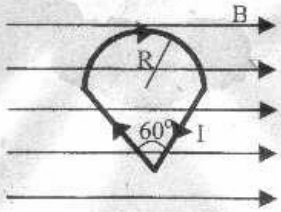
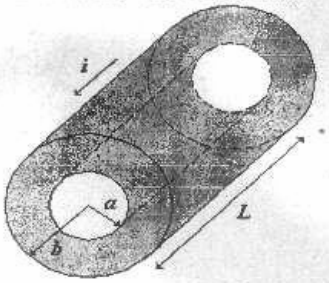
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 106 General Physics II** **Second Midterm Exam Questions**	**15/05/2003** **TIME 100 min.**

1-) A current carrying conductor, having a current I, has a shape as shown in figure 1. It is located in a uniform magnetic field. Find the net force on the current loop?



2-) The figure shows a hollow conducting wire with an outer radius b, inner radius a, and length L. The current density in the wire is $J(r)=J_0/r^2$, where r is the radial distance from the center of the wire. How much electrons enter and leave the wire in a minute?

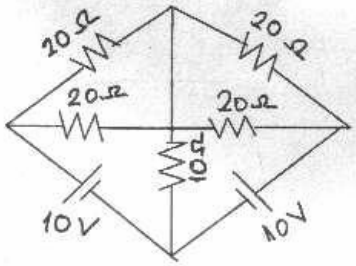


3-) In the electrical circuit given below;

(a) Find the current through the 10 Ω resistor.

(b) Determine the voltage drop across 10 Ω resistor.

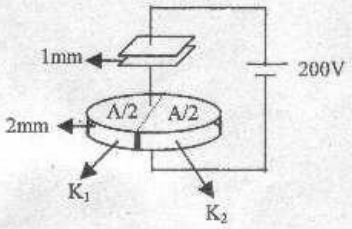
(c) Indicate the direction of the current through 10 Ω resistor.



4-) A parallel plate capacitor has circular plates of radius 4 cm and is filled with two dielecric materials of dielectric constant $K_1=2$ and $K_2=4$ respectively. The plate separation distance is 2 mm. This filled parallel palte capacitor is connected to a parallel plate air-gap capacitor its dimensions 2x2 cm and separation distance is 1 mm as seen in Figure. If this system is connected to a potential difference of 200 Volts, determine;

(a) the equivalent capacitance value of the capacitor system

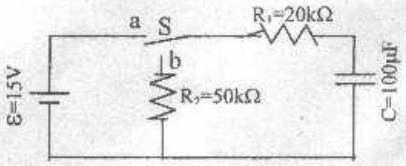
(b) the charge on each capacitor



5-) Consider the following circuit. At t=1 sec. after the switch S is thrown to positon a, determine;

(a) the rates at which the charge of capacitor is increasing (dq/dt)

(b) the rates at which the energy is being stored in the capacitor (dU/dt)



Useful Constants: $k = 9\times10^{9}\ Nm^2/C^2$; $1\mu=10^{-6}$, $1k=10^{3}$

$\varepsilon_0 = 8.85\times10^{-12}\ C^2/Nm^2$, $e = 1.6\times10^{-19}\ C$, $\mu_0=4\pi\times10^{-7}\ Tm/A$