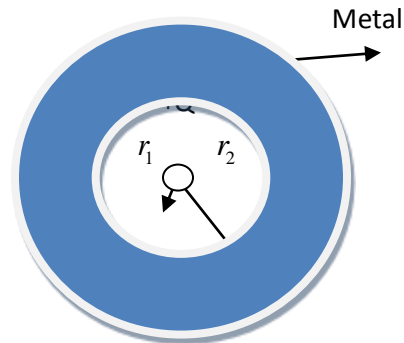


CLASS XII SAMPLE PAPER PHYSICS

Electrostatics

1. If the distance between two equal charges is doubled and their individual charges also doubled, what would happen to the force between the charges? Explain.
2. What is the number of electric lines of forces that radiate from one coulomb of charge in vacuum ?
3. An electric dipole free to move is placed in an uniform electric field . Explain along with diagram its motion when it is placed ,
 - (i) Parallel to the field.
 - (ii) Perpendicular to the field.
4. Two point charges placed at a distance 'r' in air exert a force 'F' on each other . At what distance will these charges experience the same force 'F' in a medium of dielectric constant 'K' .
5. A small metal sphere carrying charge '+Q' is located at the centre of a spherical cavity in a large uncharged metal sphere shown as in fig. Use Gauss' theorem to find electric field at points P_1 and P_2 .



6. A simple pendulum has a length 'l' and the mass of the bob 'm' . The bob is given a charge of 'q' coulomb. The pendulum is suspended between the vertical plates of a charged parallel plate capacitor . If 'E' be the electric

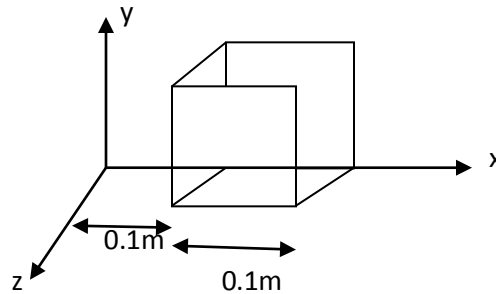
field between the plates , show that the time period of the pendulum is $T \propto \sqrt{\frac{l}{\sqrt{g^2 + \left(\frac{qE}{m}\right)^2}}}$

7. Define electric flux. Write its SI unit .

The electric field components due to a charge inside the cube of side 0.1m are shown

$$E_x = \alpha x \text{ where } \alpha = 500 \text{ NC}^{-1} \text{ m}$$

$$E_y = 0, E_z = 0$$



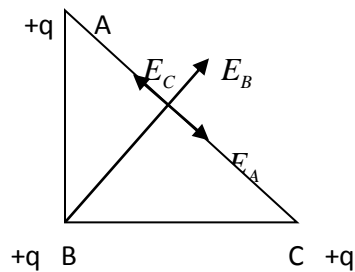
Calculate (i) the electric flux through the cube, and (ii) The charge inside the cube.

8. Two similar balls each having mass m and charge q are hung from a silk thread of length l , prove that the equilibrium separation

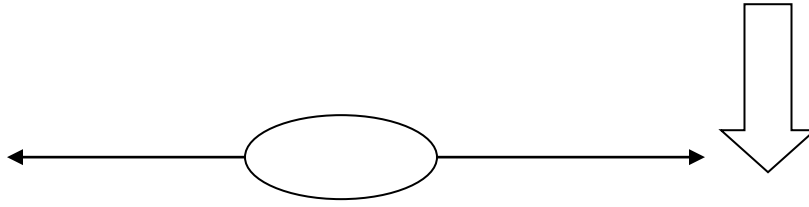
$$x = \left(\frac{q^2 l}{2\pi\epsilon_0 mg} \right)^{1/3}$$

When each thread makes a small angle θ with the vertical.

9. Two infinite parallel plates have uniform charge densities of σ_1 and σ_2 . Determine the electric fields at points (i) to the left of the sheets, (ii) between them, (iii) to the right of the sheets.
10. Find the magnitude and direction of electric field at the point P in Fig.



11. Two small spheres each having mass m Kg and charge q C are suspended from a point by insulating threads each l m long and mass less. If θ is the angle each thread makes with the vertical in equilibrium show that,
- $$q^2 = (4mgl^2 \sin^2 \theta \tan \theta) 4\pi\epsilon_0 .$$
12. State Gauss' Theorem in electrostatics. Using the theorem, derive an expression for the electric field intensity due to an infinitely long straight wire of linear charge density $\lambda \text{ Cm}^{-1}$.



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