BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

Date: 09/11/2021

Subject: Physics

Topic : Electrostatics   Class: Standard XII

---

1. If a charged body is placed near a neutral conductor, then

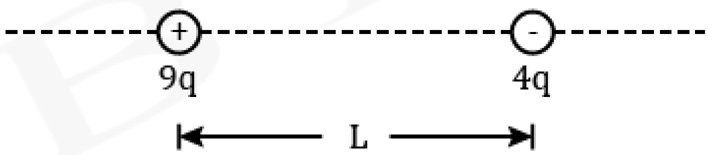
   A. It will repel the conductor

   B. It will attract the conductor

   C. It will not exert either attractive or repulsive force on conductor

   D. It may repel or attract conductor, depending on its shape

2. For the given system of charges, where should a third charge $+16q$ be placed from negative charge, so that third charge experiences no net force?



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

   B. L

   C. $2L$

   D. $3L$

3. An electric dipole has the magnitude of its charge as q and its dipole moment is p. It is placed in a uniform electric field E. If its dipole moment is along the direction of the field, the net force acting on it and its potential energy are respectively

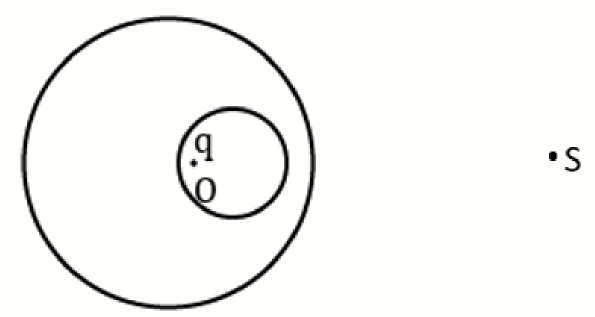
   A. $2qE$ and minimum

   B. qE and pE

   C. Zero and minimum

   D. qE and maximum

4. A charge q is placed at point O in a cavity in a spherical uncharged conductor. Point S is outside the conductor. If q is displaced from O towards S such that it is still inside the cavity, then electric field at S will



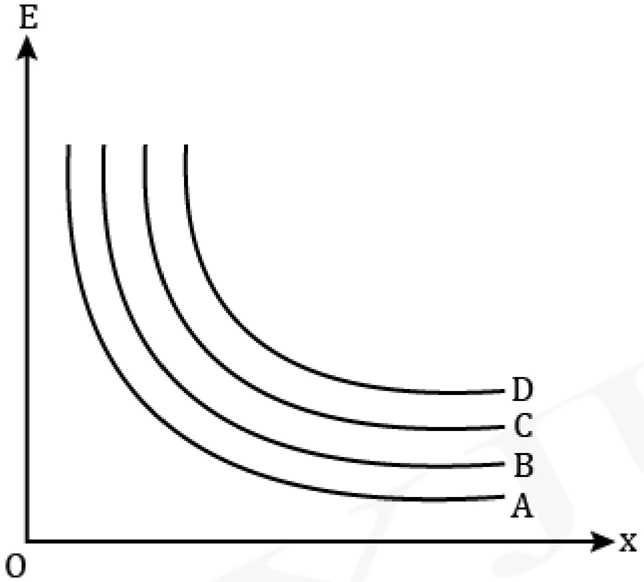
   A. increase

   B. decrease

   C. first increase and then decrease

   D. remains unchanged

5. Given graph shows electric field intensity due to a point charge (E) at a distance (x) from it.
Here graphs(A, B, C, D) corresponding to four charges are shown. Which graph represents the charge of higher magnitude?



A. A

B. B

C. C

D. D

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

A. $2\pi R^2 E$

B. $\pi R^2 / E$

C. $(\pi R^2 - \pi R)/E$

D. Zero

7. Two small spheres each having the charge $+Q$ are suspended by insulating threads of length L from a hook. This arrangement is taken in space where there is no gravitational effect. Then the angle between the two threads at the point of suspension and the tension in each thread will be

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

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

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

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

8. 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

9. Two point charges Q_1 and Q_2 placed at separation d in vacuum and force acting between them is F. Now a dielectric slab of thickness $\dfrac{d}{2}$ and dielectric constant $K = 4$ is placed between them. The new force between the charges will be

A. $\dfrac{4F}{9}$

B. $\dfrac{2F}{9}$

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

D. $\dfrac{5F}{9}$

BYJU'S Study Planner for Board Term I (CBSE Grade 12)

10. The electric potential decreases uniformly from $120 \mathrm{~V}$ to $80 \mathrm{~V}$ as one moves on the $x-$ axis from $x=-1 \mathrm{~cm}$ to $x=+1 \mathrm{~cm}$. The electric field at the origin.

