Name: _____

PHY 106 Test 4 July 21, 2005 20 minutes

La Salle University
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1. Three capacitors are connected in parallel. C_1 *is* 20 μF while C_2 and C_3 are unknown. The entire group is connected to a 10V battery for charging. The battery supplies 920 μC to charge all 3 capacitors. The amount of charge on C_3 is ½ that on C_2.

   a) Determine C_2 and C_3

   b) All 3 capacitors are now disconnected from the battery and discharged. The plate on C_3 are now moved closer together by ½ of their original spacing. If the 3 capacitors are now connected to the battery (again in parallel), what is the total charge that leaves the battery?

2. A charged ball, with mass 1.5 g and charge 100 μC, is suspended 2.3 m above the ground by means of a vertical electric field that comes from a charged plate.

   a) Determine the strength and direction of the E field that will allow the charged ball to float.

   b) The direction of the field suddenly changes by 180 degrees. As the mass moves to the ground, what is its change in electric potential energy? Its change in gravitational potential energy?

   c) Calculate the velocity of the charged ball when it hits the ground.

3. Given 2 charges of 100 pC each, how far apart should they be placed so that the voltage at the point halfway between them is 3000 V?