## UNIT-1-ELECTROSTATICS 60X1=60

1. The unit of electric flux is
   a) $Nm^2 C^{-1}$ b) $Nm^{-2} C^{-1}$ c) $Nm^2 C$ d) $Nm^{-2} C$
2. An electric dipole is placed in a uniform electric field with its axis parallel to the field. It experiences
   a) only a net force b) neither a net force nor a torque
   c) both a net force and a torque d) only a torque
3. The work done in moving 4 μC charge from one point to another in an electric field is 0.012 J. The potential difference between them is
   a) 3000 V b) 6000 V c) 30 V d) $48 \times 10^3$ V
4. The electric field outside the two oppositely charged plane sheets each of charge density σ is a) $\frac{\sigma}{2\epsilon_0}$ b) $\frac{\sigma}{2\epsilon_0}$ c) $\frac{\sigma}{\epsilon_0}$ d) zero
5. Which of the following quantities is a scalar ?
   a) Electric force b) Electric field c) Dipole moment d) Electric potential
6. Torque on a dipole in a uniform electric field is maximum when angle between $\vec{P}$ and $\vec{E}$ is a) 0° b) 90° c) 45° d) 180°
7. Potential energy of two equal negative point charges of magnitude 2 μC placed 1m apart in air is a) 2 J b) 0.36 J c) 4 J d) 0.036 J
8. A hollow metallic spherical shell carrying an electric charge produces no electric field at points
   a) on the surface of the sphere b) inside the sphere
   c) at infinite distance from the centre of the sphere d) outside the sphere
9. The unit of electric field intensity is
   a) $NC^{-2}$ b) NC c) $Vm^{-1}$ d) Vm
10. Four charges +q, +q, -q and -q respectively are placed at the corners A, B, C and D of a square of side a. The electric potential at the centre O of the square is
    a) $\frac{1}{4\pi\varepsilon_0}\frac{q}{a}$ b) $\frac{1}{4\pi\varepsilon_0}\frac{2q}{a}$ c) $\frac{1}{4\pi\varepsilon_0}\frac{4q}{a}$ d) zero
11. The value of permittivity of free space is
    a) $8.854 \times 10^{12} C^2 N^{-1} m^{-2}$ b) $9 \times 10^9 C^2 N^{-1} m^{-2}$
    c) $\frac{1}{9x10^9} C^2 N^{-1} m^{-2}$ d) $\frac{1}{4\pi \times 9 \times 10^9} C^2 N^{-1} m^{-2}$
12. The principle used in lightning conductors is
    a) corona discharge b) mutual induction
    c) self - induction d) electromagnetic induction
13. The unit of electric dipole moment is
    a) volt / metre (V/m) b) Coulomb / metre (C / m)
    c) volt. metre (Vm) d) Coulomb. metre (Cm)
14. Electric potential energy of an electric dipole in an electric field is given as

a) pE sin θ b) – pE sin θ c) –pE cos θ d) pE cos θ

15. Electric field intensity is 400 V/m at a distance of 2 m from a point charge. It will be 100 V/m at a distance of
a) 50 cm b) 4 cm c) 4 m d) 1.5 m

16. The number of electric lines of force originating from a charge of 1 micro coulomb is
a) $1.129 \times 10^{5}$ b) $1.6 \times 10^{-19}$ c) $6.25 \times 10^{18}$ d) $8.85 \times 10^{-12}$

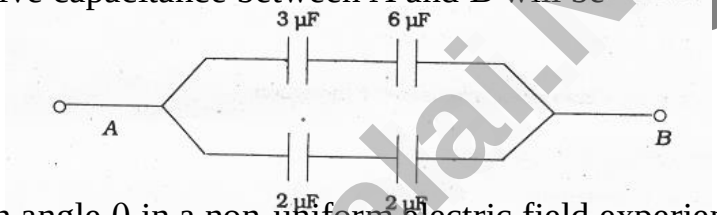
17. The equivalent capacitance of two capacitors in series is 1.5 μF. The capacitance of one of them is 4μF. The value of capacitance of the other is
a) 2.4 μF b) 0.24 μF c) 0.417 μF d) 4.17 μF

18. The law that governs the force between electric charges is
a) Ampere's law b) Faraday's law c) Coulomb's law d) Ohm's law

19. Which of the following is not a dielectric?
a) Ebonite b) Mica c) Oil d) Gold

20. The work done in moving 500 μC charge between two points on equipotential surface is
a) zero b) finite positive c) finite negative d) infinite.

