may decrease depending the upon material

Answer: A

Watch Video Solution

194. If the dielectric constant and dielectirc strength be denoted by K and x respectively, then a meterial suitable for use as a dielectric in a capacitor must have

A. high K and high X

B. high K and low X

C. low K and high X

D. low K and low X

Answer: A

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195. A molecule in which centre of gravity of positive nuclei and revolving electrons do not coincide is

A. polar molecule

B. non polar molecule

C. bipolar molecule

D. unipolar molecule

Answer: A

Watch Video Solution

196. Polar molecules have permanent

A. resistance

B. current

C. electric dipole moment

D. magnetic flux

Answer: C

Watch Video Solution

197. Which of the following is example of polar molecule ?

A. H_2O

B. O_2

C. H_2

D. CO_2

Answer: A

Watch Video Solution

198. A molecule in which centre of gravity of positive nuclei and revolving electrons coincide is

A. polar molecule

B. non polar molecule

C. bipolar molecule

D. unipolar molecule

Answer: B

Watch Video Solution

199. Non polar molecules have donot permanent

A. force

B. pressure

C. electric dipole moment

D. torque

Answer: C

Watch Video Solution

200. Which of the following is example of non polar molecule ?

A. H_2

B. HCl

C. H_2O

D. HO_2

Answer: A

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201. The electric dipole moment per unit volume of electric dipole is

A. polarisation

B. diffraction

C. interference

D. reflection

Answer: A

Watch Video Solution

202. The ratio of polarisation to electric intensity is

A. electric permitivity

B. electric susceptibility

C. electric flux

D. electric torque

Answer: B

Watch Video Solution

203. The amount of induced surface charge per unit area of the surface is

A. polarisation

B. torque

C. electric dipole

D. electric flux

Answer: A

Watch Video Solution

204. Which of the following is vector ?

A. electric potential

B. elctric charge

C. electric polarisation

D. electirc flux

Answer: C

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205. A conductor is said to have a capacity of one farad, when a .... Raise its ...... by ....

A. capacity of conductor

B. inductance of conductor

C. resistance of conductor

D. none of these

Answer: A

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206. An arrangement which increases charge storing capacity without an appreciable increase in its potential is

A. resistor

B. conductor

C. inductor

D. capacitor

Answer: D

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207. Unit of capacitance is

A. henry

B. ohm

C. farad

D. volt

Answer: C

Watch Video Solution

208. Which of the following represents the dimensions of Farad

A. joule/volt

B. volt/coulomb

C. coulomb/volt

D. coulomb/joule

Answer: C

Watch Video Solution

209. The relation between electric charge, electric potential and capacity is

A. $C = \frac{Q}{V}$

B. $C = \frac{V}{Q}$

C. V=QC

D. all of these

Answer: A

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210. The capacity of a parallel plate condenser is given by

A. $C = \frac{Q}{V}$

B. $C = \frac{Ak \in_0}{d}$

C. $C = \frac{d}{Ak \in_0}$

D. C = A.d.

Answer: B

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211. The capacity of a parallel plate condenser is inversely proportional to the

A. dielectric constant of the medium

B. area of the plate

C. length of the plate

D. distance between the two plates

Answer: D

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212. The capacity of a parallel plate condenser depends upon

A. area of the plate

B. distance between the two plates

C. permittivity constant of a dielectric medium

D. all of these

Answer: D

Watch Video Solution

213. A capacitor works in

A. A. C. circuits

B. D. C. circuits

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

Watch Video Solution

214. To reduce the capacity of a parallel plate condenser, separation between the plates is

A. reduced and area of the plates decreased

B. decreased and area of the plates increased

C. increased and area of the plates decreased

D. increased and area of the plates increased

Answer: C

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215. In a charged capacitor, the energy is stored in

A. the negative charges

B. the positive charges

C. the field between the plates

D. both 'a' and 'b'

Answer: C

Watch Video Solution

216. A parallel plate capacitor is charged and then isolated. The effect of increasing the plate separation on charge, potential and capacitance respectively are

A. constant, decreases, decreases

B. increases, decreases, decreases

C. constant, deareases, increases

D. constant, increases, decreases

Answer: D

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217. A parallel plate capacitor is made by stacking n equally spaced plates connected alternatively. If the capacitance between any two adjacent plates is 'C' then the resultant capacitance is

A. C

B. n C

C. (n + 1)C

D. (n - 1)C

Answer: D

Watch Video Solution

218. One pico Farad is equal to

A. $10^{-9}F$

B. $10^{-19}F$

C. $10^{-109}F$

D. $10^{-12}F$

Answer: D

Watch Video Solution

219. When a parallel plate capacitor is connected to a source of constant potential difference

A. all the charge drawn from source is stored in the capacitor

B. the potential difference across capacitor grows very rapidly initially and this rate decreases to zero eventually

C. only half of the energy drawn from the source is dissipated outside the capacitor

D. all of these

Answer: D

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220. When two identical capacitors are charged individually to different potentials &

then connected in parallel, after disconnecting from the source then

A. net charge = sum of initial charges

B. net potential difference $\neq$ sum of individual initial potential difference

C. net energy stored $\angle$ sum of individual initial energy

D. all of these

Answer: D

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221. If E is the electric field intensity of an electrostatic field, then the electrostatic energy density is proportional to

A. E

B. E^2

C. $1/E^2$

D. E^3

Answer: B

Watch Video Solution

222. A parallel plate capacitor is charged. If the plates are pulled apart

A. the potential difference increases

B. the capacitance increases

C. the total charge increases

D. the charge and the potential difference remain the same

Answer: A

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223. Charge present on the clouds are due to

A. motion of water drops

B. earth's magnetic field

C. lightning

D. motion of the clouds

Answer: A

Watch Video Solution

224. The accumulation of charge on clouds, which produces lightning, is caused by

A. rain drops changing into electrons

B. the electric field of the earth

C. ionisation by the sun

D. electrification due to motion of water molecules.

Answer: D

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225. The capacitance of a parallel plate condenser does not depend upon

A. area of the plates

B. metal of the plates

C. medium between the plates

D. distance between the plates

Answer: B

Watch Video Solution

226. The energy stored in a capacitor of capacity C and potential V is given by

A. $0.5C^2V$

B. $0.5CV^2$

C. 0.5 CV

D. $0.5C^2V^2$

Answer: B

Watch Video Solution

227. If two charged conductors are brought in contact, then they show

A. gain in energy

B. loss of some energy

C. gain in charge

D. loss of same charge

Answer: B

Watch Video Solution

228. Two conducting spheres of radii r_1 and r_2 are equally charged. The ratio of their potentral is-

A. $\frac{r_2}{r_1}$

B. $\frac{r_1}{r_2}$

C. $(r_1 / r_2)^2$

D. $(r_2 / r_1)^2$

Answer: A

Watch Video Solution

229. The ratio of charge to potential of a body is known as

A. inductance

B. resistance

C. conductance

D. capacitance

Answer: D

Watch Video Solution

230. An arrangement which consist of two conductors separated by a dielectric medium is called

A. resistor

B. inductor

C. rectifier

D. capacitor

Answer: D

Watch Video Solution

231. The earthed conductor plate of a condenser helps to

A. decrease the potential of charged conductor

B. increase the potential of charged conductor

C. keep constant the potential of charged conductor

D. none of these

Answer: A

Watch Video Solution

232. The ohmic resistance of a condenser for D.C. current is

A. finite

B. infinite

C. zero

D. $V/1$

Answer: B

Watch Video Solution

233. The condenser always block D. C. permits

A. pulsating current through it

B. alternating current through external circuit

C. only half cycle of alternating current through it

D. none of these

Answer: B

Watch Video Solution

234. The condenser always stores the amount of

A. magnetic energy

B. electrostatic energy

C. electric field

D. both 'b' and 'c'

Answer: D

Watch Video Solution

235. The capacitance of earth of radius R treating as spherical conductor is

A. $4\pi \in_0 R$

B. $4\pi R$

C. $\frac{\in_0}{R}$

D. $\frac{4\pi \in_0}{R}$

Answer: A

Watch Video Solution

236. Earth's surface is considered to be at

A. zero potential

B. negative potential

C. positive potential

D. infinite potential

Answer: A

Watch Video Solution

237. By keeping the charge on a capacitor unchanged, the energy of capacitor can be decreased by

A. increasing dielectric constant of the medium between the plates

B. decreasing the dielectric constant of the medium between the plates

C. making the dielectric constant zero

D. none of these

Answer: A

Watch Video Solution

238. The capacitance of a capacitor does not depend upon

A. either charge Q or potential V

B. area of either plates

C. distance between the plates

D. nature of medium between the plates

Answer: A

Watch Video Solution

239. Two copper spheres A and B of same radii, one hollow and the other solid are charged to the same potential. Which of the two will hold more charge

A. A

B. B

C. solid sphere can not hold any charge

D. both the spheres will hold the same charge

Answer: D

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240. The dielectric constant of a metal is

A. zero

B. one

C. k

D. ∞

Answer: D

Watch Video Solution

241. A sphere is constructed around a positive point charge q. The work done in moving a unit positive charge on this sphere is numerically equal to

A. infinity

B. zero

C. capacity of sphere

D. potential of sphere

Answer: B

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242. The capacity of a parallel plate condenser is C. When the distance between the plates is halved, its capacity is

A. 2 C

B. C

C. 0.25 C

D. 0.2 C

Answer: A

Watch Video Solution

243. The dielectric constant k for an insulator cannot be

A. 4

B. 5

C. 9

D. infinity

Answer: D

Watch Video Solution

244. A capacitor is connected to a battery of 20 V, so that a charge of $100\mu C$ is obtained at the plates. The capacitance of the capacitor is

A. $6\mu F$

B. $5\mu F$

C. $9.5\mu F$

D. $10\mu F$

Answer: B

Watch Video Solution

245. Six identical capacitors are joined in parallel, charged to a potential difference of 10 V, separated and then connected in series. Then the potential difference between the free plates is

A. 10 V

B. 30 V

C. 60 V

D. $\left(\frac{10}{6}\right)V$

Answer: C

Watch Video Solution

246. The plates of a parallel plate capacitor are charged up to $100v$. Now, after removing the battery, a $2mm$ thick plate is inserted between the plates Then, to maintain the same potential deffernce, the distance betweem the capacitor plates is increase by $1.6mm$. The dielectric canstant of the plate is .

A. 5

B. 1.25

C. 4

D. 2.5

Answer: A

Watch Video Solution

247. The capacitance of the earth, viewed as a spherical conductor of radius 6408 km is

A. $980\mu F$

B. $1424\mu F$

C. $712\mu F$

D. $600\mu F$

Answer: C

Watch Video Solution

248. A $4\mu F$ capacitor is charged to 400 V. If its plates are joined through a resistance of $2k\Omega$, then heat produced in the resistance is

A. 0.16 J

B. 0.32 J

C. 0.64 J

D. 1.28 J

Answer: B

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249. The area of each plate of parallel plate condenser is $20cm^2$ and distance them is 2mm. It stores the energy if 5J. The energy density of electric field between its plates is

A. $250 \times 10^6 J/m^3$

B. $1.25 \times 10^6 J/m^3$

C. $2 \times 10^6 J/m^3$

D. $4 \times 10^6 J/m^3$

Answer: B

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250. A parallel plate condenser is made up of two plates, each of surface area $40 cm^2$, separated by a distance of 0.4 cm. If a material of dielectric constant 10 is introduced between the plates, then the capacity of the condenser is

A. 8.85 pF

B. 88.5 pF

C. 885 pF

D. 585 pF

Answer: B

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251. If two conducting spheres are separately charged and then brought in contact

A. the total energy of two spheres is conserved

B. the total charge on two spheres is conserved

C. both the total energy and charge are conserved

D. the final potential is always the mean of the original potentials of the two spheres

Answer: B

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252. The parallel plates of a condenser are separated by an insulating material. It is because of

A. potential between the plate increases

B. potential between the plate decreases

C. capacity of the condenser decreases

D. energy stored by the condenser decreases

Answer: B

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253. A condenser is connected across another charged condenser. The energy in two condensers will be

A. equal to the energy in the initial condenser

B. less than that in the initial condenser

C. more than that in the initial condenser

D. more or less depending upon the relative capacities of the two condensers

Answer: B

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254. Capacity of a parallel plate condenser can be increased by

A. increasing the distance between the plates

B. increasing the thickness of the plates

C. decreasing the thickness of the plates

D. decreasing the distance between the plates

Answer: D

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255. A dielectric is introduced between the elements of the condenser kept at a constant potential difference, then the charge on condenser

A. decreases

B. increases

C. unchanged

D. may increase or decrease

Answer: B

Watch Video Solution

256. When air is replaced by a dielectric medium of constant K, the maximum force separated by a distance

A. increases k times

B. remains unchanged

C. increases k^2 times

D. decreases k times

Answer: A

Watch Video Solution

257. A parallel plate capacitor is charged and the charging battery is then disconnected. If the plates of the capacitor are moved farther apart by means of insulating handles:

A. the charge on the capacitor increases

B. the voltage across the plates increases

C. the electrostatic energy stored in the capacitor increases

D. both 'b' and 'c'

Answer: D

Watch Video Solution

258. A metal foil of negligible thickness is introduced between the two plates of a capacitor at the centre. The capacitance of capacitor will be

A. same

B. double

C. half

D. k times

Answer: A

Watch Video Solution

259. If the distance between the plates of parallel plate capacitor is halved and the dielectric constant of dielectric is doubled, then its capacity will

A. increases by 16 times

B. increases by 4 times

C. increases by 2 times

D. remains the same

Answer: B

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260. In order to increase the capacity of a parallel plate condenser one should introduce between the plates a sheet of (assume that the space is completely filled).

