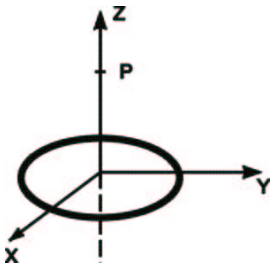
Due date: Fri 10 Sep 2004 08:00:00 AM MDT
6 point(s)
Circular_ring_of_charge

A uniform circular ring of charge Q= 5.80 microCoulombs and radius R= 1.10 cm is located in the x-y plane, centered on the origin as shown in the figure.



What is the magnitude of the electric field **E** at point P, located at z= 4.10 cm?

Tries 0/5

Consider other locations along the positive z-axis. At what value of z does **E** have its maximum value?

Tries 0/5

If z << R then E is proportional to z. (You should verify this by taking the limit of your expression for **E** for z << R.) If you place an electron on the z-axis near the origin it experiences a force F_z= -cz, where c is a constant. Obtain a numerical value for c.

Tries 0/5

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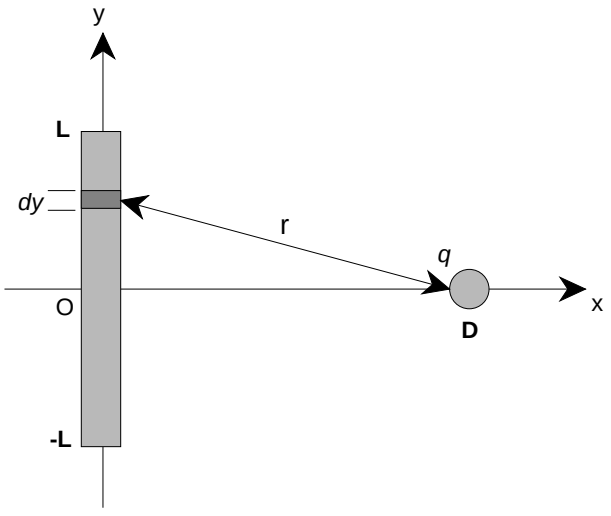
4 point(s)
Uniformly Charged Rod
A charge $Q = 1.50 \times 10^{-4}$ C is distributed uniformly along a rod of length $2L$, extending from y = -17.7 cm to y = +17.7 cm, as shown in the diagram below. A charge $q = 5.50 \times 10^{-6}$ C, and the same sign as Q , is placed at (D,0), where D = 41.0 cm.



Consider the situation as described above and the following statements. Select "True" or "False" for each statement.

Choices: **True**, **False**.

A. The charge on a segment of the rod of infinitesimal length dy is given by $dQ = \frac{Q}{L}dy$
B. The magnitude of the force on charge q due to the small segment dy is $dF = \frac{kqQ}{2Lr}dy$
C. The net force on q in the x-direction does not equal zero.
D. The net force on q in the y-direction equals zero.
E. The total force on q is in the southeast direction.

Tries 0/5

Use integration to compute the total force on q in the x-direction.

Tries 0/5

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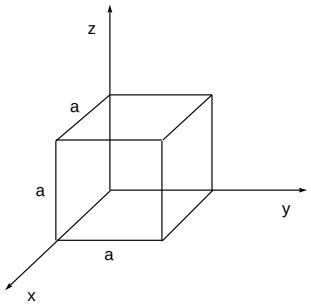
4 point(s)
Cubic Box
A cubic box of side a = 0.440 m is placed so that its edges are parallel to the coordinate axes, as shown in the figure. There is **NO** net electric charge inside the box, but the space in and around the box is filled with a nonuniform electric field of the following form: E(x,y,z) = Kz **j** + Ky **k**, where K = 3.00 N/(Cm) is a constant.



What is the electric flux through the top face of the box? (The top face of the box is the face where z = a. Remember that we define positive flux pointing out of the box.)

Tries 0/5

What is the total electric flux through the five other faces of the box? (Again, outward flux is positive.)

Tries 0/5