PHYS 2102

Exam 1

Spring 2003

Dr. Aktas

Name :_____

SS # : _____

You have five questions, 20 points each.

This is a closed book exam. I understand I am not to use any notes or information other than on this exam sheet. I may use a pocket calculator but only for the purpose of numerical calculation. I accept the responsibility to know and observe the requirements of the UNC-Charlotte Code of Student Academic Integrity.

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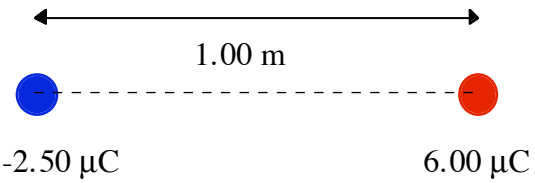
Signature

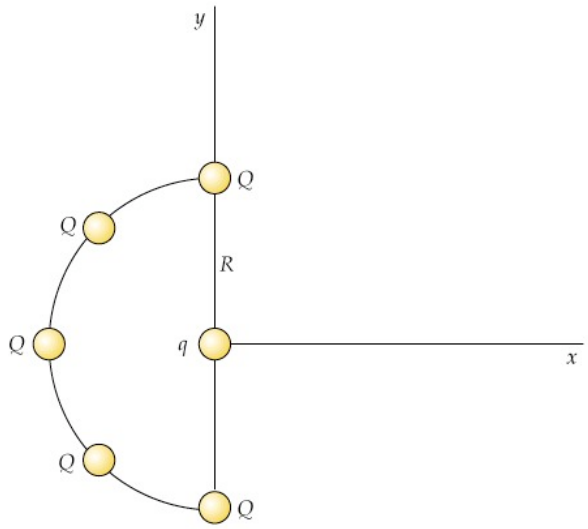
Good luck

Show all of your work. Do not skip steps. First write down the relevant equations then substitute the numbers if necessary.

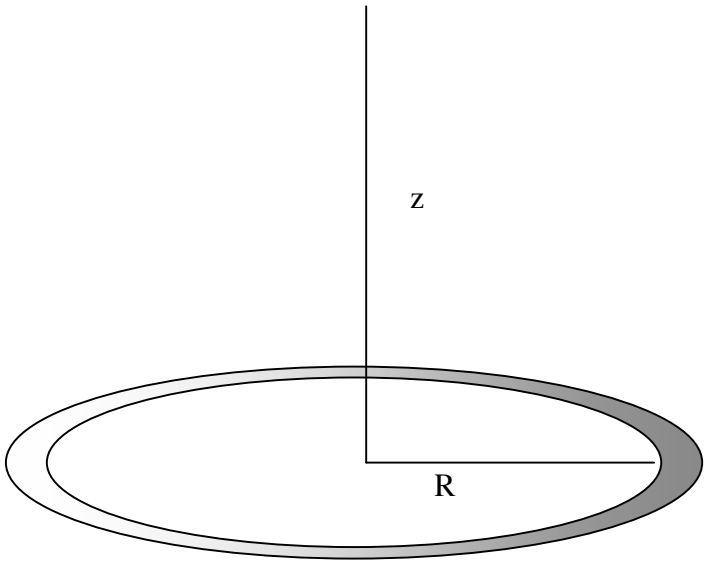
1. In figure below, determine the point (other then infinity) at which the electric field is zero. (k_e = 8.99 x 10^9 N m^2 / C^2)



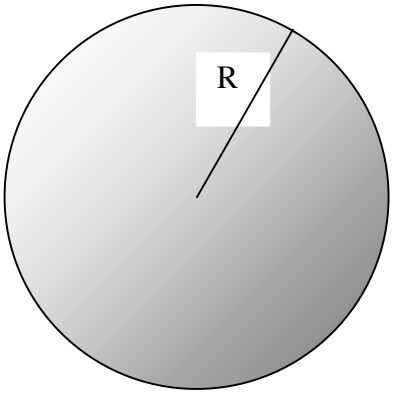
2. Five equal charges Q are equally spaced on a semicircle of radius R as shown in Figure below. Find the force on a charge q located at the center of the semicircle.



3. Calculate the electric field of a charged ring with charge Q and radius R, along its axis "z" distance from its center as shown below.



4. A charge of Q is uniformly distributed through the volume of a solid non-conducting spherical charge distribution with radius R. (a) Calculate the electric field inside of the distribution, $r < R$, (b) outside of the distribution, $r > R$. Show your all steps.



5. On a thin rod of length L lying along the x axis with one end at the origin (x = 0) as shown below, there is a distributed charge per unit length given by $\lambda = kx$ where k is a constant. (a) taking the electrostatic potential at infinity to be zero, find V at the point P on the y axis. (b) Determine the vertical component , E_y, of the electric field intensity at P from the result of part (a).