

Answer on Question #45847, Physics, Electromagnetism

Determine the electric flux through emerging from a cube if a) a charge q is placed at the center of the cube, b) at one corner of a face and c) at the center of the face.

Solution

a) If a charge q is placed at the center of the cube , then the electric flux through emerging from a cube, by Gauss's law, is just

$$\phi = \frac{q}{\epsilon_0}.$$

b) Electric lines of force produced by a charge q placed at one corner of a cube will be shared by 8 other cubes placed in the neighbor of it. Hence electric flux linked with one cube is

$$\phi = \frac{1}{8} \frac{q}{\epsilon_0}.$$

c) Electric lines of force produced by a charge q placed at the center of the face of a cube will be shared by 2 other cubes placed in the neighbor of it. Hence electric flux linked with one cube is

$$\phi = \frac{1}{2} \frac{q}{\epsilon_0}.$$