A. mica

B. tin

C. copper

D. stainless steel

Answer: A

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261. A parallel plate condenser has a capacitance $50\mu F$ in air and $100\mu F$ when immersed in an oil. The dielectric constant k of the oil is

A. 0.2

B. 1.5

C. 2.2

D. 2.5

Answer: C

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262. The capacity of parallel plate condenser is $5\mu F$. When a glass plate is placed between the plates of the condenser, its potential difference reduces to $1/8$ of the original value. The magnitude of relative dielectric constant of glass is

A. 4

B. 6

C. 7

D. 8

Answer: D

Watch Video Solution

263. A capacitor has a capacity C, when air is present between the two plates. If a dielectric of value k is placed between the plates, the new capacity C will be equal to

A. kC

B. k^2C

C. C^2k

D. 2kC

Answer: A

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264. A parallel plate capacitor has a capacity C. The separation between plates is doubled and a dielectric medium is inserted between plates. The new capacity is 3C. The dielectric constant of medium is

A. 1.5

B. 3

C. 6

D. 12.0

Answer: C

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265. The capacity of condenser containing air is $4\mu F$. What will be its capacity if the air is replaced by a material of dielectric constant 5 ?

A. $20\mu F$

B. $40\mu F$

C. $4\mu F$

D. $10\mu F$

Answer: A

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266. The capacity of a parallel plate condenser increases four times if the air between the plates is replaced by glass. The permittivity of glass will be

A. $3.54 \times 10^{-11} C^2 / Nm^2$

B. $3.54 \times 10^{-12} C^2 / Nm^2$

C. $2.54 \times 10^{-11} C^2 / Nm^2$

D. $2.22 \times 10^{-12} C^2 / Nm^2$

Answer: A

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267. A parallel plate capacitor having capacitance C farad is connected with a battery of emf V volts. Keeping the capacitor cannected with the battery, a dielectric slab of dielectric constant K is inserted between the plates. The dimensions of the slab are such that it fills the space between the capacitor plates. Then,

A. charge the capacitor plates remains the same

B. charge on the plates increases K times

C. potential difference between the plates decreases to V / K

D. all of these

Answer: B

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268. A capacitor is charged by using a battery which is then disconnected. A dielectric slab is then slipped between the plates, which results in

A. reduction of charge on the plates and increase of potential across the plates.

B. increase in potential difference across the plates, reduction in stored energy, but no change in charge on the plates

C. decrease in potential difference across the plates, reduction in stored energy, but no change in charge on the plates

D. none of these

Answer: C

Watch Video Solution

269. A parallel plate capacitor has plates with area A and separation d. A battery charges the plates to a potential difference V_0. The battery is then disconnected and a dielectric slab of thikness d is introduced. The ratio of the enrgy stored in the capacitor before and after the slab is introduced, is

A. K

B. $\frac{1}{K}$

C. $\frac{A}{d^2 K}$

D. $\frac{d^2 K}{A}$

Answer: A

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270. The capacitance of a capacitor between $4/3$ times its original value if a dielectric slab of thickness $t = d/2$ is inserted between the plates (d is the separation between the plates). What is the dielectric consant of the slab?

A. 8

B. 4

C. 6

D. 2

Answer: D

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271. Energy of a charged condenser is given by

A. $E = \frac{CV^2}{2}$

B. $E = \frac{Q^2}{2C}$

C. $E = \frac{QV}{2}$

D. all of these

Answer: D

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272. Energy of a charged condenser is directly proportional to square of

A. charge

B. potential

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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273. Energy of a charged condenser is given by

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

B. $\frac{1}{4}CV^2$

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

D. $\frac{1}{4}CV$

Answer: A

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274. The amount of energy stored in condenser becomes nine times the initial energy. The new potential of condenser is

A. three times the initial potential

B. nine times the initial potential

C. four times the initial potential

D. none of these

Answer: A

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275. The capacity of a parallel plate air capacitor is $10\mu F$ and it is given a charge of $40\mu C$. The electrical energy stored in the capacitor is

A. 400 erg

B. 600 erg

C. 800 erg

D. 900 erg

Answer: C

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276. When a capacitor having capacitance $4 \mu F$ and potential difference 100 volt is discharged, the energy released in joules is

A. 0.01

B. 0.02

C. 0.03

D. 0.07

Answer: B

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277. Find the capacitance of a capacitor having a charge of $6 \times 10^{-7} C$ and energy of $4.5 \times 10^{-4} J$

A. $4 \times 10^{-10} F$

B. $5 \times 10^{-10} F$

C. $7 \times 10^{-10} F$

D. $9 \times 10^{-10} F$

Answer: A

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278. A variable condenser is permanetly connect to a $100V$ battery. If the capacity is charged from $2\mu E$ to $10\mu F$, then change in energy is equal to

A. $2 \times 10^{-2} J$

B. $2.5 \times 10^{-2} J$

C. $6.5 \times 10^{-2} J$

D. $4 \times 10^{-2} J$

Answer: D

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279. Two capacitors each of $1 \mu F$ capacitance are connected in parallel and are then charged by 200 V. The total energy of their charges is

A. 0.01 J

B. 0.02 J

C. 0.04 J

D. 0.06 J

Answer: C

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280. A condenser of capacitance $6\mu F$ was originally charged to 10 V. Now potential difference is made 20 V. The increase in potential energy is

A. $2 \times 10^{-4}J$

B. $3 \times 10^{-4}J$

C. $6 \times 10^{-4}J$

D. $9 \times 10^{-4} J$

Answer: D

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281. If a $10 \mu F$ capacitor is to have an energy constant of 1 joule, it must be placed across a potential difference of

A. 900 V

B. 750 V

C. 447.2 V

D. 200 V

Answer: C

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282. A capacitor when charged by a potential difference of 200 Volts, stores a charge of 0.1C. By discharging energy liberated by the capacitor is-

A. 1 J

B. 2 J

C. 10 J

D. 20 J

Answer: C

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283. If the number of condensers are connected one after another then this type of combination of condensers is

A. condensers in series

B. condensers in parallel

C. condensers in series and parallel

D. none of these

Answer: A

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284. If the number of condensers are connected in series then

A. charge on each condenser is same and potential is different

B. potential is same but charge is different

C. both charge and potential is same

D. both charge and potential is different

Answer: A

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285. The resultant capacitance of n condensers of capacitances $C_1 C_2 ....\,.\,C_n$ connected in series is given by

A. $C_s = \frac{1}{C_1} + \frac{1}{C_2} + ... + \frac{1}{C_n}$

B. $\frac{1}{C_s} = \frac{1}{C_1} + ... + \frac{1}{C_n}$

C. $C_s = C_1 + C_2 + ... + C_n$

D. $C_s = C_1 - C_2 - .... - C_n$

Answer: B

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286. The equivalent capacity of number of condenser can be decreased if they are connected in

A. series

B. parallel

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: A

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287. The equivalent capacity of n identical condensers each of capacity C connented in series is given by

A. n^2C

B. nC

C. $\frac{n}{C}$

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

Answer: D

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288. The reciprocal of equivalent capacity of number of condensers connected in series is equal to

A. sum of reciprocals of their individual capacity

B. sum of their individual capacity

C. difference of the capacities of each condenser

D. none of these

Answer: A

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289. In series combination of condensers, potential is distributed in

A. proportion to there capacitances

B. inverse proportion to their capacitance

C. does not depend on capacitance

D. can not be predicted

Answer: B

Watch Video Solution

290. If the number of condensers are connected one after another then this type of combination of condensers is

A. parallel

B. series

C. both series and parallel

D. neither series nor parallel

Answer: A

Watch Video Solution

291. If the number of condensers are connected in parallel then

A. charge on each condenser is same and potential is different

B. potential is same but charge is different

C. both charge and potential is same

D. both charge and potential is different

Answer: B

Watch Video Solution

292. The equivalent capacity of number of condensers can be increased if they are connected in

A. series

B. parallel

C. both series and parallel

D. neither series nor parallel

Answer: B

Watch Video Solution

293. The resultant capacity of n condensers of capacitances $C_1, C_2 \ldots \ldots . C_n$ connected in parallel is

A. $C_p = C_1 + C_2 + \ldots \ldots . + C_n$

B. $C_p = C_1 - C_2 - C_3 - \ldots\ldots. - C_n$

C. $\frac{1}{C_p} = \frac{1}{C_1} + \frac{1}{C_2} + \ldots\ldots. + \frac{1}{C_n}$

D. $C_p = \frac{1}{C_1} + \frac{1}{C_2} + \ldots\ldots. + \frac{1}{C_n}$

Answer: A

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294. Write the equivalent capacitance of a number of identical capacitors connected in parallel.

A. n C

B. (n - 1) C

C. n^2C

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

Answer: A

Watch Video Solution

295. The resultant capacity of number of condensers connected in parallel is equal to

A. sum of reciprocals of their individual capacity

B. sum of their individual capacity

C. difference of the capacities of each condenser

D. none of these

Answer: B

Watch Video Solution

296. In parallel combination of condensers charge is distributed in

A. proportion to their capacitances

B. inverse proportion to their capacitances

C. does not depend on capacitance

D. cannot be predicted

Answer: A

Watch Video Solution

297. Two capacitors of capacity C_1 and C_2 are connected in series. The combined capacity C is given by

A. $C_1 + C_2$

B. $C_1 - C_2$

C. $\frac{C_1 C_2}{(C_1 + C_2)}$

D. $\frac{(C_1 + C_2)}{C_1 C_2}$

Answer: C

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298. Two capacitors connected in parallel having the capacities C_1 and C_2 are given 'q' charge, which is distributed among them. The ratio of the change on C_1 and C_2 will be

A. $\frac{C_1}{C_2}$

B. $\frac{C_2}{C_1}$

C. C_1C_2

D. $\frac{1}{C_1C_2}$

Answer: A

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299. The capacitance of two identical condensers connected in parallel is four times when they are connected in series. The ratio of the individual capacitances will be

A. $1:2$

B. $1:1$

C. $2:1$

D. $4:1$

Answer: B

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300. Two capacitors of equal capacities when connected in series have some resultant capacity. Then they are connected in parallel. The resultant capacity of parallel combination is

A. same as the series capacity

B. two times of the series capacity

C. three times of the series capacity

D. four times of the series capacity

Answer: D

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301. If two capacitors $2\mu F \text{ and } 6\mu F$ are put in series. The effective capacitance of the system will be

A. $8\mu F$

B. $4\mu F$

C. $3\mu F$

D. $3/2\mu F$

Answer: D

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302. Two condensers each of $4\mu F$ capacitance are joined in parallel. The resultant capacitance of the combination is

A. $2\mu F$

B. $4\mu F$

C. $6\mu F$

D. $8\mu F$

Answer: D

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303. There are 10 condensers each of capacity $5\mu F$. The ratio between maximum and minimum capacity obtained from these condensers will be

A. $25:5$

B. $40:1$

C. $60:3$

D. $100:1$

Answer: D

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304. Two capacitors $3\mu F$ and $6\mu F$ are connected in series across a potential difference of $120V$. Then the potential difference across $3\mu F$ capacitor is:

A. 50 V

B. 60 V

C. 70 V

D. 80 V

Answer: D

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305. Three identical capacitors each of capacitance C are connected in series and this connection is connected in parallel with one such more identical capacitor. Then, the capacitance of the whole combination is

