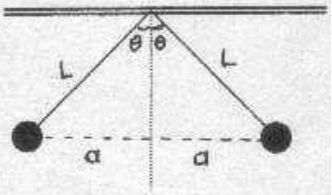
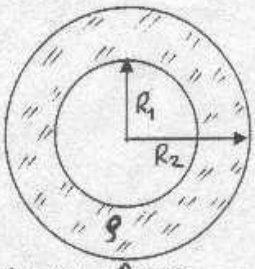
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 106 General Physics II** **First Midterm Exam Questions**	**14/04/2005** **TIME 100 min.**

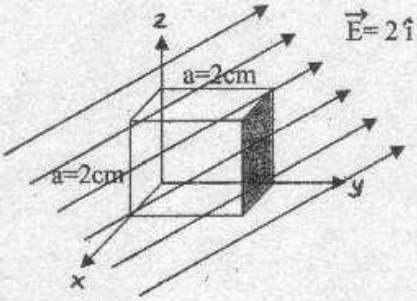
Q-1) Two pieces of small charged spheres, each having a mass of $3*10^{-6}$ kg, hang in equilibrium as shown in Figure. If the length of each string is 0.15 m and the angle $\theta=30^0$ find the magnitude of the charge on each sphere, assuming the spheres have identical charges.



Q-2) A spherical insulating thick shell has inner radius R_1 and outer radius R_2 as seen in figure. If the charge density (ρ) is uniform determine the potential difference between the inner and outer surface of the spherical shell.

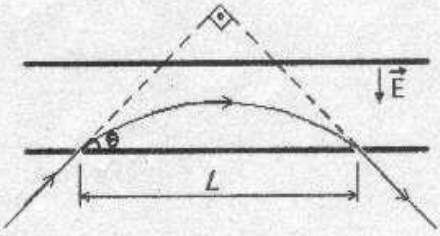


Q-3) A cube of side a= 2cm is placed in a uniform electric field $\vec{E}=2\hat{i}+4\hat{j}+2\hat{k}$ N/C. Determine; a) the flux value for left, right, front and top side of the cube. b) what can you say about the total flux for this cube ?



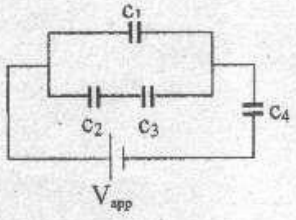
$\vec{E}=2\hat{i}+4\hat{j}+2\hat{k}$ N/C

Q-4) There is a uniform electric field, $\vec{E}$, between parallel plates as shown in Figure. Protons passing through the small hole at the bottom plate are deflected by right angle (90°) and leave the bottom plate from another hole. If the distance between holes is L=1cm and initial kinetic energy of the protons is $K = 3.2\text{x}10^{-17}$ J, what is the electric field between the plates? (Ignore the gravitational effects)



Q5) a) Find the equivalent capacitance of the combination of capacitors.

b) Assuming the potential difference V_{app}=200V, find the charge on each capacitor in the figure. c_1=2μF, c_2=3μF, c_3=6μF, c_4=4μF.



$\varepsilon_0=8.85\text{x}10^{-12}\text{C}^2/\text{Nm}^2$ $\quad 1\mu\text{C}=10^{-6}\text{C}$

$k=9\text{x}10^9\text{Nm}^2/\text{C}^2$ $\quad 1\mu\text{F}=10^{-6}\text{F}$