

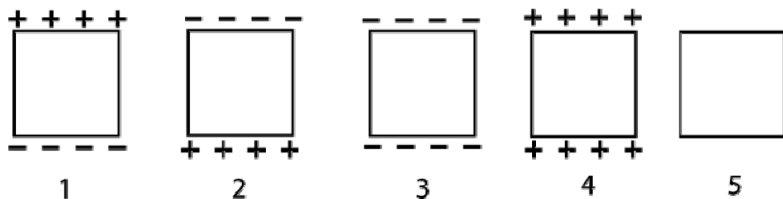
CH 16-4 – Electric Field

Important Ideas

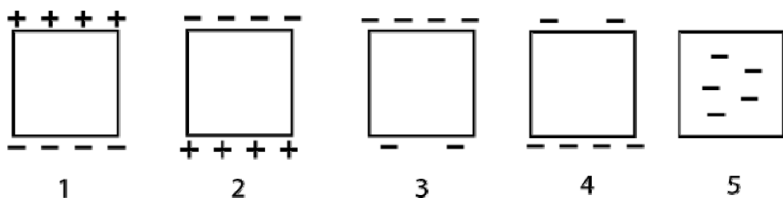
- When a conducting object has a net charge, and/or when the conducting object is placed in a region in which there is an electric field, a number of conditions apply when electrostatic equilibrium is reached. Electrostatic equilibrium is defined as there being no net flow of charge within or on the conducting object.
 1. There is no electric field inside the solid part of the conductor.
 2. The electric field at the surface of the conductor is perpendicular to the surface.
 3. If the conductor is charged, excess charge lies only at the surface of the conductor.
 4. Charge density is highest, and electric field is strongest, on pointy parts of a conductor.
- For a conductor in which there is an applied electric field, the charge on the surface of the conductor will polarize in order to create an electric field that is opposite to the applied electric field everywhere inside the solid part of the conductor. The result is a net electric field of zero everywhere inside the solid part of the conductor.

Examples

1. In a region of space there is an electric field upward (in the $+y$ direction), due to charges not shown in the diagram. A neutral copper block is placed in the region. Which diagram best describes the charge distribution on the block?



2. A negatively charged iron block is placed in a region where there is an electric field downward (in the $-y$ direction) due to charges not shown. Which diagram best describes the charge distribution in and/or on the iron block?



3. A neutral copper block is polarized as shown, due to an electric field made by external charges (not shown). What is the direction of the net electric field at location B which is inside the copper block?



4. A neutral copper block is located near two balls which have equal negative charges, as shown in the diagram. What is the direction of the net electric field at location A?