A. 3C

B. $4C/3$

C. $3C/4$

D. 2C

Answer: B

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306. Two idential capacitors are joined in parallel, charged to a potential V and then separated and then connected in series i.e. the positive plate of one is connected to negative of the other

A. charges on the free plates connected together are destroyed

B. the charges on the free plates are enhanced

C. the energy stored in the system increases

D. the potential difference between the free plates becomes 2V.

Answer: D

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307. Two capacitances of capacity $C_1$and C_2 are connected in series and potential difference V is applied across it. Then the potential difference across C_1 will be

A. $V\frac{C_2}{C_1}$

B. $\frac{V(C_1 + C_2)}{C_1}$

C. $\frac{VC_2}{(C_1 + C_2)}$

D. $\frac{VC_1}{(C_1 + C_2)}$

Answer: C

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308. Two condensers of capacity $3\mu F$ and $6\mu F$ respectively are connected in series. The combination is connected across a potential of 6V. The ratio of the energies stored by the condensers will be

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

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

C. $\frac{1}{4}$

D. $\frac{4}{1}$

Answer: B

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309. Two capacitors having capacities C_1 and C_2 are charged to voltages V_1 and V_2 respectively. There will be no exchange of energy in connecting them in parallel, if

A. $C_1 = C_2$

B. $C_1V_1 = C_2V_2$

C. $V_1 = V_2$

D. $\frac{C_1 V_1}{C_2 V_2}$

Answer: C

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310. A 200 V battery is connected across the combination of capacitors of capacities $5\mu F$ and $10\mu F$ in series. The charge on each capacitor is

A. $2.667 \times 10^{-4} C$

B. $6.667 \times 10^{-4} C$

C. $2 \times 10^{-4} C$

D. $3 \times 10^{-4} C$

Answer: B

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311. Two capacitors of capacitances $10 \mu F$ and $20 \mu F$ are connected in series across a potential difference of 100V. The potential difference across each capacitor is respectively

A. 66.67 V, 33.33 V

B. 60 V, 40 V

C. 50 V, 50 V

D. 90 V, 10 V

Answer: A

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312. A 100 volt battery is connected across the series combination of the two capacitors of $4\mu F$ and $8\mu F$. The energy stored in the series combination is

A. $\frac{3}{4} \times 10^{-2} J$

B. $\frac{4}{3} \times 10^{-2} J$

C. 0.5J

D. 1 J

Answer: B

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313. When two capacitances are connected in series, the equivalent capacitance is $2.4\mu F$ and when they connected in parallel, it is $10\mu F$. The individual capacitances are

A. $6\mu F$ and $4\mu F$

B. $5\mu F$ and $5\mu F$

C. $7\mu F$ and $3\mu F$

D. $8\mu F$ and $2\mu F$

Answer: A

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314. Two capacitors, one of $4\mu F$ and the other of $5\mu F$, are connected in parallel and then charged on a 100 V supply. The charge on each capacitor is respectively

A. 0.4 mC and 0.5 mC

B. 0.4 mC and 0.8 mC

C. 4 mC and 5 mC

D. 4 mC and 8 mC

Answer: A

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315. Two condensers of capacities $8\mu F$, and $4\mu F$ are connected in parallel across a potential difference of 120 V. The charge and potential difference across $4\mu F$ capacitior is respectively

A. 1 mC, 10 V

B. 0.2 mC, 20 V

C. 0.4 mC, 60 V

D. 0.48 mC, 120 V

Answer: D

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316. A capacitor C_1 is charged to a p.d.V. The charging battery is then removed and the capacitor is connected to an uncharged capacitor C_2. The final p.d. across the combination is

A. $V\frac{C_1}{C_1+C_2}$

B. $V\frac{C_2}{C_1+C_2}$

C. $V\frac{C_1C_2}{C_1+C_2}$

D. $\frac{V}{C_1+C_2}$

Answer: A

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317. An infinite number of capacitors, having capacitances $1\mu F, 2\mu F, 4\mu F$ and $8\mu F.....$ are connected in series. The equivalent capacitance of the system is

A. infinite

B. $0.25\mu F$

C. $0.5\mu F$

D. $2\mu F$

Answer: C

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318. Two capacitors of $3pF$ and $6pF$ are connected in series and a potential difference of $5000V$ is applied across the combination. They are then disconnected and reconnected in parallel. The potential between the plates is

A. 2250 V

B. 1111 V

C. $2.25 \times 10^6 V$

D. $1.1 \times 10^6 V$

Answer: B

Watch Video Solution

319. A parallel plate capacitor having a plate separation of $2mm$ is charged by connecting it to a $300v$ supply. The energy density is

A. $0.01J/m^3$

B. $0.1J/m^3$

C. $1J/m^3$

D. $10J/m^3$

Answer: B

Watch Video Solution

320. The capacitors of $8\mu F$, $8\mu F$ and $4\mu F$ are connected in parallel across a source of p.d. 120 V. The total charge on the effective capacity will be

A. 2.4 mC

B. $240\mu C$

C. 0.24 mC

D. $24\mu C$

Answer: A

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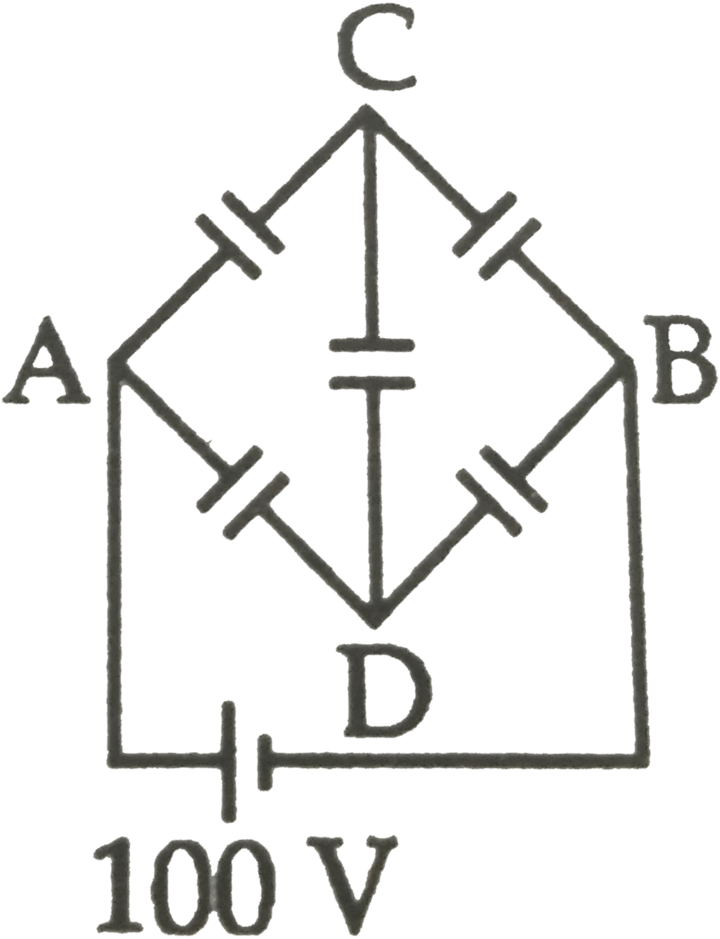
321. Five capacitors each of $10\mu F$ capacitance are connected as shown to a source of e.m.f. The equivalent capacitance between point A and B is



A. $40 \mu F$

B. $30 \mu F$

C. $20\mu F$

D. $10\mu F$

Answer: D

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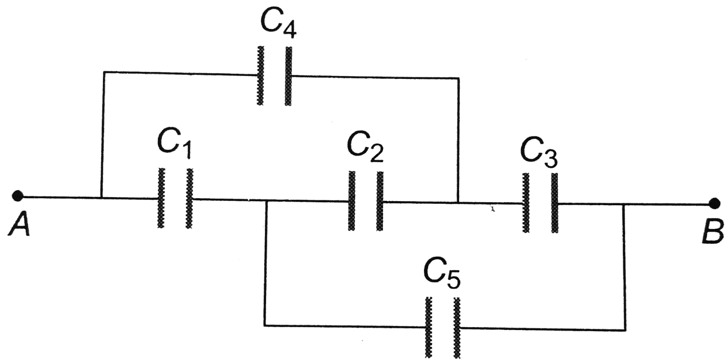
322. In the given figure the capacitors C_1, C_3, C_4, C_5 have a capaciance $4\mu F$ each if the capaitor C_2 has a capacitance $10\mu F$, then effective capacitance between A and B will be



A. $8\mu F$

B. $6\mu F$

C. $2.5\mu F$

D. $4\mu F$

Answer: D

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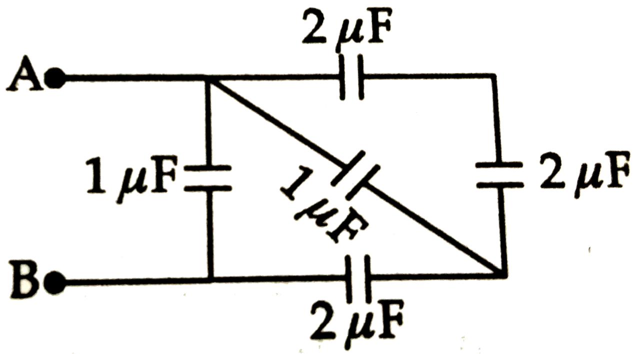
323. The net capacitance of system of capacitors in figure between points A and B is



A. $1 \mu F$

B. $2 \mu F$

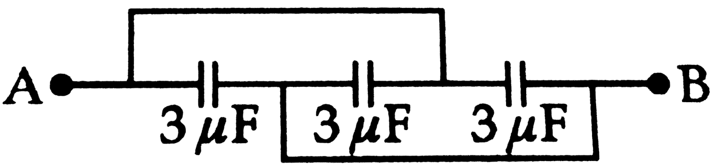
C. $3 \mu F$

D. $4 \mu F$

Answer: B

Watch Video Solution

324. The equivalent capacity between the points A and B in the following figure will be



A. $9\mu F$

B. $1\mu F$

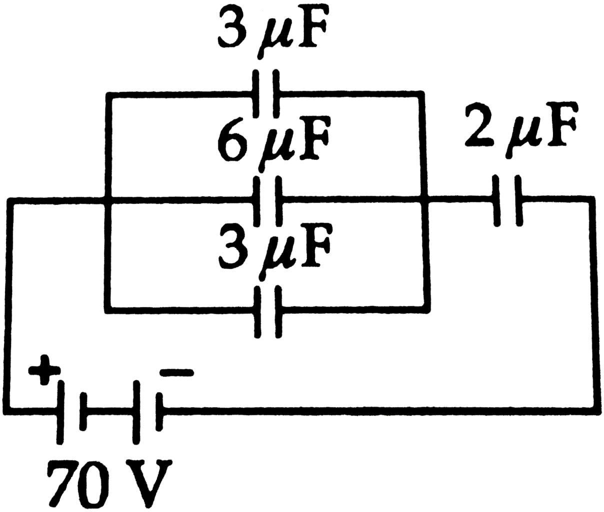
C. $4.5\mu F$

D. $6\mu F$

Answer: A

Watch Video Solution

325. The p.d. across the capacitance of $2\mu F$ in the figure along with is



A. 10 V

B. 60 V

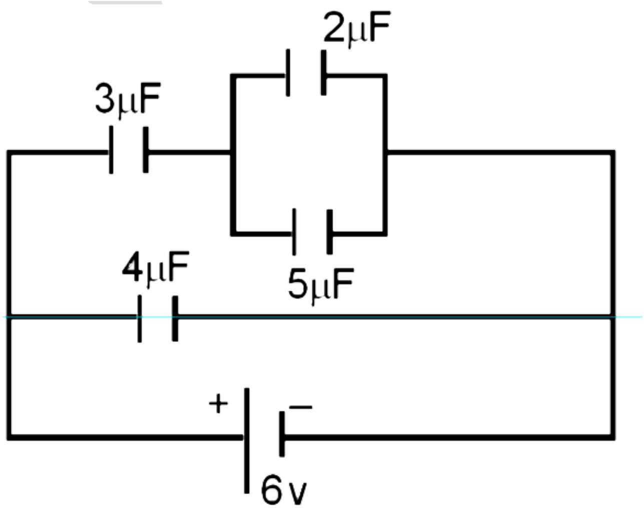
C. 28 V

D. 56 V

Answer: B

Watch Video Solution

326. A circuit is shown in the figure below. Find out the charge of the condenser having capacity $5\mu F$



A. $4.5\mu C$

B. $9\mu C$

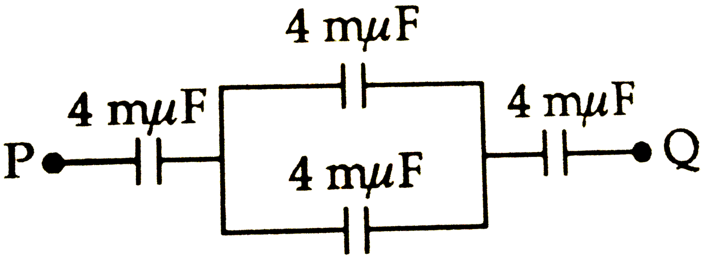
C. $7\mu C$

D. $30\mu C$

Answer: B

Watch Video Solution

327. Four condensers each of capacity $4\mu F$ are connected as shown in the adjoining figure. If $V_P - V_Q = 15V$, the energy stored in the system is