21. In the given circuit, the effective capacitance between A and B will be
a) 3μF
b) 36/13 F
c) 13 μF
d) 7 μF.




22. An electric dipole placed at an angle θ in a non-uniform electric field experiences
a) neither a force nor a torque b) torque only
c) both force and torque d) force only.

23. A capacitor of capacitance 6 μF is connected to a 100 V battery. The energy stored in the capacitor is
a) 30 J b) 3 J c) 0.03 J d) 0.06 J

24. When an electric dipole of dipole moment P is aligned parallel to the electric field E then the potential energy of the dipole is given as
a) PE b) zero c) –PE d) $PE/\sqrt{2}$

25. The capacitance of a parallel plant capacitor increases from 5 μF to 60 μF when a dielectric is filled between the plates. The dielectric constant of dielectric is
a) 65 b) 55 c) 12 d) 10

26. The unit of $\frac{1}{4\pi\varepsilon_0}$ is
a) $C^2N^{-1}m^{-2}$ b) $Nm^2\ C^{-2}$ c) $Hm^{-1}$ d) $NC^{-2}m^{-2}$

27. Quantisation of electric charge is given by
a) n = qe b) q = cv c) n = q/e d) a = c/v

28. An example of conductor is
a) glass b) human body c) dry wood d) ebonite

29. The magnitude of the force acting on a charge of $2x10^{-10}$ C place din a uniform electric field of 10 $Vm^{-1}$ is
a) $2 \times 10^{-9}$ N b) $4 \times 10^{-9}$ N c) $2 \times 10^{-10}$ N d) $4 \times 10^{-10}$ N

30. Electric potential energy (U) of two point charges is

a) $\frac{q_1 q_2}{4\pi\varepsilon_0 r^2}$ b) $\frac{q_1 q_2}{4\pi\varepsilon_0 r}$ c) PE cos $\theta$ d) PE sin $\theta$

31. The torque ($\tau$) experienced by an electric dipole placed in a uniform electric field (E) at an angle $\theta$ with the field is

a) PE cos$\theta$ b) – PE cos$\theta$ c) PE sin$\theta$ d) 2 PE sin $\theta$

32. The capacitance of a parallel plate capacitor increases from 5 μF to 50 μF when a dielectric is filled between the plates. The permittivity of the electric is

a) 8.854 x $10^{-12}$ $C^2$ $N^{-1}$ $m^{-2}$ b) 8.854 x $10^{-11}$ $C^2$ $N^{-1}$ $m^{-2}$ c) 12 d) 10

33. The negative gradient of potential is

a) electric force b) torque c) electric current d) electric field intensity

34. When a point charge of 6 $\mu$ c is moved between the two points is an electric field, the work done is 1.8 x $10^{-5}$J. The potential difference between the two point is

a) 1.08 v b) 1.08 $\mu$ v c) 3v d) 30 v

35. Three capacitors of capacitances 1 $\mu$ F, 2 $\mu$ F and 3 $\mu$ F are connected in series. The effective capacitance of the capacitors is

a) 6 $\mu$ F b) $\frac{11}{6}$ $\mu$ F c) $\frac{6}{11}$ $\mu$ F d) $\frac{1}{6}$ $\mu$ F

36. An electric dipole of moment $\vec{p}$ is placed in a uniform electric field of intensity $\vec{E}$ at an angle $\theta$ respect to the field. The direction of the torque is

a) along the direction of $\vec{p}$ b) opposite to the direction of $\vec{p}$

c) along the direction of $\vec{E}$ d) perpendicular to the plane containing $\vec{p}$ and $\vec{E}$

37. The electric field intensity at a distance r due to infinitely long straight charged wire is directly proportional to

a) r b) $\frac{1}{r}$ c) $r^2$ d) $\frac{1}{r^2}$

38. The ratio of electric potential at points 10 cm and 20 cm from the centre of an electric dipole along its axial line is

a) 1 : 2 b) 2 : 1 c) 1 : 4 d) 4 : 1

39. The intensity of electric field at a point is equal to

a) the force experienced by a charge q

b) the work done is bringing unit positive charge from infinity to that point

c) the positive gradient of the potential

d) the negative gradient of the potential

40. The capacitance of a capacitor is

a) directly proportional to the charge q given to it b) inversely proportional to its potential v

c) directly proportional to the charge q and inversely proportional to the potential v

d) independent of both the charge q and potential v.

