Calculating Total Charge

Each group will be given one of the charge distributions given below: (α and k are constants with dimensions appropriate for the specific example.)

For your group's case, answer the following questions:

1. Find the dimensions of the constants α and k.
2. Find the total charge.

- **Spherical Symmetry** - A positively charged (dielectric) spherical shell of inner radius a and outer radius b with a spherically symmetric internal charge density:
  $\rho(\vec{r}) = \alpha \frac{1}{r^2} e^{(kr)}$
- **Cylindrical Symmetry** - A positively charged (dielectric) cylindrical shell of inner radius a and outer radius b and height H with a cylindrically symmetric internal charge density:
  $\rho(\vec{r}) = \alpha e^{(ks)^2}$