A. 2.4 ergs

B. 1.8 ergs

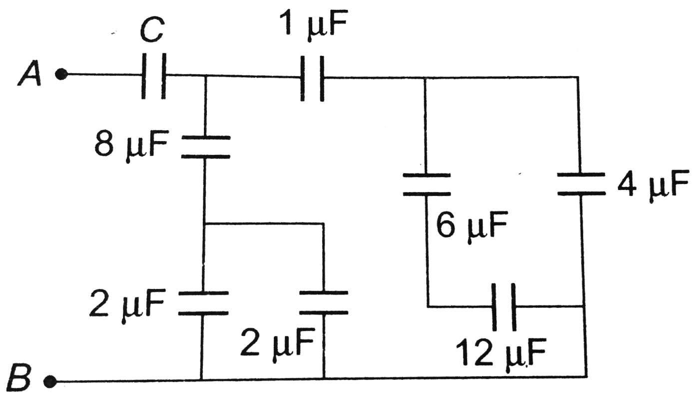
C. 3.6 ergs

D. 5.4 ergs

Answer: B

Watch Video Solution

328. In the following circuit, the resultant capacitance between A and B is $1 \mu F$. Then value of C is



A. $\frac{32}{11} \mu F$

B. $\frac{11}{32} \mu F$

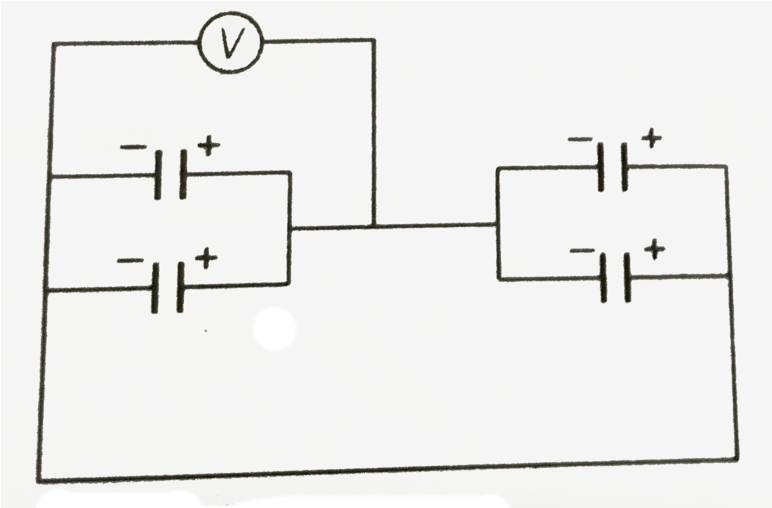
C. $\frac{23}{32} \mu F$

D. $\frac{32}{23} \mu F$

Answer: D

Watch Video Solution

329. The four capacitors, each of $25\mu F$ are connected as shown in figure. The DC voltmeter reads 200V. The charge on each plate of capacitor is



A. $2 \times 10^{-3} C$

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

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

D. $5 \times 10^{-2} C$

Answer: B

Watch Video Solution

330. The electric potential at the surface of an atomic nucleus (Z = 50) of radius $9 \times 10^{-15} m$ is

A. $4 \times 10^6 V$

B. $8 \times 10^6 V$

C. $4 \times 10^{-6} V$

D. $8 \times 10^{-6} V$

Answer: D

Watch Video Solution

331. An oil drop is found floating freely between thr plates of a parallel plate condenser, the plates being horizontal and the lower plate carrying a charge + Q. The area of each plate is A and the distance of separation between them is D. The charge on oil drop must be (g is acceleration due to gravity)

A. $\dfrac{mg \in_0}{Q}$

B. $\dfrac{mg \in_0 A}{Q}$

C. $\frac{mg \in_0 A^2}{Q}$

D. $\frac{mg \in_0 A}{Q^2}$

Answer: B

Watch Video Solution

332. Three charges $4q, Q$ and q are in a straight line in the position of $0. l/2$ and l respectively. The resultant force on q will be zero, if $Q =$

A. Q = -q

B. Q = q

C. $Q = q^2$

D. Q = 2q

Answer: A

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333. Two point charges +9e and +e are kept at a distance 'a' from each other. A third charge is placed at a distance 'x' from +9e on the line joining the above two charges. For the third charge to be in equilibrium 'x' is

A. $3a/4$

B. $3a/2$

C. $a/2$

D. $a/4$

Answer: A

Watch Video Solution

334. An electron of mass m_e initially at rest moves through a certain distance in a uniform electric field in time t_1. A proton of mass m_p also initially at rest takes time t_2 to move through an equal distance in this uniform electric field.Neglecting the effect of gravity, the ratio of t_2 / t_1 is nearly equal to

A. $\frac{m_p}{m_e}$

B. $\left(\frac{m_p}{m_e}\right)^2$

C. $\left(\frac{m_p}{m_e}\right)^{1/2}$

D. $\left(\frac{m_p}{m_e}\right)^{3/2}$

Answer: C

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335. Electrons are caused to fall through a potential difference of 1500 V. If they are initially at rest, their final speed is

A. $23 \times 10^7 m/s$

B. $2.3 \times 10^7 m/s$

C. $32 \times 10^7 m / s$

D. $3.2 \times 10^7 m / s$

Answer: B

Watch Video Solution

336. The electric field in a region of space is given by,

$E = 5\overrightarrow{i} + 2\overrightarrow{j} N / C$

The electric flux through an area $2m^2$ lying in the YZ plane in SI unit is

A. 10

B. 20

C. 5

D. 15

Answer: A

Watch Video Solution

337. A given charge is situated at a certain distance from an electric dipole in the end-on position experiences a force F If the distance of the charge is doubled, the force acting on the charge will be

A. $F/2$

B. $F/4$

C. $F/8$

D. $F/16$

Answer: C

Watch Video Solution

338. Two small spheres, each carrying a charge q are placed r m apart and they interact with force F. If one of the sphere is taken around the other once in a circular path, the work done will be equal to

A. 0

B. F

C. 2F

D. $F/2$

Answer: A

Watch Video Solution

339. 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. $Q/4$

B. $-Q/4$

C. $-Q/8$

D. $Q/8$

Answer: B

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340. n small drops of same size are charged to V volts each .If they coalesce to from a single large drop, then its potential will be -

A. V n

B. Vn^2

C. V/n

D. $Vn^{2/3}$

Answer: D

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341. A charged particle of mass m and charge q is released from rest in an electric field of constant magnitude E. The kinetic energy of the particle after time t is

A. $\frac{1}{2}\frac{q^2E^2t^2}{m}$

B. $\frac{q^2E^2t^2}{m}$

C. $\frac{1}{4}\frac{q^2E^2t^2}{m}$

D. $\frac{1}{4}\frac{q^2Et^2}{m}$

Answer: A

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342. A H_2 atom consits of a proton and an electron that revolves in a circular orbit around the proton with a radius of $5.3 \times 10^{-9} cm$. If the electron moves so that its centrifugal force is just equal to the electrostatic force then the speed is

A. $22 \times 10^7 m / s$

B. $2.2 \times 10^6 m / s$

C. $3.2 \times 10^7 m / s$

D. $3.2 \times 10^7 m / s$

Answer: B

Watch Video Solution

343. A parallel plate condenser with air as dielectric has capacity $C_0 = \frac{\in_0 A}{d}$. A thin mica sheet of dielectric constant K and thickness t is introduced near the first plate and then moved with constant velocity v towards the other plate. The capacity of the condenser will be

A. $\dfrac{\in_0 A}{d - t + \frac{t}{k}}$

B. $\dfrac{\in_0 Av}{d - t + \frac{t}{k}}$

C. $\dfrac{\in_0 Av}{d - t}$

D. $\dfrac{\in_0 A}{d - t}$

Answer: A

Watch Video Solution

344. If K is the dielectric constant of the medium. A is area of insulated charged plates and d is the distance between two plates of parallel plate condenser then its capacity in CGS unit is

A. $\frac{KA}{4\pi d}$

B. $\frac{KA}{2\pi d}$

C. $\frac{KA}{\pi d}$

D. $\frac{KA}{d}$

Answer: A

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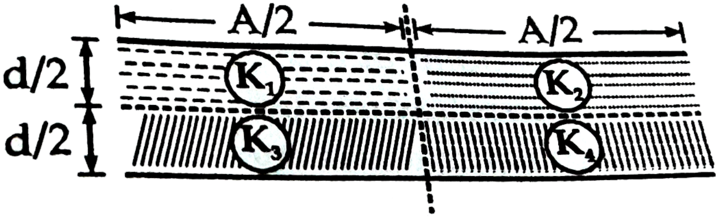
345. The space between parallel plate capacitors is filled with four dielectrics of equal dimensions but of dielectric constants K_1, K_2, K_3 and K_4 respectively. If K is the dielectric constant of a single dielectric that must be filled between capacitor plates to have the same capacitance between A and B.

Then we must have



A. $\frac{1}{K} = \frac{1}{K_1 + K_2} + \frac{1}{K_3 + K_4}$

B. $\frac{1}{K} = \frac{1}{K_1 + K_2} - \frac{1}{K_3 + K_4}$

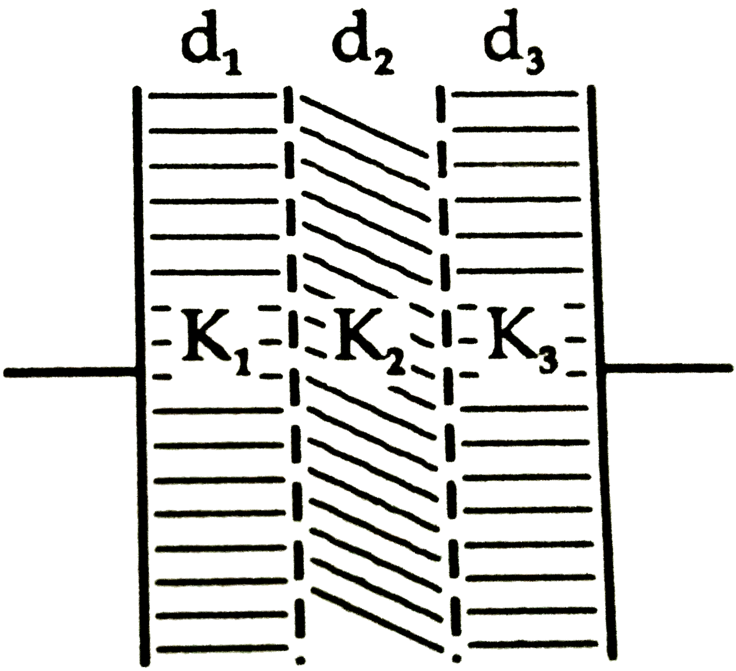
C. $\frac{1}{K} = \frac{1}{K_1 - K_2} + \frac{1}{K_3 - K_4}$

D. $\frac{1}{K} = \frac{1}{K_1 - K_2} - \frac{1}{K_3 - K_4}$

Answer: A

Watch Video Solution

346. The expression for the capacity of the capacitor formed by compound dielectric placed between the plates of a parallel plate capacitor as shown in figure will be



