

# AP 2 Capacitors WS 2

Name: \_\_\_\_\_ Period: \_\_\_\_\_



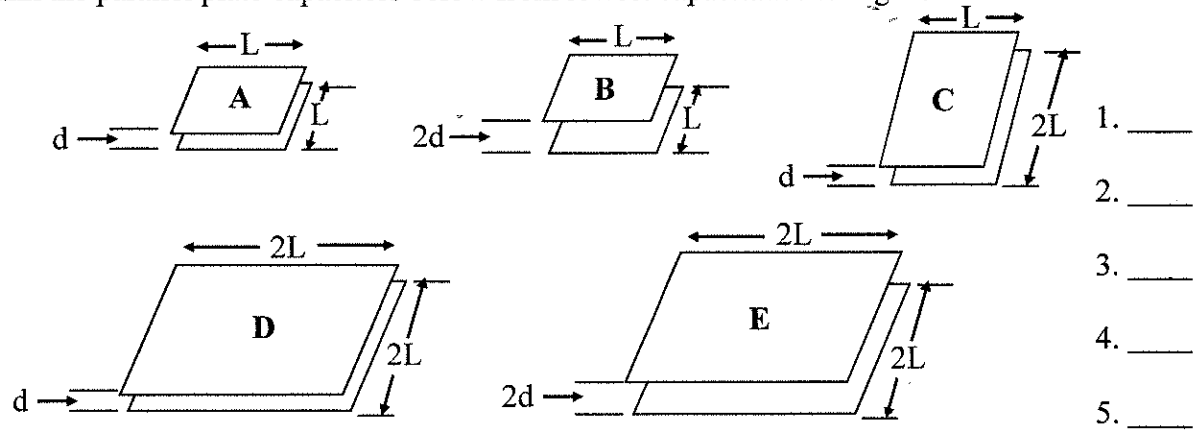
“So Yoda sounds like our best bet as an energy source. But with world electricity consumption pushing 2 terawatts, it would take a hundred million Yodas to meet our demands. All things considered, switching to Yoda power probably isn't worth the trouble — though it would definitely be green.”  
 – **Randall Munroe, What If?: Serious Scientific Answers to Absurd Hypothetical Questions**

1. A  $10.0 \mu\text{F}$  parallel plate capacitor is charged with a 9.0-volt battery
  - a. How much excess charge resides on each plate when the capacitor is fully charged?

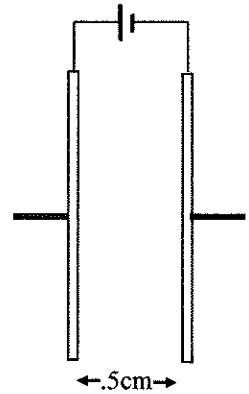
Before the linear accelerator

- b. How much energy is stored in the capacitor when it is fully charged?
- c. How much work did the battery do during the charging cycle?
- d. The capacitor is discharged and then charged with a 3-volt battery. What is the capacitance of the capacitor now?

2. Rank the parallel plate capacitors below from lowest capacitance to highest.



3. A parallel plate capacitor of capacitance  $C$  has been charged with a battery of voltage  $V$ . The battery is then disconnected and the plates are then pulled apart using the insulated handles until they are separated by a distance of 1.0 cm.



a. By what factor has the capacitance of the capacitor been changed? Explain your reasoning.

b. By what factor has the potential difference between the two plates been changed? Explain your reasoning.

c. By what factor has the energy stored in the capacitor been changed? Explain your reasoning.

d. If the energy of the system differs from the initial conditions, explain how the energy was transferred into or out of the system.

4. A capacitor is charged with  $6.2 \times 10^{-4}$  joules of energy.

a. If there are  $8.6 \times 10^{-6}$  coulombs of excess charge on each plate, what is the potential difference between the two plates?

b. What is the capacitance of the capacitor?