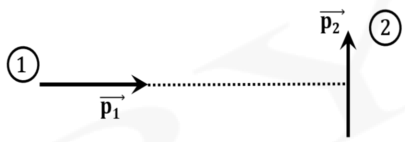
   A. must be equal to $20 \mathrm{~V} / \mathrm{cm}$

   B. must be equal to $20 \mathrm{~V} / \mathrm{m}$

   C. may be greater than $20 \mathrm{~V} / \mathrm{cm}$

   D. may be less than $20 \mathrm{~V} / \mathrm{cm}$

11. Assertion(A): If a dipole $(\overrightarrow{p_1})$ is moved along the line normal to the axis (shown in dotted line) of another dipole $(\overrightarrow{p_2})$, their interaction energy does not change.



Reason(R): The electric field due to $(\overrightarrow{p_2})$ at the position of $(\overrightarrow{p_1})$ is normal to $(\overrightarrow{p_1})$

Select the most appropriate answer from the options given below

   A. Both A and R are true and R is the correct explanation of A

   B. Both A and R are true but R is not the correct explanation of A

   C. A is true but R is false

   D. A is false and R is also false

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

12. Assertion(A): In the frame of reference where all the considered charges are at rest, the force experienced by a moving test charge due to all considered charges is purely electrical in nature.

Reason(R): A stationary charge produces an electric field only.

Select the most appropriate answer from the options given below

A. Both A and R are true and R is the correct explanation of A

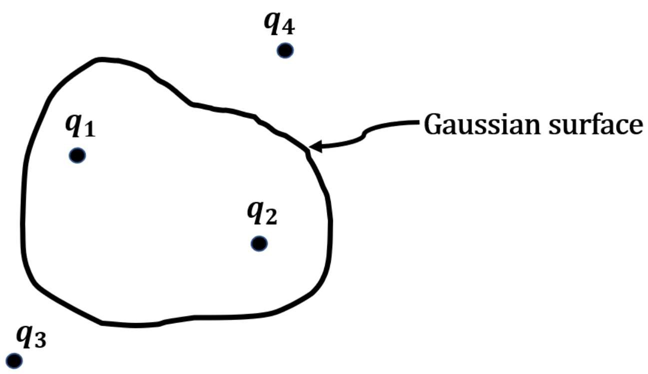
B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false and R is also false

13. Assertion(A): Four point charges q_1, q_2, q_3 and q_4 are as shown in figure. The flux over the shown gaussian surface depends only on charges q_1 and q_2

Reason(R): Electric field at all points on gaussian surface is depends only on charges q_1 and q_2



Select the most appropriate answer from the options given below

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

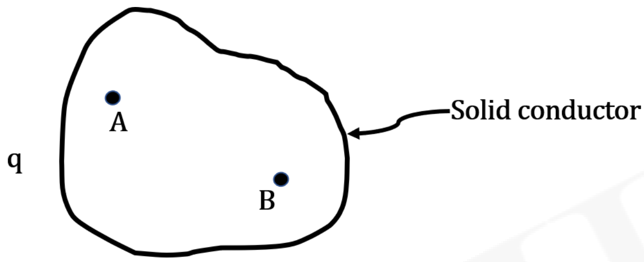
C. A is true but R is false

D. A is false and R is also false

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

14. Assertion(A) : A point charge q is placed near an arbitrary shaped solid conductor, as shown in the figure. The potential difference between points A and B within the conductor remains same irrespective of the magnitude of the charge q.

Reason(R) : Electric field inside the solid conductor is zero under the electrostatic conditions.



Select the most appropriate answer from the options given below

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false and R is also false

15. Assertion(A): In a region where, uniform electric field exists, the net charge within a volume of any size is zero.

Reason(R): Net electric flux within any closed surface in the region of uniform electric field is zero.