A. $\dfrac{\in_0 A}{\dfrac{d_1}{K_1}+\dfrac{d_2}{K_2}+\dfrac{d_3}{K_3}}$

B. $\dfrac{\in_0 A}{\dfrac{d_1}{K_1} - \dfrac{d_2}{K_2} - \dfrac{d_3}{K_3}}$

C. $\dfrac{\in_0 A^2}{\dfrac{d_1}{K_1} - \dfrac{d_2}{K_2} - \dfrac{d_3}{K_3}}$

D. $\dfrac{\in_0 A^2}{\dfrac{1}{K_1} + \dfrac{1}{K_2} + \dfrac{1}{K_3}}$

Answer: A

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347. Two insulated metallic spheres of $3\mu F$ and $5\mu F$ capacitances are charged to $300V$

and $500V$ respectively. The energy loss, when they are connected by a wire is

A. 0.375 J

B. 0.0375 J

C. 0.735 J

D. 0.0735 J

Answer: B

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348. The $500\mu F$ capacitor is charged at a steady rate of $100\mu C / s$. The potential difference across the capacitor will be 10 V after an interval of

A. 5 s

B. 0.5 s

C. 0.05 s

D. 50 s

Answer: D

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349. An unchanged capacitor with a solid dielectric is connected to a similar air capacitor charged to a potential of V_0. . If the common potential after sharing of charges becomes V, then the dielectric constant of the dielectric must be

A. $\frac{V_0 - V}{V}$

B. $\frac{V_0 + V}{V}$

C. $\frac{V_0}{V}$

D. $\frac{V_0}{2V}$

Answer: A

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350. The area of the plates of a parallel plate condenser is A and the distance between the plates is $10mm$. There are two dielectric sheets in it, one of dieectirc constant 10 and thickness $6mm$ an dthe other of dielectric constant 5 and thickness $4mm$. the capacity of the condenser is

A. $\frac{5000}{7} \in_0 A$

B. $\frac{500}{7} \in_0 A$

C. $\frac{50}{7} \in_0 A$

D. $\frac{50}{14} \in_0 A$

Answer: A

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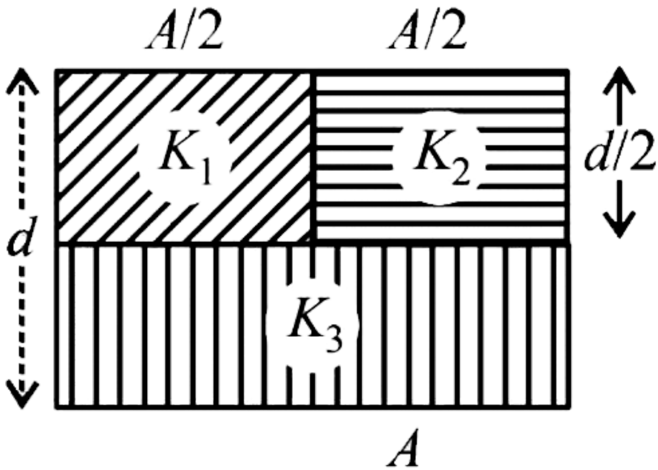
351. A parallel plate capacitor of area A, plate separation d and capacitance C is filled with three different dielectric materials having dielectric constants k_1, k_2 and k_3 as shown. If a isngle dielectric material is to be used to have the same capacitance C in this capacitor, then its dielectic constant k is given by



A. $\frac{1}{K_1 + K_2} + \frac{1}{2K_3}$

B. $\frac{1}{K_1 + K_2} - \frac{1}{2K_3}$

C. $\frac{1}{K_1 - K_2} + \frac{1}{2K_3}$

D. $\frac{2}{K_1 + K_2} + \frac{1}{2K_3}$

Answer: A

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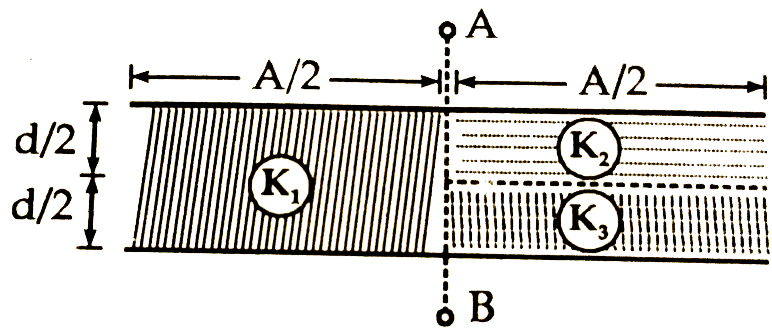
352. A parallel plate capacitor is constructed using three different dielectric materials as shown in figure. The parallel plates across which a potential difference is applied are of area $A = 1cm^2$ and are separated by a distance d = 2mm. If $K_1 = 4, K_2 = 6 \text{ and } K_3 = 2,$ find capacitance across points A and B



A. 1.56 pF

B. 2.56 pF

C. 2.65 pF

D. 3 pF

Answer: A

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353. Van de Graff generator produces

A. high voltage and high current

B. high voltage and low current

C. low voltage and high current

D. low voltage and low current

Answer: B

Watch Video Solution

354. Van de Graaff generator is

A. an electromagnetic machine

B. an electrostatic machine

C. an electrodynamic machine

D. used to produce charged particles

Answer: B

Watch Video Solution

355. Van de Graaff generator is

A. high voltage generator

B. low voltage generator

C. ac generator

D. dc generator

Answer: A

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356. In van de Graaff generator, potential difference is of the order of

A. $10^7 V$

B. $10^3 V$

C. $10^2 V$

D. $10^{12} V$

Answer: A

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357. Which of the following instruments works on the principle of action of sharp points ?

A. Van de Graff generator

B. Cyclotron

C. Dynamo

D. Induction coil

Answer: A

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358. In van de Graaff generator, the process of spraying the charge is called

A. gases discharge

B. corona discharge

C. electron discharge

D. none of these

Answer: B

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359. Van de Graff generator is used to produce high energetic charged particles of energy of about

A. 10 MeV

B. 50 MeV

C. 100 MeV

D. 0.5 MeV

Answer: A

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360. Van de Graaff generator is used for

A. produce radioactive isotopes

B. study nuclear structure

C. study different types of nuclear reactions

D. all of these

Answer: D

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361. Van de Graaff generator is used for

A. carry out radioactive disintegration

B. produce ac voltage

C. convert ac into dc voltage

D. produce total internal reflection

Answer: A

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362. The number of lines of force starting from a point charge of $10\mu C$ in vacuum are

A. $1.2 \times 10^6 Nm^2 / C$

B. $1.3 \times 10^6 Nm^2 / C$

C. $1.13 \times 10^6 Nm^2 / C$

D. $2.3 \times 10^6 Nm^2 / C$

Answer: C

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363. The number of tubes of force originating from a point charge of $17.7 \times 10^{-8} C$ placed in dielectric medium of dielectric constant 4 are

A. $3000 Nm^2 / C$

B. $5000 Nm^2 / C$

C. $6000 Nm^2 / C$

D. $5500 Nm^2 / C$

Answer: B

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364. A plane surface of element of area $1mm^2$ is situated in a uniform electric field of intensity $9 \times 10^6 N/C$ with its plane making an angle of 30° with the direction of the field. The electric flux through the surface element is

A. $4.5Nm^2/C$

B. $3.5Nm^2/C$

C. $0.5Nm^2/C$

D. $2.5Nm^2/C$

Answer: A

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365. An isolated conducting sphere of diameter 20 cm placed in air carries a charge of $9\mu C$. The electric intensity at a point at a distance of 10 cm from the surface of the charged sphere is

A. $10.25 \times 10^5 N/C$

B. $15.25 \times 10^5 N/C$

C. $25.25 \times 15^5 N/C$

D. $20.25 \times 10^5 N/C$

Answer: D

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366. A charged cylindrical conductor of infinite length has charge per unit length of $10\mu C/m$. The electric intensity at a point at a distance of 20 cm from its axis in the surrounding medium is $2.5 \times 10^5 N/C$. The relative permittivity of the surrounding medium is

A. 3.6

B. 2.6

C. 4.6

D. 3.0

Answer: A

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367. An electric cable of diameter 10 cm runs under water (k for water = 81) for a distance of 5 km. If the cable carries a charge of 0.01 C on its surface. The electric intensity at a distance of 95 cm from the surface of the cable is

A. $2.4 \times 10^2 N/C$

B. $4.4 \times 10^2 N/C$

C. $4.4 \times 10^3 N/C$

D. $4.4 \times 10^{-2} N/C$

Answer: B

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368. The surface charge density of a conducting sphere is $8.85 \times 10^{-10} C/m^2$ and the electric field intensity at a distance of 4m from the centre of the sphere is $10^{-2} V/m$. The radius of the sphere, assuming the sphere to be in vacuum is

A. 3 cm

B. 4 mm

C. 4 cm

D. 4 km

Answer: C

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369. Find the electric field intensity due to a positively charged conducting cylinder with radius 1 cm and surface charge density $10^{-9} C/m^2$, at a point at a distance of 2 m from the axis of cylinder. The dielectric constant of the medium surrounding the cylinder is 2.

A. $0.28V/m$

B. $1.28V/m$

C. $2.28V/m$

D. $1.00V/m$

Answer: A

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370. The electric field near the surface of the earth is $300V/m$. The surface density of charge on the earth's surface is

A. $3.65 \times 10^{-9} C/m^2$

B. $2.65 \times 10^{-9} C/m^2$

C. $3.65 \times 10^{9} C/m^2$

D. $2.65 \times 10^{-9} C/m^2$

Answer: D

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371. A closed conducting sphere is positively charged such that the surface charge density is $17.7 \times 10^{-12} C / m^2$. If the dielectric constant of the medium surrounding the conductor is 100, then electric field intensity at a point just outside it will be

A. $1.02 V / m$

B. $0.02 V / m$

C. $1.22 V / m$

D. $2.22 V / m$

Answer: B

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372. The outward pull on a metal plate of area $0.01m^2$ having a charge density of $50\mu C / m^2$ is

A. 1.4 N

B. 2.4 N

C. 0.4 N

D. 1.8 N

Answer: A

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373. A circular metal plate of radius 10 cm is given a charge of $20\mu C$. The outward pull on the plate in the vacuum is

A. 560 N

B. 370 N

C. 360 N

D. 630 N

Answer: C

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374. A metal sphere of radius 10 cm is charged to a potential of 100 V. The outward pull per unit area of the surface is

A. $4.4 \times 10^{-6} N / m^2$

B. $2.4 \times 10^{-6} N / m^2$

C. $4.4 \times 10^{6} N / m^2$

D. $4.2 \times 10^{-6} N / m^2$

Answer: A

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375. The energy density at a point in vacuum is $1.77 \times 10^{-7} J / m^3$. The intensity of the electric field at the point is

A. $100 V / m$

B. $200 V / m$

C. $300 V / m$

D. $400 V / m$

Answer: B

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376. The capacitance of earth, treating it as a spherical conductor of radius 6400 km is

A. $5.1 \times 10^{-4} F$

B. $6.1 \times 10^{-4} F$

C. $7.1 \times 10^{4} F$

D. $7.1 \times 10^{-4} F$

Answer: D

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377. A parallel plate condenser consists of two plates each of area $100cm^2$. They are separated by mica sheet of thickness 8.85 mm. If the relative permittivity of mica is 6. Then capacity of parallel plate condenser is

A. 50 pF

B. 40 pF

C. 60 pF

D. 30 pF

Answer: C

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378. The charge and energy stored in the capacitor of capacity $32\mu F$, when it is charged to a potential difference of 0.6 kV are respectively

A. $1.92 \times 10^{-2} C, 5.76 J$

B. $2.92 \times 10^{-2} C, 5.76 J$

C. $1.92 \times 10^{2} C, 5.76 J$

D. $1.92 \times 10^{-2} C, 4.76 J$

Answer: A

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379. Four condensers having capacities 2pF, 3pF, 4pF and 6pF are connected in series. The equivalent capacity of the combination is

A. 8.0 pF

B. 0.8 pF

C. 1.8 pF

D. 0.4 pF

Answer: B

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380. When two capacitors are connected in series, the equivalent capacitance is $1.2\mu F$. When they are connected in parallel, the equivalent capacitance is $5\mu F.$ The capacitances of the capacitors are

A. $3\mu F$ and $2\mu F$

B. $4\mu F$ and $1\mu F$

C. $2.5\mu F$ and $2.5\mu F$

D. $3.5\mu F$ and $1.5\mu F$

Answer: A

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381. Parallel combination of two condensers of capacities $2 \mu F$ and $4 \mu F$ and the series combination of two condensers of capacities $6 \mu F$ and $12 \mu F$ are connected in series. The equivalent capacity of entire combination is

A. $4.4 \mu F$

B. $2.2 \mu F$

C. $2.4 \mu F$

D. $1.4 \mu F$

Answer: C

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382. Two insulated spherical conductors of capacities $1\mu F$ and $2\mu F$ are charged to 100 V and 200 V respectively. The conductors are then brought in contact. The charges on the sphere after contact are

