SP212-Spring-2016

CH-23-B Assignment

First do the following Wiley-Plus assignment: Assignment #23b

After completing the Wiley-Plus, in your homework notebook, complete the following problems:

CH23 Question #2

CH23 Problems # Good problems to look over if you have time, \textit{but are not assigned} are: #33, 36, 44, and 52.

To check your work, the answers to the odd problems are in the back of the book.

The answers to the even problems are:

#36) a) \( \vec{E} = 2.00 \times 10^{-11} \frac{N}{C} \hat{j} \)
   
   b) \( E=0 \)
   
   c) \( \vec{E} = -2.00 \times 10^{-11} \frac{N}{C} \hat{j} \)

#44) \( q = 2.2 \times 10^{-6} \frac{C}{\hat{j}} \)

#52) a) \( E=0 \) at \( r=0 \)  \hspace{1cm} b) \( E=0 \) at \( r=a/2 \)  \hspace{1cm} c) \( E=0 \) at \( r=a \)
   
   \hspace{4cm} d) \( E = 7.32 \frac{N}{C} \) at \( r=1.50a \)  \hspace{1cm} e) \( E = 12.1 \frac{N}{C} \) at \( r=b=2a \)  \hspace{1cm} f) \( E=1.35 \frac{N}{C} \) at \( r=3b=6a \)

Homework

\textbf{Then} complete the attached worksheets: (Note: the above problems were designed to ensure you have the skills to solve the worksheet problems. It is imperative to your learning of the problem solving technique to do the above problems \textbf{BEFORE} attempting the worksheet problems. \textit{You are graded on both! Homework notebooks are graded.})
CH-23-B-1:

For each of the equations below,

1) State what each term is in your own words ...
2) What the units of each term are...
3) What is the general use of that equation in your own words?

A. \[ E = \frac{\sigma}{\varepsilon_0} \]

B. \[ E = \frac{\lambda}{2\pi\varepsilon_0 r} \]

C. \[ E = \frac{\sigma}{2\varepsilon_0} \]

D. \[ \vec{E} = \left(\frac{q}{4\pi\varepsilon_0 R^3}\right)r \]

1. Since this equation is not on your equation sheet, also include how this equation is derived for a solid non-conducting sphere.
ESSAY Question: Using *physics*, explain WHY the following curves are shaped the way they are. Be as specific as possible. (Write on the back if necessary)

Conducting Sphere and Non-conducting Sphere
CH-23-B-3:

Figure below (a) shows three plastic sheets that are large, parallel, and uniformly charged. Figure (b) below gives the component of the net electric field along an x axis through the sheets. The scale of the vertical axis is set by $E_s = 12.0 \times 10^5$ N/C.

What is the surface charge density of plate 3?

Show all work including Draw the E-fields on the diagram too.
CH-23-B-4:

The Figure below shows, in cross section, two solid spheres with uniformly distributed charge $q_1$ and $q_2$ throughout their volumes. Each has radius $R$. Point $P$ lies on a line connecting the centers of the spheres, at radial distance $R/3.00$ (neglect the fact that the picture looks like it is half way it is actually 1/3 the distance) from the center of sphere 1. 

If the net electric field at point $P$ is zero, what is the ratio $q_2/q_1$ of the two charges?

Show all work: