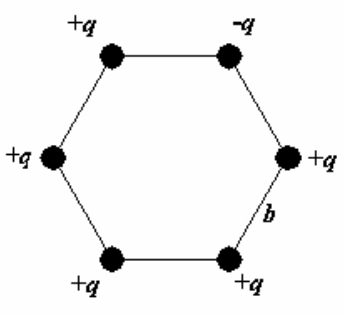
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 106 General Physics II** **First Midterm Exam Questions**	**??/04/2003** **TIME 100 min.**

[1]. Six charges are arranged in a hexagon whose one side is *b* as in Figure given right. Calculate total *Coulomb Force* acting on charge *–q* both in magnitude and direction.

Hint: Select a coordinate such that its origin coincide with the position of the charge *–q* to simply the solution



[2]. As seen from figure, two equal dimensional metal plates are parallel to each other. The plates are oppositely charged and the charge on each plate is equal to Q=7.08 nC.

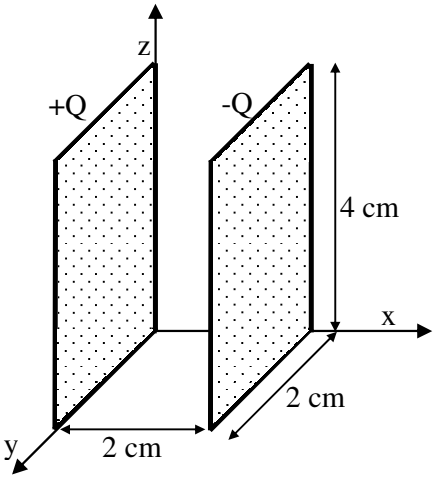
(a) What is the electric field at points (x=-2, y=1, z=3) cm, (x=1, y=1, z=2) cm, (x=3, y=1, z=1) cm.

(b) What is the potentail difference between points (x=0, y=1, z=2) cm, (x=2, y=1, z=2) cm.

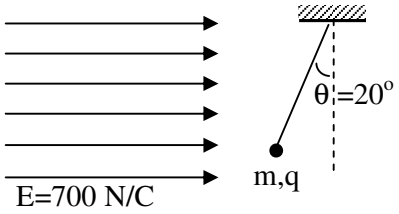
(c) Suppose that a positive charge q=1 nC is relased from the point (x=0, y=1, z=2) cm and hits to the negatively charged plate.

i. Where it hits to the negatively charged plate?

ii. What is the velocity when it hits to the negatively charged plate?.



[3]. The tiny ball at the end of the thread shown in below figure has a mass of 0.609 g and is in horizontal electric field of intensity 700 N/C. It is in equilibrium in the position. What are the magnitude and sign of the charge on the ball?



[4]. The electric field outside a charged long straight wire is given by E = –500/r (V/m) and is radially inward, where r is measured in meter.

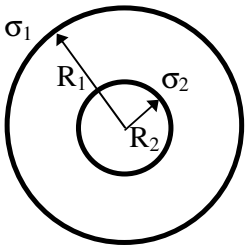
(a) Find the value of $V_B - V_A$ if r_B=60 cm and r_A=30 cm.

(b) What is the sign of charge on the wire?

[5]. A thin conducting spherical shell of surface charge density $+\sigma_1$ and radius R_1 is concentric with a small other conducting spherical shell of surface charge density $+\sigma_2$ and radius R_2, as seen in below figure.

(a) What is the electric potential difference between the points $4R_1$ and $R_2/2$?

(b) How much work is done on the charge q when it moves from $4R_1$ to $R_2/2$?



Useful Constants: $k=9\times10^9$ Nm^2/C^2; 1 nC=1×10^{-9} C $\varepsilon_0=8.85\times10^{-12}$ C^2/Nm^2