A. $1.6 \times 10^{-4}C, 3.3 \times 10^{-4}C$

B. $2.6 \times 10^{-4}C, 3.3 \times 10^{-4}C$

C. $1.6 \times 10^{-4}C, 4.3 \times 10^{-4}C$

D. $2.6 \times 10^{-4} C, 4.3 \times 10^{-4} C$

Answer: A

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383. Two capacitors of capacitances $3\mu F$ and $5\mu F$ respectively are connected in parallel and this combination is connected in series with a third capacitor of capacitance $2\mu F$. A potential difference of 100 V is applied across the entire combination. The charge and the potential difference across the third capacitor is

A. $100\mu C, 40V$

B. $100\mu C, 80V$

C. $160\mu C, 40V$

D. $160\mu C, 80V$

Answer: D

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384. A condenser having a capacity of $50 \mu F$ is charged to a potential of 200 V. If the area of each plate of the condenser is $10 cm^2$ and the distance between the plates is 0.1 mm. The energy per unit volume of the field between the plates is

A. $10^6 J/m^3$

B. $10^{-6} J/m^3$

C. $10^7 J/m^3$

D. $10^{-7} J/m^3$

Answer: C

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385. The cell membrane of a resting nerve in a human body has a thickness of 75 Å. If potential difference between the two sides of membrace is 0.06 V. Then intensity of electric field is

A. $8 \times 10^6 V / m$

B. $4 \times 10^6 V / m$

C. $8 \times 10^{-6} V/m$

D. $4 \times 10^{-6} V/m$

Answer: A

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386. A parallel plate capacitor with air between the plates has a capacitance $2\mu F$. The capacity of the condenser when the distance between the plates is reduced to half of initial distance is

A. $3\mu F$

B. $4.4\mu F$

C. $2.4\mu F$

D. $4\mu F$

Answer: D

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387. A conductor of capacity $2\mu F$ is charged to a potential of 200 V. If an additional charge of

$-2 \times 10^{-4} C$ is deposited on it, then resultant potential will be

A. 110 V

B. 100 V

C. 200 V

D. 220 V

Answer: B

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388. A plane conductor with very large dimensions is charged such that surface charge density is $1.6 \times 10^{-2} C/m^2$. The electric field intensity at a point near it if the conductor is in a medium of dielectric constant 5 is

A. $1.8 \times 10^{8} V/m$

B. $1.8 \times 10^{-2} V/m$

C. $1.8 \times 10^{-6} V/m$

D. $1.8 \times 10^{2} V/m$

Answer: A

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389. Condensers of capacities 5F and 10F are connected in parallel in a circuit with a cell of e.m.f. 2V. The capacity of the condenser to be connected in series with parallel combination of the condensers to get 1C charge to flow in the circuit is

A. 0.62 F

B. 0.52 F

C. 1.62 F

D. 0.42 F

Answer: B

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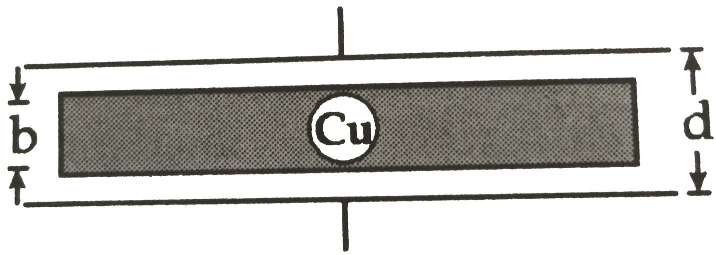
390. A slab of copper of thickness b is inserted in between the plates of a parallel plate capacitor as shown in figure. The separation of the plates is d. If $b = d/2$, then the ratio of capacities of the capacitor after and before inserting the slab will be



A. $1:1$

B. $1:\sqrt{2}$

C. $2:1$

D. $\sqrt{2}:1$

Answer: A

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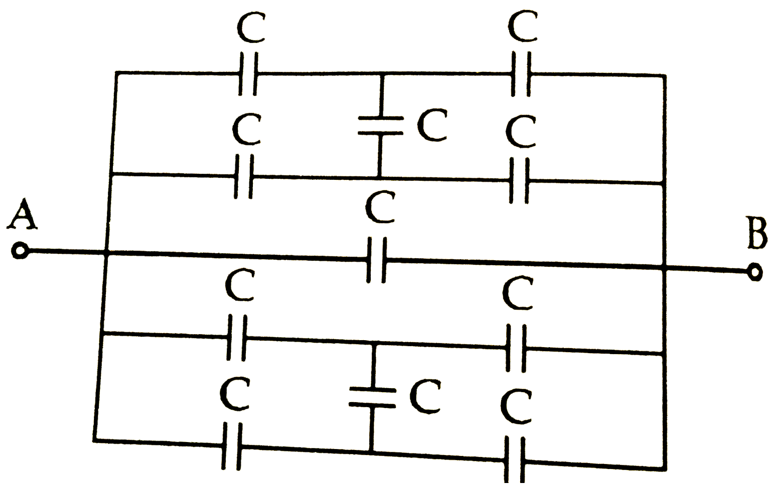
391. In the following diagram, the effective capacitance between A and B is



A. C

B. 2 C

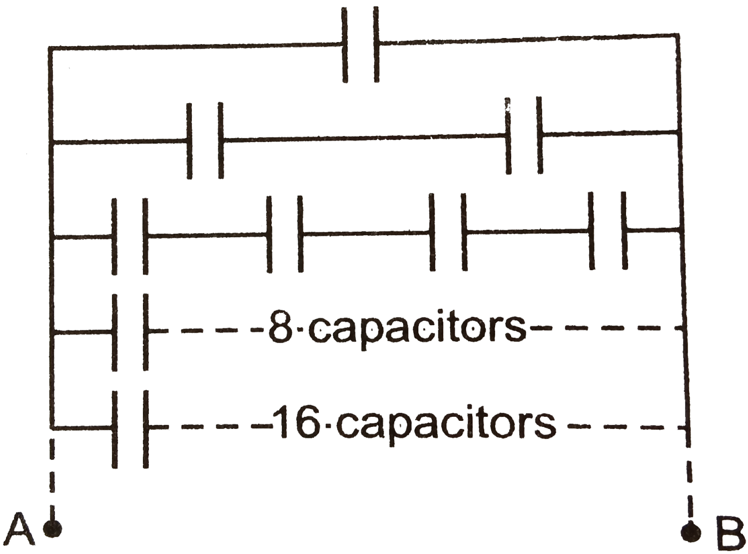
C. 3 C

D. 4 C

Answer: C

Watch Video Solution

392. An infinite number of identical capacitors each of capacitance $1\mu F$ are connected $1\mu F$ are connected as shown in Fig. Then the equivalent capacitance between A and B is



A. $1\mu F$

B. $2\mu F$

C. $0.5\mu F$

D. ∞

Answer: B

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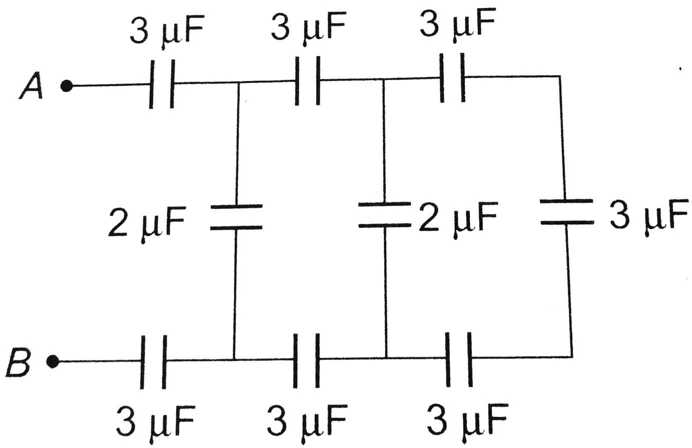
393. The resultant capacitance between A and B in the following figure is equal to



A. $1\mu F$

B. $1.5\mu F$

C. $2\mu F$

D. $3\mu F$

Answer: A

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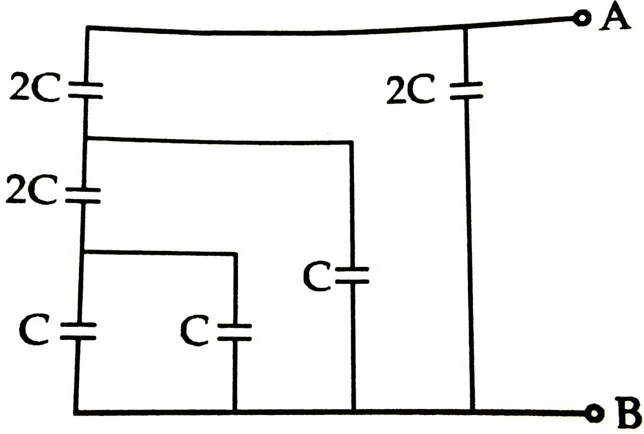
394. The effective capacity between A and B of the given network is



A. 3C

B. 2C

C. C

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

Answer: A

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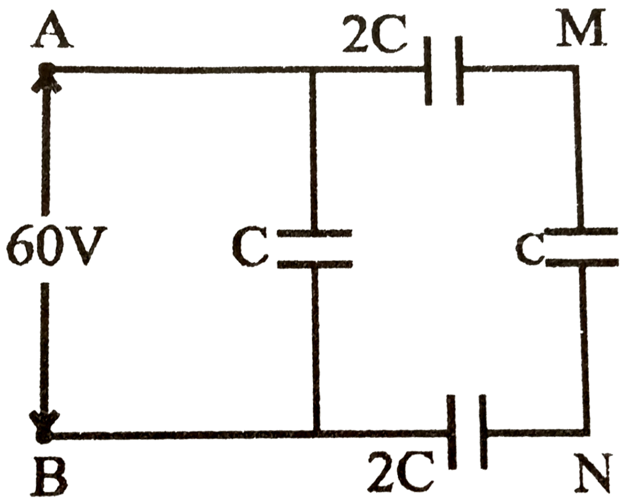
395. In the circuit shown, a potential difference of $60V$ is applied acrodd.AB. The potential difference between the point M and N is-



A. 60 V

B. 45 V

C. 40 V

D. 30 V

Answer: D

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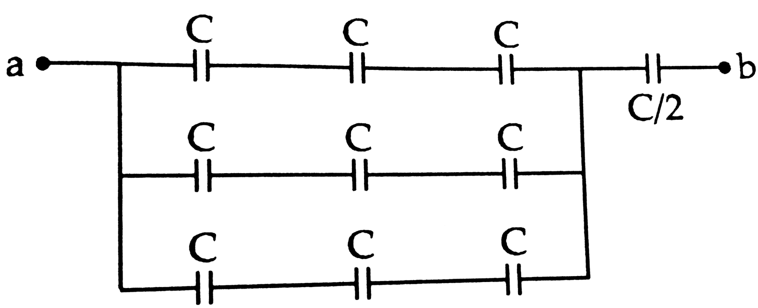
396. Refer to network shown in figure. The effective capacitance between a and b is



A. C

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

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

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

Answer: C

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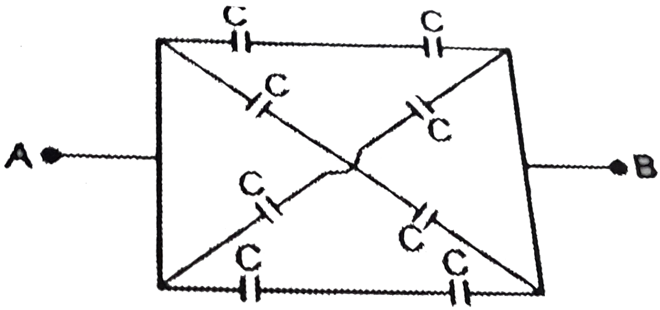
397. In the adjoining circuit, the capacity between the points A and B will be -



