ASSIGNMENT SHEET (Physic)

CLASS - XII

UNIT I :- ELECTROSTATICS

1. The unit of permittivity of free space (ε_0) is

(*a*) $CN^{-1}m^{-1}$ (*b*) Nm^2C^{-2}

(*c*) $C^2N^{-1}m^{-2}$ (*d*) $C^2N^{-2}m^{-2}$ [CBSE 2004]

2. When air is replaced by a dielectric medium of dielectric constant κ, the maximum force of attraction between two charges separated by a distance

(*a*) decreases κ times

(*b*) remains unchanged

(*c*) increases κ times

(*c*) decreases κ^2 times. [CBSE 1999]

3. An electron is moving round the nucleus of a hydrogen atom in a circular orbit of radius *r*, The coulomb force $\vec{F}$ between the two is

(*a*) $-k\frac{e^3}{r^3}\hat{r}$ (*b*) $k\frac{e^2}{r^3}\vec{r}$

(*c*) $-k\frac{e^2}{r^3}\vec{r}$ (*d*) $k\frac{e^2}{r^3}\hat{r}$ [CBSE 2003]

4. A charge *q* is placed at the centre of the line joining two exactly equal positive charges *Q*. The system of three charges will be in equilibrium, if *q* is equal to

(*a*) $-Q/4$ (*b*) $+Q$

(*c*) $-Q$ (*d*) $Q/2$ [CBSE 1995]

5. Point charges $+4q$, $-q$ and $+4q$ are kept on the *X*-axis at points $x = 0$, $x = a$ and $x = 2a$ respectively.

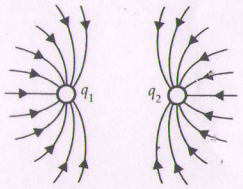
(*a*) Only $-q$ is in stable equilibrium.

(*b*) None of the charges is in equilibrium.

(*c*) All the charges are in unstable equilibrium.

(*d*) All the charges are in stable equilibrium. [CBSE 1992]

6. Figure gives electric lines of force due to two charges q_1 and q_2. What are the signs of the two charges ?



(*a*) Both are negative

(*b*) Both are positive

(*c*) q_1 is positive but q_2 is negative

(*d*) q_1 is negative but q_2 is positive. [CBSE 1994]

7. There is an electric field in the *X*-direction. If the work done in moving a charge of 0.2 C through a distance of 2 m along a line making an angle of 60° with *X*-axis is 4 J, then what is the value of *E* ?

(*a*) $\sqrt{3}\,NC^{-1}$ (*b*) $4\,NC^{-1}$

(*c*) $5\,NC^{-1}$ (*d*) $20\,NC^{-1}$ [CBSE 1995]

8. Torque acting on electric dipole of dipole moment $\vec{p}$ placed in uniform electric field $\vec{E}$ is

(*a*) $\vec{p}\times\vec{E}$ (*b*) $\vec{p}.\vec{E}$

(*c*) $\vec{p}\times(\vec{E}\times\vec{p})$ (*d*) $\vec{E}.\vec{p}/p^2$ [CBSE 2001]

9. A point *P* lies on the perpendicular bisector of an electric dipole of dipole moment *p*. If the distance of *P* from the dipole is *r* (much larger than the size of the dipole), then the electric field at *P* is proportional to

(*a*) p^{-1} and e^{-2} (*b*) *p* and r^{-2}

(*c*) p^2 and r^{-3} (*d*) *p* and r^{-3} [CBSE 1998]

10. Three point charges $+q$, $-2q$ and $+q$ are placed at points $(x = 0, y = a, z = 0)$, $(x = 0, y = 0, z = 0)$ and $(x = a, y = 0, z = 0)$ and $(x = a, y = 0, z = 0)$ respectively. The magnitude and direction of the electric dipole moment vector of this charge assembly are

(*a*) $\sqrt{2}\ qa$ along the line joining the points $(x = 0, y = 0, z = 0)$ and $(x = a, y = a, z = 0)$.

