WebAssign
**CH22-HW02-FALL2010 (Homework)**

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PHYS 272-FALL 2012, Fall 2012
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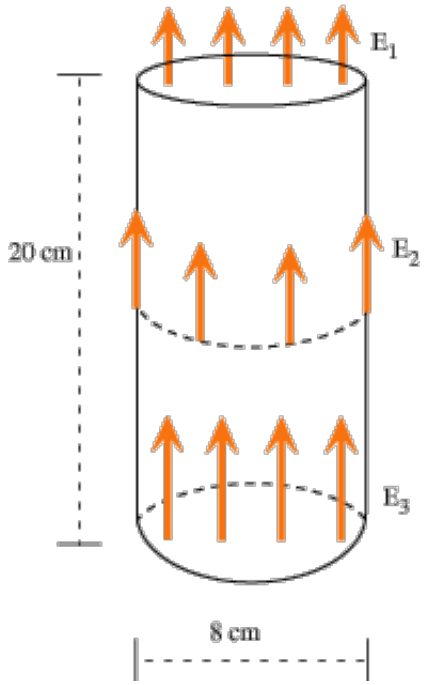
**Current Score :** 15 / 15 **Due :** Tuesday, November 13 2012 11:59 PM EST

**1.** 7/7 points | Previous Answers MI3 22.3.P.015.alt01

The electric field is measured all over the surface of a cylinder whose diameter is 8 cm and whose height is 20 cm, as shown in the diagram. At every location on the surface the electric field points in the same direction (+y). $E_1$ is found to be 546V/m; $E_2$ is 771V/m; $E_3$ is 1210V/m.




(a) Which of the following statements are true?

- [x] The angle between $E_2$ and $\hat{n}$ is 90 degrees.
- [ ] The angle between $E_1$ and $\hat{n}$ is 90 degrees.
- [ ] Only the curved surface of the cylinder gives a nonzero contribution to the net electric flux.
- [ ] Not enough information is given to solve this problem.
- [ ] This is an impossible pattern of electric field.
- [x] The net flux on this cylindrical surface is negative.
- [ ] The flux on the flat ends of the cylinder is 0.

(b) What is the net electric flux on this surface?

net electric flux = -3.338 Vm

(c) How much charge is inside the surface? $\varepsilon_0$ = 8.85e-12 $C^2/N\ m^2$.

$Q_{inside}$ = -2.95e-11 ✔ C

- *Read the eBook*
- Section 22.3

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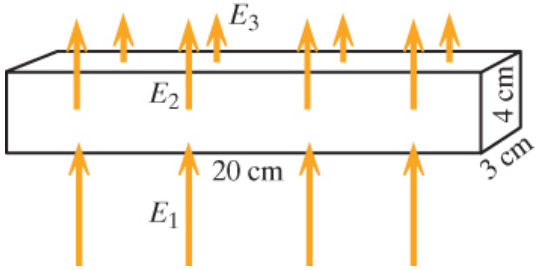
**2.** 6/6 points | Previous Answers MI3 22.3.P.015

**Simple applications**

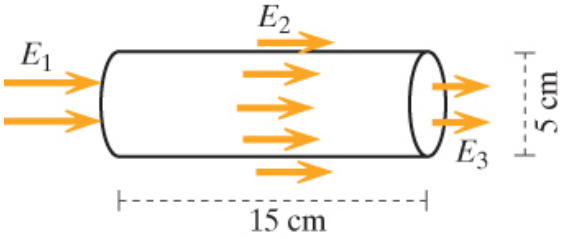
(a) The electric field has been measured to be vertically upward everywhere on the surface of a box 20 cm long, 4 cm high, and 3 cm deep, shown in the figure. All over the bottom of the box $E_1$ = 1100 V/m, all over the sides $E_2$ = 950 V/m, and all over the top $E_3$ = 800 V/m.




What is the amount of charge enclosed by the box? Use the accurate value $\varepsilon_0 = 8.85 \times 10^{-12}$ $C^2/N \cdot m^2$.

-1.593e-11 ✔ C

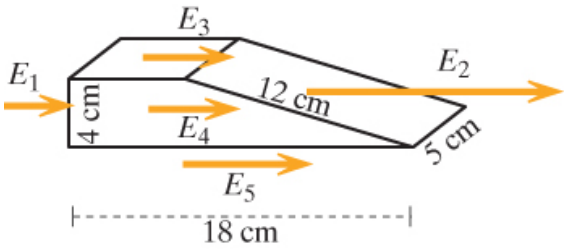
(b) The electric field is horizontal and has the values indicated on the surface of a cylinder shown in the figure. $E_1$ = 1600 N/C, $E_2$ = 1300 N/C, and $E_3$ = 1000 N/C.




What is the amount of charge enclosed by the cylinder? Use the accurate value $\varepsilon_0 = 8.85 \times 10^{-12}$ $C^2/N \cdot m^2$.

-1.043e-11 ✔ C

(c) The electric field has been measured to be horizontal and to the right everywhere on the closed box shown in the figure. All over the left side of the box $E_1$ = 90 V/m, and all over the right, slanting, side of the box $E_2$ = 300 V/m. On the top the average field is $E_3$ = 220 V/m, on the front and back the average field is $E_4$ = 250 V/m, and on the bottom the average field is $E_5$ = 285 V/m.




How much charge is inside the box? Use the accurate value $\varepsilon_0 = 8.85 \times 10^{-12}$ $C^2/N \cdot m^2$.

3.717e-12 ✔ C

- *Read the eBook*
- Section 22.3

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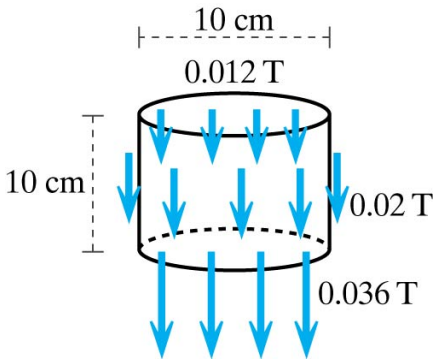
**3.** 2/2 points | Previous Answers MI3 22.5.X.027

In the figure the magnetic field in a region is vertical and was measured to have the values shown on the surface of a cylinder. Which of the following are true?




- [x] The measurements are probably incorrect, since we have never yet found a magnetic monopole.
- [ ] The measurements imply that the box contains a bar magnet.
- [x] The magnetic flux over the closed box is nonzero, which violates Gauss's Law for magnetism.
- [ ] The measurements imply that the box contains nothing at all.
- [ ] The measurements imply that the box contains a current-carrying loop of wire.

✔

- *Read the eBook*
- Section 22.5