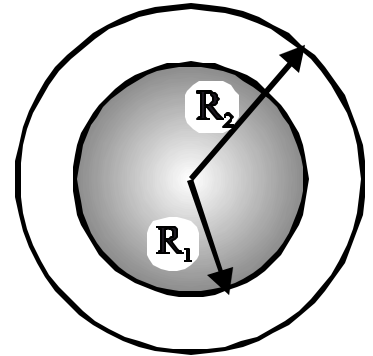


NAME _____
PERIOD _____

QUIZ#38D
ELECTROSTATIC POTENTIAL

A charged, insulating cylinder, which has a radius of $R_1 = 12.0$ cm., is surrounded by a cylindrical shell, which has a radius of $R_2 = 15.0$ cm., as shown to the right. The charge density on the insulating cylinder varies with the radius of the cylinder according to the relationship $\rho = +(220+12450 r^2) \mu\text{C}/\text{m}^3$, while the cylindrical shell contains $-28.0 \mu\text{C}$ per meter of length. [Assume that $V = 0$ at the center of the insulating cylinder.]



**Charged, Insulating
Cylinder surrounded by a
Conducting Cylindrical
Shell**

1. What will be the charge per unit length of this insulating cylinder? [3 pts]
2. What will be the magnitude of the electric field 5.0 cm from the center of this insulating cylinder? [3 pts]
3. What will be the electrostatic potential of the outer edge of the insulating cylinder? [3 pts]
4. What will be the potential difference between the outside of the insulating cylinder and the surrounding cylindrical shell? [3 pts]
5. How far from the center of the insulating cylinder will the electrostatic potential again reach exactly zero? [3 pts]