# QB365 Question Bank Software Study Materials

## Electrostatics 50 Important 1 Marks Questions With Answers (Book Back and Creative)

12th Standard

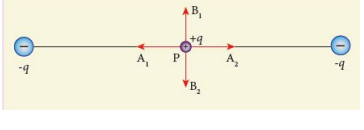
**Physics**

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

1) Two identical point charges of magnitude –q are fixed as shown in the figure below. A third charge +q is placed midway between the two charges at the point P. Suppose this charge +q is displaced a small distance from the point P in the directions indicated by the arrows, in which direction(s) will +q be stable with respect to the displacement?



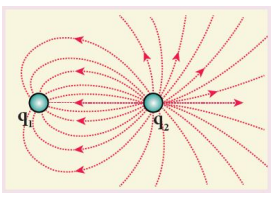

(a) $A_1$ and $A_2$ **(b) $B_1$ and $B_2$** (c) both directions (d) No stable

2) Which charge configuration produces a uniform electric field?

(a) point charge (b) uniformly charged infinite line **(c) uniformly charged infinite plane**

(d) uniformly charged spherical shell

3) What is the ratio of the charges $\left|\frac{q_1}{q_2}\right|$ for the following electric field line pattern?

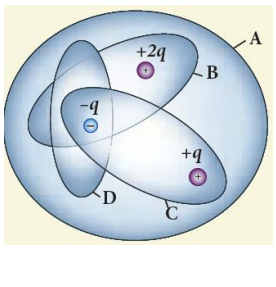



(a) $\frac{1}{5}$ (b) $\frac{25}{11}$ (c) 5 **(d)** $\frac{11}{25}$

4) An electric dipole is placed at an alignment angle of 30° with an electric field of 2 x $10^5$ $NC^{-1}$. It experiences a torque equal to 8 N m. The charge on the dipole if the dipole length is 1 cm is

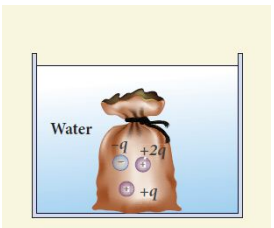
(a) 4 mC **(b) 8 mC** (c) 5 mC (d) 7 mC

5) Four Gaussian surfaces are given below with charges inside each Gaussian surface. Rank the electric flux through each Gaussian surface in increasing order.




**(a) D < C < B < A** (b) A < B = C < D (c) C < A = B < D (d) D > C > B > A

6) The total electric flux for the following closed surface which is kept inside water

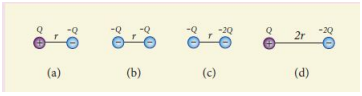



(a) $\frac{80q}{\varepsilon_0}$ **(b)** $\frac{q}{40\varepsilon_0}$ (c) $\frac{q}{80\varepsilon_0}$ (d) $\frac{q}{160\varepsilon_0}$

7) Two identical conducting balls having positive charges $q_1$ and $q_2$ are separated by a centre to centre distance r. If they are made to touch each other and then separated to the same distance, the force between them will be _____.

(a) less than before (b) same as before **(c) more than before** (d) zero

8) Rank the electrostatic potential energies for the given system of charges in increasing order

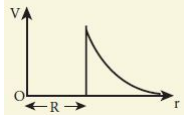


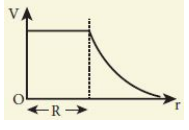

**(a) 1 = 4 < 2 < 3** (b) 2 = 4 < 3 < 1 (c) 2 = 3 < 1 < 4 (d) 3 < 1 < 2 < 4

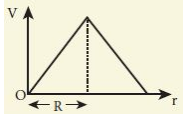
9) An electric field $\vec{E} = 10x\hat{i}$ exists in a certain region of space. Then the potential difference V = $V_o$ – $V_A$, where $V_o$ is the potential at the origin and $V_A$ is the potential at x = 2 m is _____.

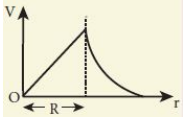
(a) 10 V (b) -20 V **(c) +20 V** (d) -10 V

10) A thin conducting spherical shell of radius R has a charge Q which is uniformly distributed on its surface. The correct plot for electrostatic potential due to this spherical shell is _____.

(a) 

**(b)** 

(c) 

(d) 


11) Two points A and B are maintained at a potential of 7 V and -4 V respectively. The work done in moving 50 electrons from A to B is _____.

**(a) 8.80 x $10^{-17}$ J** (b) -8.80 x $10^{-17}$ J (c) 4.40 x $10^{-17}$ J (d) 5.80 x $10^{-17}$ J

12) If voltage applied on a capacitor is increased from V to 2V, choose the correct conclusion.

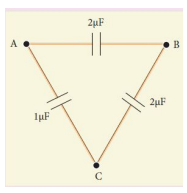
(a) Q remains the same, C is doubled (b) Q is doubled, C doubled **(c) C remains same, Q doubled**

(d) Both Q and C remain same

13) A parallel plate capacitor stores a charge Q at a voltage V. Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?