Select the most appropriate answer from the options given below

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false and R is also false

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

16. In a certain region, uniform electric field exists as $\overrightarrow{E} = E_0\hat{j}$. A proton and an electron are projected from origin at time $t = 0$ with certain velocities along $+x$-axis direction. Due to the electric field, they experience force and move in the xy-plane along different trajectories.

(i) The path followed by the particles will be a

A. parabola

B. circular

C. hyperbola

D. spiral

17. In a certain region, uniform electric field exists as $\overrightarrow{E} = E_0\hat{j}$. A proton and an electron are projected from origin at time $t = 0$ with certain velocities along $+x$-axis direction. Due to the electric field, they experience force and move in the xy-plane along different trajectories.

(ii) If they have same kinetic energy then for the same displacement along $+x$-direction, the deflection is

A. more for proton

B. more for electron

C. equal for both

D. independent of kinetic energy

18. In a certain region, uniform electric field exists as $\overrightarrow{E} = E_0\hat{j}$. A proton and an electron are projected from origin at time $t = 0$ with certain velocities along $+x$-axis direction. Due to the electric field, they experience force and move in the xy-plane along different trajectories.

(iii) If they have the same initial velocity then for the same displacement along x axis, displacement along y axis is

A. more for proton

B. more for electron

C. equal for both

D. independent of kinetic energy

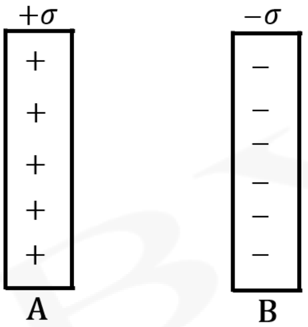
BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

19. Charge between parallel plates :

Surface charge density is defined as the charge per unit surface area of surface charge distribution. i.e., $\sigma = \frac{q}{S}$

Two large thin metal plates are parallel and close to each other, on their inner faces, the plates have surface charge densities of opposite sign having magnitude of $1.70 \times 10^{-22}\ \mathrm{Cm}^{-2}$ as shown in figure.
[Use $\varepsilon_0 = 8.85 \times 10^{-12}\ \mathrm{Fm}^{-1}$]

(i) The electric field E in the region in between the plates A and B is



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

B. $2 \times 10^{-10}\ \mathrm{NC}^{-1}$

C. $0.2 \times 10^{-10}\ \mathrm{NC}^{-1}$

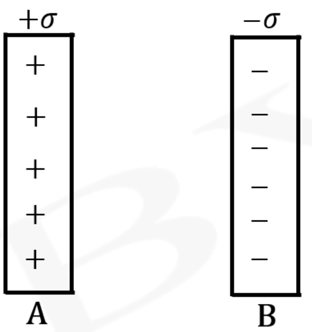
D. $1.2 \times 10^{-12}\ \mathrm{NC}^{-1}$

20. Charge between parallel plates :

Surface charge density is defined as the charge per unit surface area of surface charge distribution. i.e., $\sigma = \frac{q}{S}$

Two large thin metal plates are parallel and close to each other, on their inner faces, the plates have surface charge densities of opposite sign having magnitude of $1.70 \times 10^{-22}\ \mathrm{Cm^{-2}}$ as shown in figure.
[Use $\varepsilon_0 = 8.85 \times 10^{-12}\ \mathrm{Fm^{-1}}$]

(ii)The electric field E in the region to the left of plate A and to the right of plate B is



A. $1.2 \times 10^{-10}\ \mathrm{NC^{-1}}\ ;\ 1.2 \times 10^{-10}\ \mathrm{NC^{-1}}$

B. $1.2 \times 10^{-12}\ \mathrm{NC^{-1}}\ ;\ 1.2 \times 10^{-12}\ \mathrm{NC^{-1}}$

C. $0.2 \times 10^{-10}\ \mathrm{NC^{-1}}\ ;\ 0.2 \times 10^{-10}\ \mathrm{NC^{-1}}$

D. $0\ \mathrm{NC^{-1}}\ ;\ 0\ \mathrm{NC^{-1}}$