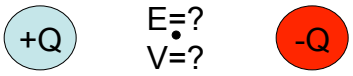
Old Sci-Fi movie trivia:
In the movie Back to the Future, what was the device which was critical to the functioning of Doc Brown's time machine?

A) Micro Black Hole
B) Warp Core
C) Tachyon Field
D) Flux Capacitor
E) Don't know/don't care/...

Two charges, +Q and -Q, are fixed in space. What is the magnitude of the E field, and the value of the voltage, at the midpoint between them?

(Assume the potential is zero at infinity.)



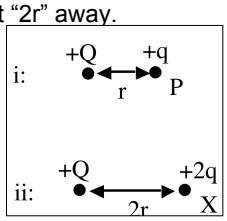
(Midpoint)

A) **E**=0 , V nonzero
B) **E** nonzero , V=0
C) Both are 0
D) Both are nonzero
E) ???

Two test charges are brought separately into the vicinity of a fixed charge +Q.

i: +q is brought to point A, "r" away.

Ii: +2q is brought to a point “2r” away.



(U=0 and V=0 at ∞)

The potential (V) at point P (in situation. i) is

A: greater than…

B: Less than…

C: The same as…

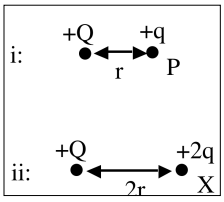
…the potential at point X in situation ii.

The potential energy, U of the test charge in situation i is ...

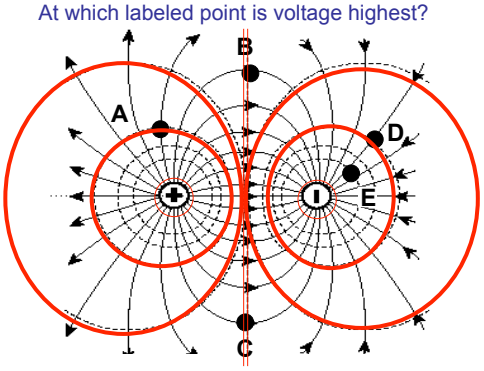
A: Greater than in situation ii

B: Smaller than in situation ii

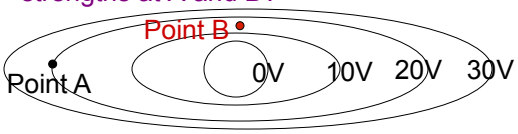
C: The same for both.



At which labeled point is voltage highest?

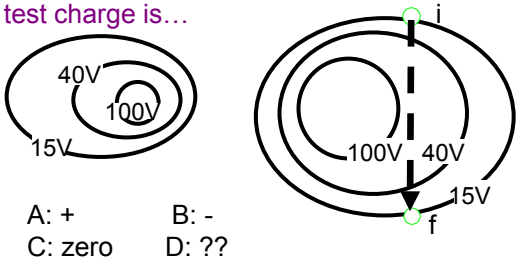


Given the equipotential lines shown,
what can we conclude about the E field strengths at A and B?



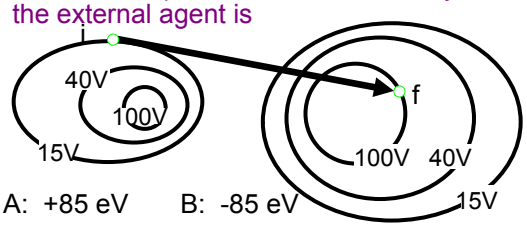
A) $|E_A| > |E_B|$
B) $|E_A| < |E_B|$
C) $|E_A| = |E_B|$
E) ???

A test charge (+q) is carried from point i to point f at constant speed. The work done by the external agent carrying the test charge is…



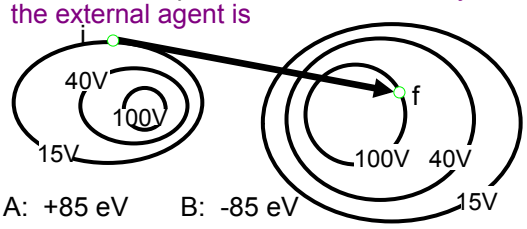
A: + B: -
C: zero D: ??

A proton is carried from point i to point f at constant speed. The work done by the external agent is



A: +85 eV B: -85 eV
C: >+85 eV D: Between 0 and +85eV
E: None of these

An electron is carried from point i to point f at constant speed. The work done by the external agent is

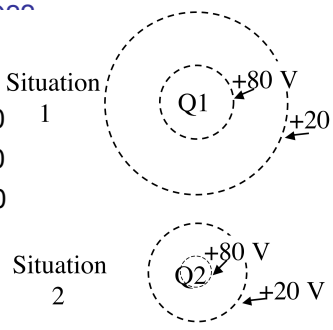


A: +85 eV B: -85 eV

C: >+85 eV D: Between 0 and +85eV

E: None of these/depends

What can you conclude about Q1 and Q2?



A: Q1 > Q2 > 0

B: Q2 > Q1 > 0

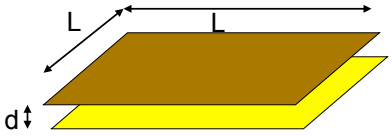
C: Q1 < Q2 < 0

D: Q2 < Q1 < 0

E: ??

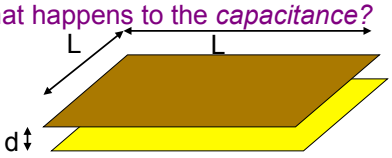
Parallel plate capacitor formulae from last time:
$E=4\pi k\, Q/A$ and $\Delta V=4\pi\, k\, Q\, d/A$

If you fix the charge on a capacitor, and double the spacing between the plates, what happens to the E field between the plates?



A: no change B: up by 2. C: up by 4.
D: decreases by 2 E: none of these

A parallel-plate capacitor has square plates of edge length L, separated by a distance d.
If we *double* the charge on the plates (so +Q and -Q have become +2Q and -2Q), what happens to the *capacitance?*



A: no change B: up by 2. C: up by 4.
D: decreases by 2 E: none of these