(a) Capacitance (b) Charge (c) Voltage **(d) Energy density**

14) Three capacitors are connected in triangle as shown in the figure. The equivalent capacitance between the points A and C is




(a) 1μF **(b) 2μF** (c) 3μF (d) $\frac{1}{4}$μF

15) Two metallic spheres of radii 1 cm and 3 cm are given charges of -1 × $10^{-2}$ C and 5 × $10^{-2}$ C respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is

**(a) 3 × $10^{-2}$ C** (b) 4 × $10^{-2}$ C (c) 1 × $10^{-2}$ C (d) 2 × $10^{-2}$ C

16) _____ and Coulomb's law form fundamental principles of electrostatics

(a) Newton's law of gravitation **(b) superposition principle** (c) ohm's law (d) Kepler's law

17) In a hydrogen atom the electron revolves around the proton in an orbit of 0.53 $\mathring{A}$. The potential produced by the electron on the nuleus is _____

(a) 6.8 V (b) 13.6 V (c) 54.4 V **(d) 27.2 V**

18) The concept of 'Field' was introduced by _____

(a) Faraday (b) Gauss **(c) Maxwell** (d) None

19) The expression for electric field in vector form is

(a) $\frac{1}{4\pi\varepsilon_0}\frac{q}{r}\hat{r}$ (b) $\frac{-1}{4\pi\varepsilon_0}\frac{q}{r}\hat{r}$ (c) $\frac{-1}{4\pi\varepsilon_0}\frac{q}{r^2}\hat{r}$ **(d)** $\frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}\hat{r}$

20) Which one of these is a vector quantity?

(a) Electric charge **(b) Electric field** (c) Electric flux (d) Electric potential

21) The expression for the electric field due to a surface of total charge 'Q' is given by _____

**(a)** $\vec{E} = \frac{1}{4\pi\varepsilon_0}\int \frac{\sigma dA}{r^2}\hat{r}$ (b) $\vec{E} = \frac{1}{4\pi\varepsilon_0}\int \frac{\rho dA}{r^2}\hat{r}$ (c) $\vec{E} = \frac{1}{4\pi\varepsilon_0}\int \frac{\lambda dl}{r^2}\hat{r}$ (d) $\vec{E} = \frac{1}{4\pi\varepsilon_0}\int \frac{dq}{r^2}\hat{r}$

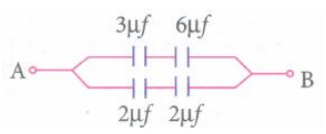
22) The potential due to a single point charge falls as

(a) $\frac{1}{r^2}$ (b) $\frac{1}{r^3}$ **(c)** $\frac{1}{r}$ (d) $-\frac{1}{r}$

23) The time taken by a conductor to reach electrostatic equilibrium is in the order of

(a) $10^{-18}$ (b) $10^{-14}$s **(c) $10^{-16}$ s** (d) $10^{-20}$ s

24) In the given cricuit the effective capacitance between A and B will be




**(a) 3μf** (b) $\frac{36}{13}$ μf (c) 13μf (d) 7μf

25) The capacitance of a parallel plate capacitor increases from 5μf of 50μf when a dielectric is filled between the plates. The permitivity of the dielectric is

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

26) A bird sitting an a high power line

(a) gets killed instantly (b) gets a mild shock **(c) is not affected practically** (d) gets a fatal shock

27) Two conducting charged spheres x and y having unequal charges are connected by a wire. Which of the following is true?

**(a) charge is conserved** (b) electrostatic energy is conserved (c) both the charge and electrostatic energy are conserved

(d) neither of these is conserved

28) Two identical metal balls with charges +2Q and -Q are separated by some distance and exerts a force F on each other. They are joined by a conducting wire, which is then removed. The force between them will now.

**(a) F/8** (b) F/12 (c) F (d) F/4

29) In a parallel plate capacitor of capacitance C, a metal sheet is inserted between the plates, parallel to them. The thickness of the sheet is half of the separation between the plates. The capacitance now becomes

**(a) 2C** (b) $\frac{C}{4}$ (c) 4C (d) $\frac{C}{2}$

30) Which of the following cannot be the units of electric field intensity?

