Recitation Class
Week 2
(Examples)

Teaching Assistant
Xie Jinglei

Review

Topics

- Electric field
- Electric flux
- Gauss's Law
- Electric Potential (partial)

Discussions

Gauss's Law

Q22.4 A certain region of space bounded by an imaginary closed surface contains no charge. Is the electric field always zero everywhere on the surface? If not, under what circumstances is it zero on the surface?

Exercises

Electric Potential

23.27 •• A thin spherical shell with radius $R_1 = 3.00$ cm is concentric with a larger thin spherical shell with radius $R_2 = 5.00$ cm. Both shells are made of insulating material. The smaller shell has charge $q_1 = +6.00$ nC distributed uniformly over its surface, and the larger shell has charge $q_2 = -9.00$ nC distributed uniformly over its surface. Take the electric potential to be zero at an infinite distance from both shells. (a) What is the electric potential due to the two shells at the following distance from their common center: (i) $r = 0$; (ii) $r = 4.00$ cm; (iii) $r = 6.00$ cm? (b) What is the magnitude of the potential difference between the surfaces of the two shells? Which shell is at higher potential: the inner shell or the outer shell?

Electric Field & Gauss's Law

Electric charge is distributed uniformly along an infinitely long, thin wire. The charge per unit length is λ (assumed positive). Find the electric field by using Gauss's law.

Gauss's Law

An infinite cylinder of radius R is charged non-uniformly with the density of charge $\rho = Ar$, where A is a positive constant. Find the electric field at any point of space (consider both: $r < R$ and $r > R$).

Gauss's Law & Superposition