41. The intensity of the electric field that produces a force of $10^{-5}$ N on a charge of 5 $\mu$ C is

a) 5 x $10^{-11}$ $NC^{-1}$ b) 50 $NC^{-1}$ c) 2 $NC^{-1}$ d) 0.5 $NC^{-1}$

42. The unit of the number of electric lines of force passing through a given area is

a) no unit b) $NC^{-1}$ c) $Nm^2 C^{-1}$ d) Nm

43. If a point hes at a distance 'x 'from the mid-point of the dipole, the electric potential at this point is proportional to

a) $\frac{1}{x^2}$ b) $\frac{1}{x^3}$ c) $\frac{1}{x^4}$ d) $\frac{1}{x^{\frac{3}{2}}}$

44. The unit of permittivity is

a) $C^2N^{-1}m^{-2}$ b) $N\ m^2C^{-2}$ c) $Hm^{-1}$ d) $NC^{-2}m^{-2}$

45. A dielectric medium is placed in an electric field $E_o$. The field induced inside the medium
a) acts in the direction of the electric field $E_o$ b) acts opposite to $E_o$
c) acts perpendicular to $E_0$ d) is zero

46. A non-polar dielectric is placed in an electric field (E). Its induced dipole moment

a) is zero b) acts in the direction of E

c) acts opposite to the directinon of E d) acts perpendicular to E.

47. n capacitors each of capacitance C are connected in series. The effective capacitance is

a) $\frac{n}{C}$ b) $\frac{C}{n}$ c) nC d) C

48. The direction of electric field at a point on the equatorial line due to an electric dipole is
a) along the equatorial line towards the dipole

b) along the equatorial line away from the dipole
c) parallel to the axis o the dipole and opposite to the direction of dipole moment.

d) parallel to the axis of the dipole and in the direction of dipole moment

49. When the charge given to a capacitor is doubled, its capacitance

a) increase twice b) decrease twice c) increases four times d) does not change

50. The value of relative permittivity of air is

a) $8.854 \times 10^{-12}\ C^2\ N^{-1}\ m^{-2}$ b) $9 \times 10^{9}\ C^2\ N^{-1}\ m^{-2}$ c) 1 d) $8.854 \times 10^{12}$

51. The electric field intensity at a short distance r form uniformly charged infinite plane sheet of charge is

a) proportional to r b) proportional to 1/r

c) proportional to $1/r^2$ d) independent of r

52. Two point charges +q and –q are placed at points A and B respectively separate by a small distance. The electric field intensity at the midpoint O of AB

a) is zero b) acts along AB c) acts along BA d) acts perpendicular to AB

53. An electric dipole of dipole moment 'p' is kept parallel to an electric field of intensity 'E'. The work done in rotating the dipole through an angle of 90° is :

a) Zero b) –pE c) pE d) 2pE

54. The total flux over a closed surface enclosing a charge q (in $Nm^2\ C^{-1}$ )

a) $8\pi\ q$ b) $9 \times 10^{9} q$ c) $36\pi \times 10^{9} q$ d) $8.854 \times 10^{-12}\ q$

55. The repulsive force between two like charges of 1 coulomb each separated by a distance of 1 m in vacuum is equal to :

a) $9 \times 10^{9}$ N b) $10^{9}$N c) $9 \times 10^{-9}$ N d) 9 N

56. The unit of relative permittivity is

a) $C^2\ N^{-1}\ m^{-2}$ b) $N\ m^2\ C^2$ c) No Unit d) $N\ m^{-2}\ C^{-2}$

57. The electric field between the two oppositely charged plane sheets each of charge density σ is

a) $\frac{\sigma}{2\epsilon_0}$ b) $\frac{\sigma}{2\epsilon_0}$ c) $\frac{\sigma}{\epsilon_0}$ d) zero

58. What must be the distance between two equal and opposite points charges (say +q and -q) for the electro static force between them to have a magnitude of 16N?

a) $4\sqrt{kq}$ metre b) $\frac{q}{4}\sqrt{k}$ metre c) 4kq metre d) $\frac{4k}{q}$ metre

59. A non-polar molecule is placed in an external electric field $\vec{E}$ The induced dipole moment acts:

a) in the direction of $\vec{E}$ b) opposite to the direction of $\vec{E}$

c) perpendicular to the direction of $\vec{E}$ d) at random

60. Van de Graaff generator works on the principle of :

a) electromagnetic induction and action of points

b) electrostatic induction and action of points

c) electrostatic induction only

d) action of points only



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