**PHYS 202 … Practice Problems**

**Gauss’s Law … Part A**

1. A solid conducting sphere has a radius of 0.0425 m and a net charge of 3.24 x 10 – 6 C.
   1. What is the magnitude of the electric field at the center of the sphere?
   2. What is the magnitude of the electric field at a point 0.0216 m from the center of the sphere?
   3. What is the magnitude of the electric field at the surface of the sphere?
   4. What is the magnitude of the electric field at a point 0.0647 m from the center of the sphere?
2. A solid conducting sphere has a radius R and a positive net charge Q. At a distance of 0.0320 m from the surface of the sphere the electric field is measured to have a magnitude of 125 N/C. The electric field is measured to be 89.4 N/C at a distance of 0.0482 m from the sphere’s surface.
   1. What is the radius of the sphere?
   2. What is the net charge of the sphere?
3. An infinitely long line of charge lies along the y-axis. The electric field due to this line of charge is measured to be 5.39 x 10 5 N/C î at a location on the x-axis where x = ‒ 4.22 cm.
   1. What is the magnitude of the electric field at x = 2.50 cm on the x-axis?
   2. What is the magnitude of the electric field at x = 6.49 cm on the x-axis?
   3. What is the magnitude (absolute value) of the linear charge density of this line of charge?
   4. Is the linear charge density positive or negative?
4. Two straight, parallel lines of charge are separated by a distance of 3.20 cm. The lines of charge are VERY long compared to this distance. The first line of charge is known to be positive and have a linear charge density of 6.40 x 10 – 6 C/m. The second line of charge is of unknown linear charge density. The net electric field exactly half-way between the two lines is measured to have a magnitude of 4.10 x 10 6 N/C.
   1. If the net electric field is directed toward the unknown line of charge, what is the linear charge density of the unknown line of charge?
   2. If the net electric field is directed away from the unknown line of charge, what is the linear charge density of the unknown line of charge?