(*b*) qa along the line joining the points $(x = 0, y = 0, z = 0)$ and $(x = a, y = a, z = 0)$.

(*c*) $\sqrt{2}\ qa$ along $+x$ direction.

(*d*) $\sqrt{2}\ qa$ along $+y$ direction. [CBSE 2007]

11. A semi-circular arc of radius *a* is charged uniformly and the charge per unit length is λ. The electric field at the centre is

(*a*) $\frac{\lambda}{4\pi^2\varepsilon_0 a}$ (*b*) $\frac{\lambda}{2\pi\varepsilon_0 a^2}$

(*c*) $\frac{\lambda}{2\pi\varepsilon_0 a}$ (*d*) $\frac{\lambda^2}{2\pi\varepsilon_0 a}$ [CBSE 2000]

12. A point charge $+q$ is placed at the midpoint of a cube of side *l*. The electric flux emerging from the cube is

(*a*) zero (*b*) $\frac{q}{\varepsilon_0}$

(*c*) $\frac{6ql^2}{\varepsilon_0}$ (*d*) $\frac{q}{6l^2\varepsilon_0}$ [CBSE 1993, 96]

13. A charge *q* is located at the centre of a cube. The electric flux through any face is

(*a*) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{4\pi q}{6}$ (*b*) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{\pi q}{6}$

(*c*) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{q}{6}$ (*d*) $\frac{1}{4\pi\varepsilon_0}\cdot\frac{2\pi q}{6}$ [CBSE 2003]

14. A charge *Q* μC is placed at the centre of a cube. The flux coming out from any surface will be

(*a*) $\frac{Q}{6\varepsilon_0}\times10^{-6}$ (*b*) $\frac{Q}{\varepsilon_0}\times10^{-3}$

(*c*) $\frac{Q}{24\varepsilon_0}$ (*d*) $\frac{Q}{8\varepsilon_0}$ [CBSE 2001]

15. A charge *q* μC is placed at the centre of a cube of side 0.1 m. Then the electric flux diverging from each face of this cube is

(*a*) $\frac{q\times10^{-6}}{\varepsilon_0}$ (*b*) $\frac{q}{\varepsilon_0}\times10^{-4}$

(*c*) $\frac{q\times10^{-6}}{6\varepsilon_0}$ (*d*) $\frac{q\times10^{-4}}{6\varepsilon_0}$ [CBSE 1994]

16. A charge *Q* is placed at the corner of a cube. The electric flux through all the six faces of the cube is

(*a*) $\frac{Q}{\varepsilon_0}$ (*b*) $\frac{Q}{6\varepsilon_0}$

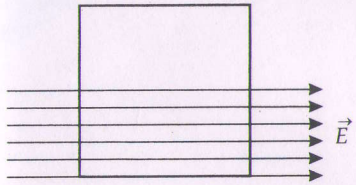
(*c*) $\frac{Q}{8\varepsilon_0}$ (*d*) $\frac{Q}{3\varepsilon_0}$ [CBSE 2000]

17. An electric charge *q* is placed at one of the corners of a cube of side *a*. The electric flux on one of its faces will be

(*a*) $\frac{q}{a\varepsilon_0}$ (*b*) $\frac{q}{\varepsilon_0 a^2}$

(*c*) $\frac{q}{4\pi\varepsilon_0 a^2}$ (*d*) $\frac{q}{24\varepsilon_0}$ [CBSE 1993]

18. A square surface of side *L* metres is in the plane of the paper. A uniform electric $\vec{E}$ (volt m^{-1}), also in the plane of the paper, is limited only to the



lower half of the square surface as shown in the figure. The electric flux (in SI units) associated with the surface is

(*a*) EL^2 (*b*) $\frac{EL^2}{2\ e_0}$

(*c*) $\frac{EL^2}{2}$ (*d*) zero [CBSE 2006]