(a) $NC^{-1}$ (b) $Vm^{-1}$ (c) $JC^{-1}/m$ **(d) $JC^{-1}$**

31) When three capacitors are joined in series, the total capacitance is

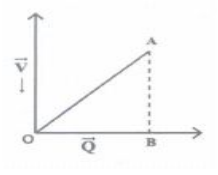
(a) Equal to the sum of the capacitance **(b) Greater than the value of the maximum capacitance**

(c) Less than the value of the mininim capacitance (d) none of the above

32) A charge Q μ C is placed at the center of a cube. The flux coming out from any surface will be

(a) $\frac{Q}{24\varepsilon_0}$ (b) $\frac{Q}{8\varepsilon_0}$ **(c)** $\frac{Q}{6\varepsilon_0} \times 10^{-6}$ (d) $\frac{Q}{6\varepsilon_0} \times 10^{-3}$

33) Charge Q on a capacitor varies with voltage V as shown in graph, where Q is along X-axis and V along Y-axis. The area of triangle OAB represents

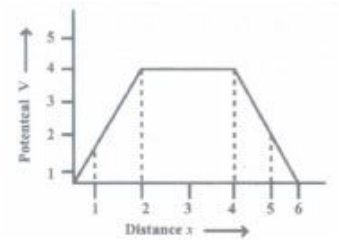



(a) capacitance (b) capacitive reactance (c) magnetic field between the plates **(d) energy stored in the capacitor**

34) A charge q is placed at the centre of a cubical box of side with top open. The flux of electric field through the surface of the cubical box is

(a) Zero (b) $\frac{q}{\varepsilon_0}$ (c) $\frac{q}{6\varepsilon_0}$ **(d)** $\frac{5q}{6\varepsilon_0}$

35) Find the electric field at x = 5m from the graph.




**(a) 2 V/m** (b) -2.5 V/m (c) 2/5 V/m (d) -2/5 V/m

36) For a large charge accumulation, the end of the conductor should have larger curvature that is_____.

(a) bigger radius **(b) Smaller radius** (c) maximum radius (d) less bent

37) The electric flux is _____ if the electric field lines enter the closed surface.

(a) positive **(b) negative** (c) zero (d) maximum

38) Electrostatics deals with the _____

(a) charges in motion **(b) static electric charges** (c) charges through conductors (d) accelerated charges

39) The force between two charges at a particular distance in air is 36 N. If the distance between the charges is filled by a medium of dielectric constant 6, then the force is:

(a) 216 N **(b) 6 N** (c) 30 N (d) 24 N

40) Two charged bodies of charges +q, -3q are brought in contact and separated. The charges prossed by each body after separation.

**(a) -q,-q** (b) +q,-2q (c) -q, +3q (d) q, q

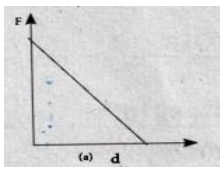
41) The torque ($\tau$) experienced by an electric dipole placed in a uniform electric field (E) at an angle θ with the field is

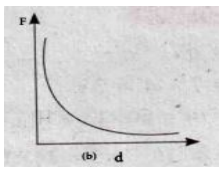
(a) pEcosθ (b) pE cosθ **(c) pE sinθ** (d) 2pE sinθ

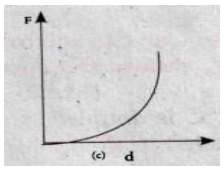
42) Two charges are placed at a distance apart. lf a glass slab is introduced between the force between them will

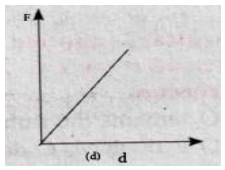
(a) increase **(b) decrease** (c) remain the same (d) be zero

43) Which of the following graph represents the variation between the force between two point charges and the distance between them?

(a) 


**(b)** 


(c) 


(d) 


44) Which one of the following is correct with reference to properties of electric lines of force?

(a) Electric lines start from negative charge and terminate at positive charge

**(b) Electric lines start from positive charge and terminate at negative charge** (c) Electric lines intersect each other

(d) Electric lines are dense in a weak electric field

45) The number of electric lines of force passing through a given surface area perpendicular to the lines is

(a) inversely proportional to the magnitude of the electric field

**(b) directly proportional to the magnitude of the electric field**

(c) directly proportional to the direction of the electric field (d) inversely proportional to the direction of the electric field

46) An electric dipole placed in a uniform electric field has minimum potential energy. The angle of inclination of the dipole moment with the field is _____.

(a) $2\pi$ (b) $\pi$ **(c) Zero** (d) $\frac{\pi}{4}$

47) The electric field outside the plates of two oppositely charged plane sheets of charge density $\sigma$ is

(a) $\frac{\sigma}{\varepsilon_0}$ (b) $\frac{\sigma}{2\varepsilon_n}$ **(c) Zero** (d) Infinity

48) The surface charge density will be great if

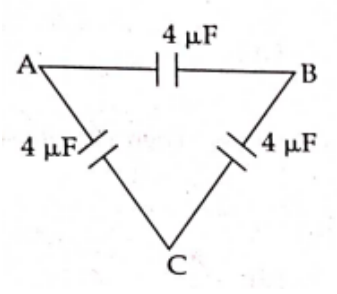
**(a) smaller the radius of curvature at any point** (b) greater the radius of curvature at any point (c) surface is spherical

(d) surface is plane

49) At infinity, the electrostatic potential is

(a) infinity (b) maximum (c) minimum **(d) zero**

50) Three capacitors are connected in triangle as shown in figure. The equivalent capacitance between the points A and C is:




(a) 4 μF (b) 2 μF (c) 8 μF **(d) 6 μF**