University of Mississippi
Phys 212H – Spring 2011

Name: * KEY *

Quiz 4

Provide a concise answer to each question.

(1) When a 200-V voltage is applied to the plates of a given parallel-plate, air-filled capacitor, a charge of 1.00 μC appears on the plates. What is the capacitance of this capacitor? (2 pts.)

Using $C = \frac{Q}{V} = \frac{1.00 \times 10^{-6}}{200} = 5.00 \times 10^{-9}\ F$

$= 5.00\ nF$

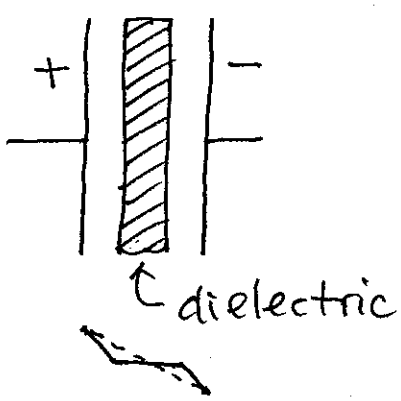
(2) If the charged capacitor is disconnected from the voltage supply and the distance between its plates decreased to half of its previous value, what happens to each of the quantities below? (4 pts.)

	↓ by factor 4	↓ by factor 2	no change	↑ by factor 2	↑ by factor 4
Charge			✓		
Voltage		✓			
Capacitance				✓	
Stored Energy		✓			

(3) If instead the charged capacitor remains connected to the battery and the space between its plates is filled with a dielectric of dielectric constant 2, what happens to each quantity? (4 pts.)

	↓ by factor 4	↓ by factor 2	no change	↑ by factor 2	↑ by factor 4
Charge				✓	
Voltage			✓		
Capacitance				✓	
Stored Energy				✓	

(4) Bonus question. If instead of filling the space between the plates completely, the dielectric only partially fills it (see drawing), will each quantity change: not at all, less than in question 3, as in question 3, or more than in question 3. You will only get credit if you briefly <u>explain</u> your answer.



The quantities change less than in the question 3, because ...