University of Bahrain
College of Science
Department of Physics

PHYCS 110
Test (1)

Time: 11:00 – 12:00 noon

Date: 24th April 2001

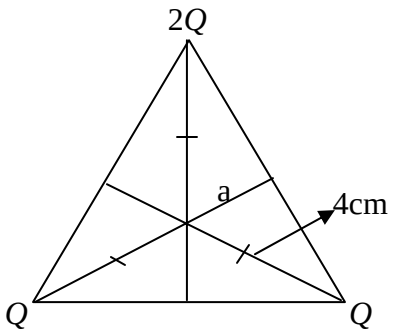
Name:----------ID#----------
Sec:----------

Qts	Marks	
1		
2		
3		
4		
Total		

Q1. Three charges are located at the corners of an equilateral triangle as shown in the figure. The electric field at the central point (a) is 2.5 x 10^3 N/C. Compute the following:

a) the value of (*Q*)

b) the electrical potential at point (a).



Q2. An oil drop of charge *Q* and mass 0.1g is hanging at rest in an upward electric field E = 2000 N/C.

a) Calculate *Q* (magnitude and sign)

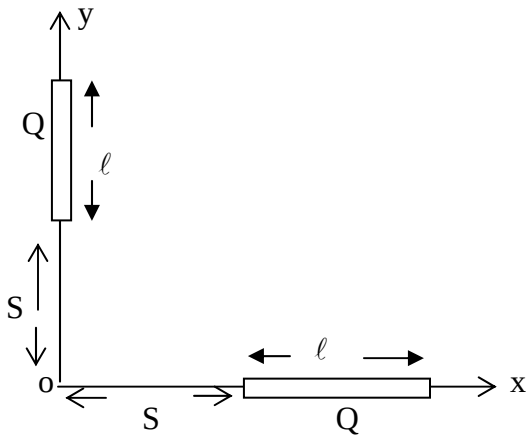
b) If E is increased to 3000 N/C find the acceleration of the ball. (Consider the motion in the vacuum).

Q3. A rod of length ℓ carrying (Q) is laying on the x-axis as shown in figure (a).

a. Show that the electric field at point O is given by:

$$\vec{E} = \frac{-Q}{4\pi\varepsilon_o\, s(\ell + s)}\,\vec{i}$$

b. If an identical rod is placed along the y-axis as shown in figure (b). Find the magnitude and direction of the resultant electric field at point O.



(a) (b)

Q4. A parallel plate capacitor is half filled with a slab of dielectric constant K=3 as shown in the figure below. A voltage of 25 Volts is applied across the capacitor.

a. Find the equivalent capacitance.

b. Find V_1 and V_2 and the charge on each plate.