A. C

B. 2C

C. 3C

D. 4C

Answer: B

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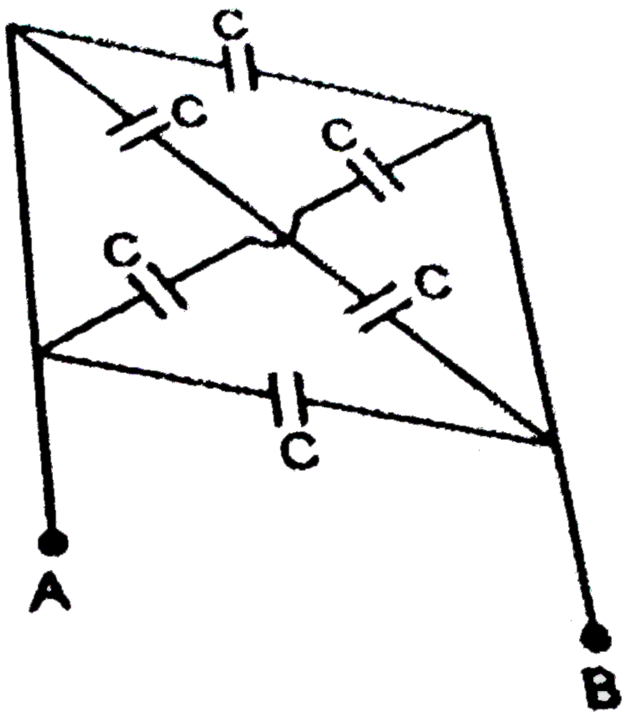
398. The resultant capacity between the points

A and B in the adjoining circuit will be -



A. C

B. 2C

C. 3C

D. 4C

Answer: A

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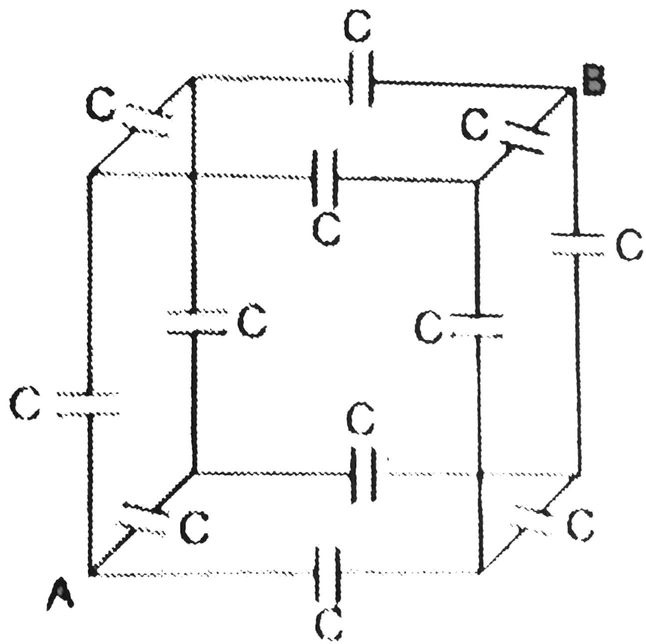
399. Each edge of the cube contains a capacitance C. The equivalent capacitance between the points A and B will be -



A. $\frac{6C}{5}$

B. $\frac{5C}{6}$

C. $\frac{12C}{7}$

D. $\frac{7C}{12}$

Answer: B

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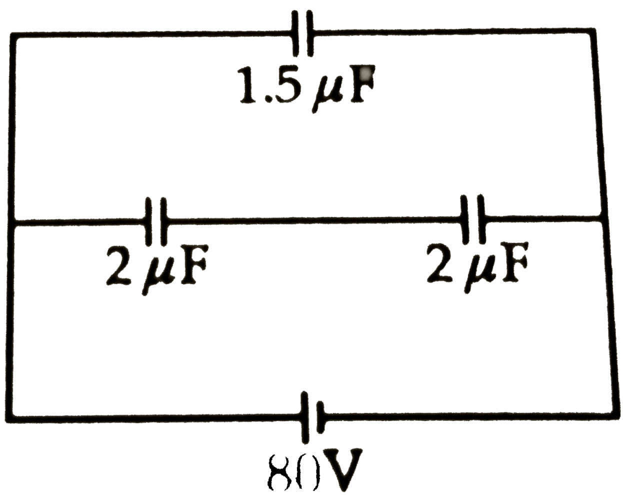
400. In figure (below) the charge on the $1.5 \mu F$ capacitor is



A. $60\mu C$

B. $90\mu C$

C. $120\mu C$

D. $30\mu C$

Answer: C

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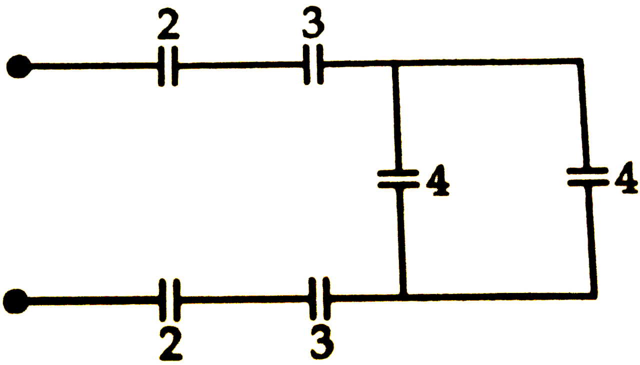
401. The effective capacity between A and B in the figure given is (inμF)



A. $\frac{43}{24}$

B. $\frac{24}{43}$

C. $\frac{43}{12}$

D. $\frac{12}{43}$

Answer: B

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

A. 4C

B. 2C

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

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

Answer: A

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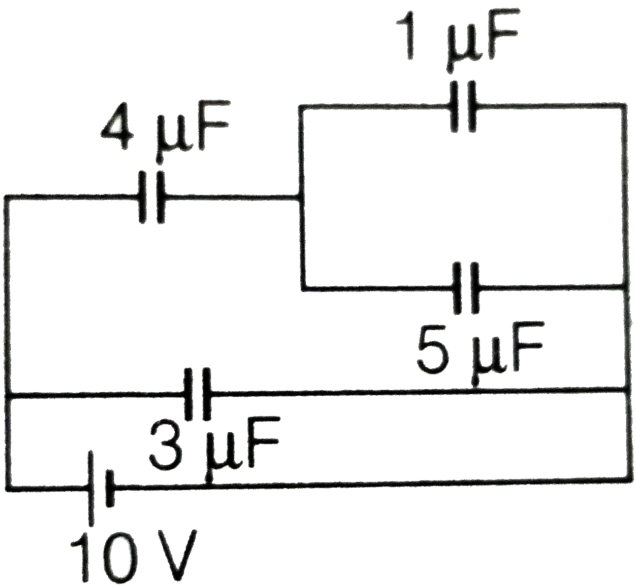
403. The charge on $4 \mu F$ capacitor in the given circuit (in μC) is



A. 12

B. 24

C. 36

D. 42

Answer: B

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404. Three capacities of respective capacities 6, 4 and $2\mu F$ are connected in parallel and P.D. of 5 volt applied across it. Its total capacity and the charge on each condenser in order will be

A. $12\mu F, 30\mu C, 10\mu C, 20\mu C$

B. $12\mu F, 10\mu C, 30\mu C, 20\mu C$

C. $12\mu F, 10\mu C, 20\mu C, 30\mu C$

D. $12\mu F, 30\mu C, 20\mu C, 10\mu C$

Answer: D

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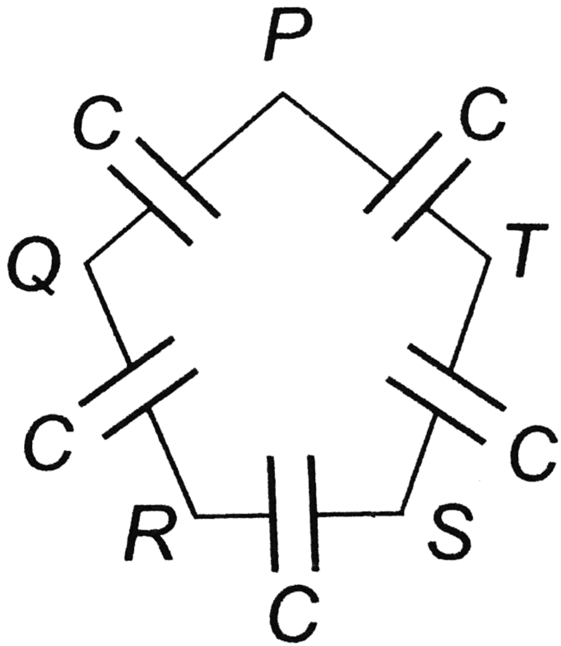
405. Five capacitors, each of capacitance value C are connecteed as shown in the figure. The ratio of capacitance between P and R, and the capacitance between P and Q, is.



A. $3:1$

B. $5:2$

C. $2:3$

D. $1:1$

Answer: C

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406. In a parallel plate capacitor , the capacity increases if

A. increase of its area

B. decrease of its area

C. increase of distance between plates

D. it is independent on area

Answer: A

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407. A capacitor of $20\mu F$ is charged to 500 volts and connected in parallel ith another capacitor of $10\mu F$ and charged to 200 volts. The common potential is

A. 500V

B. 400V

C. 300V

D. 200V

Answer: B

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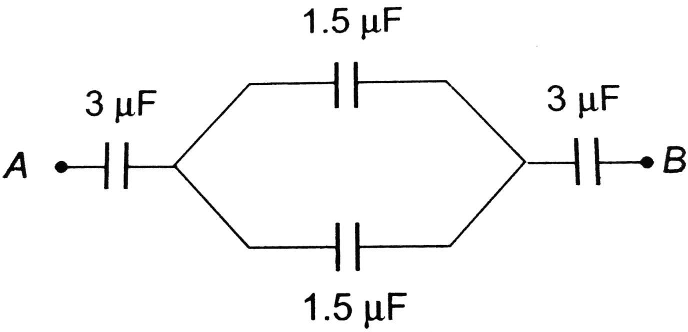
408. The capacitance between the points A and B in the given circuit will be



A. $3.5\mu F$

B. $3\mu F$

C. $2\mu F$

D. $1\mu F$

Answer: D

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409. A $4\mu F$ capacitor is charged to 400 V. If its plates are joined through a resistance of $4k\Omega$, then heat produced in the resistance will be

A. 0.16 J

B. 0.32 J

C. 0.64 J

D. 1.28 J

Answer: B

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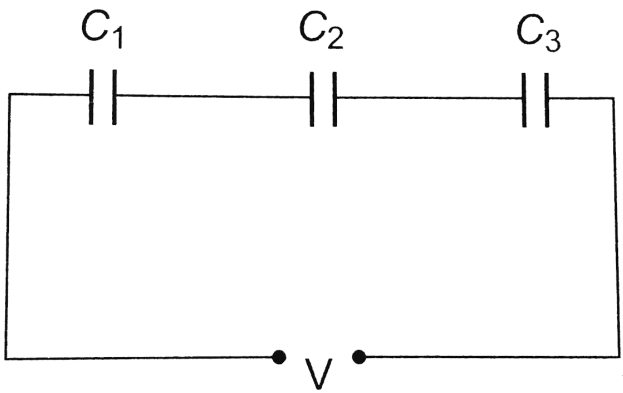
410. In the figure, three capacitors each of capacitance $6pF$ are connected in series. The total capacitance of the combination will be



A. 9 pF

B. 6 pF

C. 3 pF

D. 2 pF

Answer: D

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411. A 700 pF capacitor is charged by a 50 V battery. The electrostatic energy stored it is

A. $6.7 \times 10^{-7} J$

B. $8.7 \times 10^{-7} J$

C. $9.7 \times 10^{7} J$

D. $6.7 \times 10^7 J$

Answer: B

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412. In fig. $C_1 = 20\mu F, C_2 = 30\mu F$ and $C_3 = 15\mu F$ and the insulated plate of C_1 is at a potential of 90 V, one plate of C_3 being earthed. What is the potential difference between th plates of

C_2 three capacitors being connected in series

?

A. 10 e.s.u.

B. 30 e.s.u.

C. 40 e.s.u.

D. 20 e.s.u.

Answer: D

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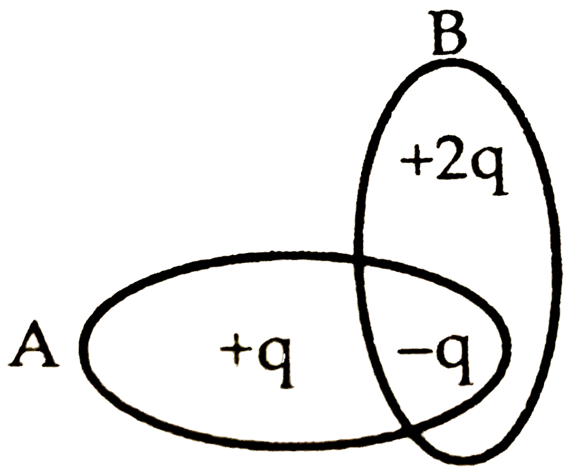
413. What is T.N.E.I. through the surface A and B respectively ?



