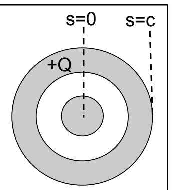
A long coax has total charge +Q on the OUTER conductor.
The INNER conductor is neutral.

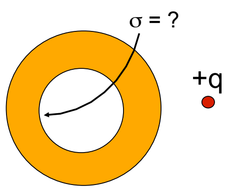


What is the sign of the potential difference, $\Delta V = V(c)-V(0)$, between the center of the inner conductor (s=0) and the outside of the outer conductor?

C) Positive
D) Negative
E) Zero

(To think about: how and where do charges distribute on surfaces?)

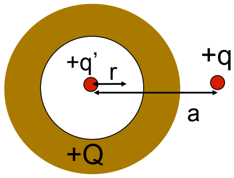
A point charge +q is near a neutral copper sphere with a hollow interior space. In equilibrium, the surface charge density σ on the interior of the hollow space is..



A) Zero everywhere
B) Non-zero, but with zero net total charge on interior surface
C) Non-zero with non-zero net total charge on interior surface.

2.30a

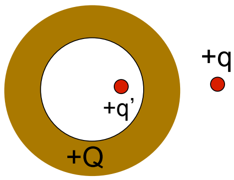
A HOLLOW copper sphere has total charge +Q.
A point charge +q sits outside at distance a.
A charge, q', is in the hole, at the center.
(We are in static equilibrium.)
What is the magnitude of the E-field a distance r from q', (but, still in the "hole" region)



A) $|E| = kq'/r^2$
B) $|E| = k(q'-Q)/r^2$
C) $|E| = 0$
D) $|E| = kq/(a-r)^2$
E) None of these! / it's hard to compute

2.3b

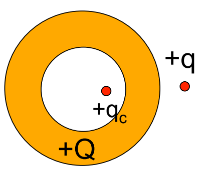
A HOLLOW copper sphere has total charge +Q.
A point charge +q sits outside.
A charge, q', is in the hole, SHIFTED right a bit.
(We are in static equilibrium.)
What does the E field look like in the "hole" region?



A) Simple Coulomb field (straight away from q', right up to the wall)
B) Complicated/ it's hard to compute

2.30c

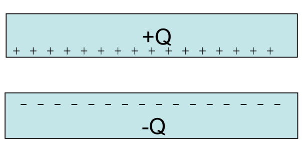
A HOLLOW copper sphere has total charge +Q.
A point charge +q sits outside.
A charge, $+q_c$, is in the hole, SHIFTED right a bit.
(Assume static equilibrium.)
What does the charge distribution look like on the inner surface of the hole?



A) All - charges, uniformly spread around
B) - charges close to q_c, + charges opposite q_c
C) All - but more close to q_c and fewer opposite
D) All + but more opposite q_c and fewer close
E) Not enough information

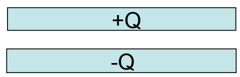
2.49

Given a pair of very large, flat, conducting capacitor plates with surface charge densities +/- σ, what is the E field in the region between the plates?



A) $\sigma/2\varepsilon_0$
B) σ/ε_0
C) $2\sigma/\varepsilon_0$
D) $4\sigma/\varepsilon_0$
E) Something else

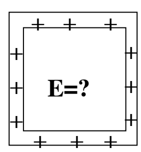
2.49m Given a pair of very large, flat, conducting capacitor plates with total charges +Q and –Q. Ignoring edges, what is the equilibrium distribution of the charge?



A) Throughout each plate
B) Uniformly on both side of each plate
C) Uniformly on top of + Q plate and bottom of –Q plate
D) Uniformly on bottom of +Q plate and top of –Q plate
E) Something else

2.27

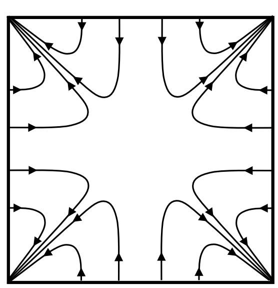
A cubical non-conducting *shell* has a ***uniform*** positive charge density on its surface. (There are no other charges around)
What is the field inside the box?



A: **E**=0 everywhere inside
B: **E** is non-zero everywhere inside
C: **E**=0 only at the very center, but non-zero elsewhere inside.
D: Not enough info given

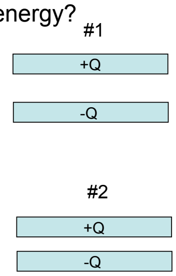
E-field inside a cubical box with a **uniform** surface charge.

The E-field lines sneak out the corners!



2.50

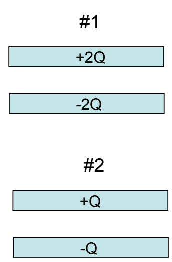
You have two very large parallel plate capacitors, both with the same area and the same charge Q.
Capacitor #1 has twice the gap of Capacitor #2.
Which has more stored potential energy?



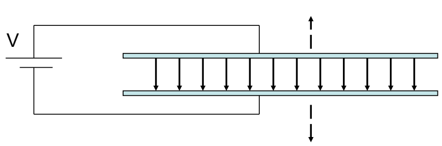
A) #1 has twice the stored energy
B) #1 has *more* than twice
C) They both have the same
D) #2 has twice the stored energy
E) #2 has more than twice.

2.51

You have two parallel plate capacitors, both with the same area and the same gap size.
Capacitor #1 has twice the charge of #2.
Which has more capacitance? More stored energy?



A) C1>C2, PE1>PE2
B) C1>C2, PE1=PE2
C) C1=C2, PE1=PE2
D) C1=C2, PE1>PE2
E) Some other combination!



A parallel plate capacitor is attached to a battery which maintains a constant voltage difference V between the capacitor plates. While the battery is attached, the plates are pulled apart. The electrostatic energy stored in the capacitor

A) increases
B) decreases
C) stays constant.