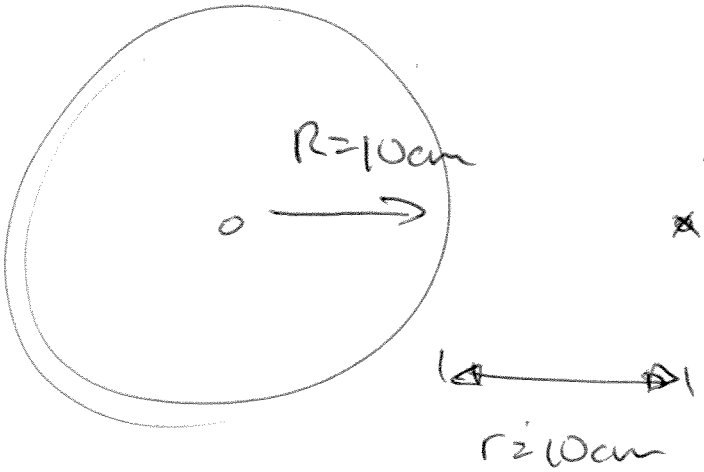
General Problem Solving Guide

Name:	
Lab Time:	KEY
Date:	
Test:	
Problem #:	

List given information, define variables, sketch picture:



Simplify question, list target quantity:

Find Electric Field inside and outside conducting sphere

List all related quantitative relationships:

$\vec{E} = \frac{kq}{r^2}\hat{r}$

$\vec{E} = 0$ inside conductor at equilibrium

$E(0.2m) = \frac{kQ}{(0.2m)^2} = 15\,N/C$

Outline approach, sketch diagrams if needed (or sketch next to pictures above):

, Find Q

.. Use $\vec{E}(r)$ to draw graph

Obtain a general solution:

$Q = \frac{2}{3} pC = 6.\overline{6} \times 10^{-11} C$

$E(0.1m) = 60\ N/C$

$E(0.3m) = 6.6\ N/C$

$E(1m) = 0.6\ N/C$

$E(r<0.1m) = 0\ N/C$

[inside conductor
$E = 0$ at equilibrium]

Check Units: _____.

$\frac{N}{C} = \frac{N m^2}{C^2} \cdot \frac{1}{m^2} \cdot C = \frac{N}{C}$ ✓

Check Limiting Cases: _____.

$Q\uparrow \quad E\uparrow$ ✓

$r\uparrow \quad E\downarrow$ ✓

Obtain a numeric solution: _____.
(i.e. plug in the numbers)

Why is solution reasonable? Explain.

units check
E is parabolic outside sphere