A. (q, 2q)

B. (-q, -2q)

C. (0, q)

D. (q, 0)

Answer: C

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414. The number of tubes of force through a charge 'q' is

A. q

B. $q/\in_0$

C. $2q/\in_0$

D. 0

Answer: B

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415. A parallel plate capacitor of 6 μF is connected across 18 V battery and charged. The battery is k = 2.1 is introduced between the plates. What will be the charge on capacitor ?

A. $50 \mu C$

B. $108 \mu C$

C. $60 \mu C$

D. $85\mu C$

Answer: B

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416. Four capacitors are connected as shown in figure. The equivalent capacitance between A and B is

A. $80\mu F$

B. $40\mu F$

C. $60\mu F$

D. $20\mu F$

Answer: D

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417. Ampere second is a unit of

A. capacitance

B. charge

C. energy

D. power

Answer: B

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418. The capacity of a parallel plate condenser is $12\mu F$. Its capacity, when the separation between plates is doubled and area is halved will be

A. $3\mu F$

B. $12\mu F$

C. $6\mu F$

D. $1.5\mu F$

Answer: A

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419. A metal surface of area $1m^2$ is charged with $\sqrt{8.85}\mu C$ in air. The mechanical force acting on it is

A. $0.05N/m^2$

B. $1.5N/m^2$

C. $0.5N/m^2$

D. $2.5N/m^2$

Answer: C

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420. If a $4\mu F$ capacitor is charged to 1 kV, then energy stored in the capacitor is

A. 1 J

B. 4 J

C. 6 J

D. 2 J

Answer: D

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421. How do you arrange four equal capacitor of $4\mu F$ to get effective capacitance $3\mu F$?

A. three in series, one in parallel

B. two in parallel, two in series

C. three in parallel, one in series

D. all four in series

Answer: C

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422. Cyclinder is charged by 10mC. Length of cyclinder is 1km and radius is 1 mm. Surface charge density of cyclinder is

A. $1.59 \times 10^{-4} C/m^2$

B. $1.59 \times 10^{-2} C/m^2$

C. $1.59 \times 10^{-3} C/m^2$

D. $1.59 \times 10^{-5} C/m^2$

Answer: C

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423. If charge q is induced on outer surface of sphere of radius R, then intensity at a point P at a distance S from its centre is

A. inversely proportional to $(S+R)^2$

B. inversely proportional to R^2

C. inversely proportional to S^2

D. directly proportional to S^2

Answer: C

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424. When three identical capacitors are connected in series, their equivalent capacitance is $2\mu F$. Now they are connected in parallel across a source of e.m.f. 200 V. The total energy stored is

A. 0.36 J

B. 0.48 J

C. 0.16 J

D. 0.08 J

Answer: A

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425. In a parallel plate capacitor with air, the distance between the plates is reduced to half and the space is filled with dielectric of constant 4. If initial capacity of capacitor is $2\mu F$, then final value of capacity is

A. $4\mu F$

B. $8\mu F$

C. $16\mu F$

D. $2\mu F$

Answer: C

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426. Unit of electric flux is

A. Vm

B. V/m

C. Nm/C

D. C/Nm

Answer: A

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427. Consider a sphere of radius R and cylinder of length L. If both have same charge density σ and E_s and E_c are electric intensity at a point at a distance r from axis of sphere and cylinder respectively, then E_s equal to

A. $\dfrac{E_c R}{r}$

B. $\dfrac{E_c r}{R}$

C. $\dfrac{2E_c r}{R}$

D. $\dfrac{E_c r}{2R}$

Answer: A

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428. If $4 \times 10^{20} eV$ energy is required to move a charge of 0.25 coulomb between two points. Then what will be the potential difference between them ?

A. 100 V

B. 256 V

C. 200 V

D. 128 V

Answer: B

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429. A parallel plate capacitor has a capacity c. If a medium of dielectric constant K is introduced between plates, the capacity of capacitor becomes

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

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

C. M^2C

D. KC

Answer: D

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430. Two capacitors of capacities $1\mu F$ and $4\mu F$ are connected in series with battery of 200V. The voltage across them are in the ratio of

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

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

C. $\frac{1}{4}$

D. $\frac{4}{1}$

Answer: D

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431. Energy stored in a condenser of capacity $10uF$, charged to 6kV is used to lift mass of 10 gm. The height to which the body can be raised is (Take $g = 10m / s^2$)

A. 180 m

B. 18 m

C. 1.8 m

D. 1800 m

Answer: D

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432. Three charges +5C, +7C and -4C are situated within a closed surface and charges -5C, -7C and +4C are situated outisde the surace what is the T.N.E.I. over the closed surface?

A. $-8C$

B. 0

C. $+8C$

D. 10 C

Answer: C

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433. Electric intensity at a point just outside a charged conductor of any shape is

A. $\frac{\sigma}{\in_0 K}$

B. $\frac{\sigma}{2 \in_0 K}$

C. $\frac{2\sigma}{\in K}$

D. $\frac{\sigma^2}{2 \in K}$

Answer: A

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434. A capacitor of $20\mu F$ is given a potential difference of 500 V and a $10\mu F$ capacitor is charged through a potential difference of 200 V. What is the potential across each when they are connected in parallel ?

A. 200 V

B. 400 V

C. 600 V

D. 800 V

Answer: B

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435. A string is compressed by 2 mm by a force of 8 N and condenser is charged through a potential difference of 200 V possess a charge of 80 microcoulomb the ratio of energy stored in the two bodies is

A. 1

B. $3/2$

C. 2

D. $1/2$

Answer: A

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436. Condenser is a device used to store

A. large charge at low potential

B. large charge at high potential

C. less charge at low potential

D. less charge at high potential

Answer: A

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437. Two capacitor each of capacity $4\mu F$ are connected in series and third capacitor of capacity $4\mu F$ is connected in parallel with the combination. The equivalent capacitance of the arrangement is

A. $12\mu F$

B. $8\mu F$

C. $6\mu F$

D. $2.65\mu F$

Answer: C

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438. Three capacitor of capacitance $C(\mu F)$ are connected in parallel to which a capacitor of capacitance C is connected in series. Effective capacitance is 3.75. then capacity off each capacitor is

A. $4\mu F$

B. $5\mu F$

C. $6\mu F$

D. $8\mu F$

Answer: B

Watch Video Solution

439. If dielectric is inserted in charged capacitor (battery removed), then quantity that remains constant is

A. capacitance

B. potential

C. intensity

D. charge

Answer: D

Watch Video Solution

440. A charged oil drop is suspended in a uniform filed of $3 \times 10^4 v / m$ so that it neither falls nor rises. The charge on the drop will be (Take the mass of the charge $= 9.9 \times 10^{-15} kg$ and $g = 10 m / s^2$)

A. $3.3 \times 10^{-18} C$

B. $3.2 \times 10^{-18} C$

C. $1.6 \times 10^{-18} C$

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

Answer: A

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441. In a parallel plate capacitor , the capacity increases if

A. area of plate is decreased

B. distance between plate increases

C. area of plate is increased

D. dielectric constant decreases

Answer: C

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442. The electric intensity of outside a charged sphere of radius R at a distance $r(r > R)$ is

A. $\frac{\sigma R^2}{\varepsilon_0 r^2}$

B. $\frac{\sigma r^2}{\varepsilon_0 R^2}$

C. $\frac{\sigma R}{\varepsilon_0 r}$

D. $\frac{\sigma r}{\varepsilon_0 R}$

Answer: A

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443. Capacity of a capacitor is $48\mu F$. When it is charged from 0.1 C to 0.5 C , change in the energy stored is

A. 2500 J

B. $2.5 \times 10^{-3} J$

C. $2.5 \times 10^{6} J$

D. 2.42×10^{-2}

Answer: A

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444. A charged cylinder of radius 3 mm has surface density of charge $4\mu C/m^2$. It is placed in a medium of dielectric constant 6.28. The electric intensity at a point at a distance of 1.5 M from its axis is

A. $1.44V/m$

B. $2.44V/m$

C. $3V/m$

D. $0.5V/m$

Answer: A

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445. If A is the area of each plate, charge on it is q and potential difference is V then the distance between the parallel plate capacitor is

A. $\frac{\varepsilon_0 AV}{2q}$

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

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

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

Answer: B

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446. If n identical capacitors are connected in series and then in parallel then the ratio of effective capacity in parallel and in series combination i.e. $\frac{C_P}{C_S}$ is

A. n

B. $1/n$

C. n^2

D. $1/n^2$

Answer: C

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447. Two identical capacitors are first connected in series and then in parallel. The difference between their effective capacities is $3\mu F$. The capacity of each capacitor is

A. $3\mu F$

B. $4\mu E$

C. $2\mu F$

D. $5\mu E$

Answer: C

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448. Van de Graff generator produces

A. high voltage and high current

B. high voltage and low current

C. low voltage and high current

D. low voltage and low current

Answer: B

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449. A, B and C are the points in a uniform electric field. The electric potential is

A. maximum at B

B. maximum at C

C. same at all the three points A, B and C

D. maximum at A

Answer: A

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

A. $\left(\frac{r}{\sqrt[3]{2}}\right)$

B. $\left(\frac{2r}{\sqrt{3}}\right)$

C. $\left(\frac{2r}{3}\right)$

D. $\left(\frac{r}{\sqrt{2}}\right)^{2}$

Answer: A

451. Surface density of charge on a sphere of radius R in terms of electric intensity E at a distance in free space is

(ε_0 = permittivity of free space)

A. $\in_0 E\left(\frac{R}{r}\right)^2$

B. $\frac{\in_0 ER}{r^2}$

C. $\in_0 E\left(\frac{r}{R}\right)^2$

D. $\frac{\in_0 Er}{R^2}$

Answer: C

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452. Two concentric spheres kept in air have radii R and r. They have similar charge and equal surface charge density σ. The electrical potential at their common centre is (where, $\varepsilon_0 =$ permittivity of free space)

A. $\dfrac{\sigma(R+r)}{\in_0}$

B. $\dfrac{\sigma(R-r)}{\in_0}$

C. $\dfrac{\sigma(R+r)}{2\in_0}$

D. $\dfrac{\sigma(R+r)}{4\in_0}$

Answer: A

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453. In air, a charged soap bubble of radius 'r' is in equilibrium having outside and inside pressures being equal. The charge on the drop is ($\in_0$ = permittivity of free space, T = surface tension of soap solution)

A. $4\pi r^2\sqrt{\dfrac{2T\in_0}{r}}$

B. $4\pi r^2\sqrt{\frac{4T\in_0}{r}}$

C. $4\pi r^2\sqrt{\frac{6T\in_0}{r}}$

D. $4\pi r^2\sqrt{\frac{8T\in_0}{r}}$

Answer: D

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454. Two charges of equal magnitude q are placed in air at a distance 2a apart and third charge $-2q$ is placed at mid-point . The potential energy of the system is (ε_0 = permittivity of free space)

A. $-\dfrac{q^2}{8\pi \in_0 a}$

B. $-\dfrac{3q^2}{8\pi \in_0 a}$

C. $-\dfrac{5q^2}{8\pi \in_0 a}$

D. $-\dfrac{7q^2}{8\pi \in_0 a}$

Answer: D

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455. The differeence in the effective capacity of two similar capacitor when joined in series and then in paralllel is 6 μ F the capacity of each capacitor is

A. $2\mu F$

B. $4\mu F$

C. $8\mu F$

D. $16\mu F$

Answer: B

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456. An electron of mass m and charge q is accelerated from rest in a uniform electric field of strength E. The velocity acquired by it as it travels a distance l is

A. $\left[\frac{2Eql}{m}\right]^{1/2}$

B. $\left[\frac{2Eq}{ml}\right]^{1/2}$

C. $\left[\frac{2Em}{ql}\right]^{1/2}$

D. $\left[\frac{Eq}{ml}\right]^{1/2}$

Answer: A

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457. The electric field intensity at point near and outside the surface of a charged conductor of any shape is E_1 the electric field intensity due to uniformly charged infinite thin plane sheet is E_2 the relation between E_1 and E_2 is

A. $2E_1 = E_2$

B. $E_1 = E_2$

C. $E_1 = 2E_2$

D. $E_1 = 4E_2$

Answer: C

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458. A capacitor $C_1 = 4\mu$ F is connected is series with another capacitor $C_2 = 1\mu$F the combination is connected across DC source of 200 V the ratio of potential across C_2 to C_1 is

A. $2 : 1$

B. $4 : 1$

C. $8 : 1$

D. $16 : 1$

Answer: B

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