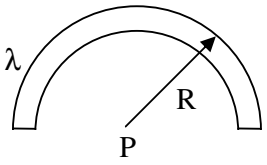
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 106 General Physics II** **Final Exam Questions**	**??/06/2005** **TIME 100 min.** **SUMMER SCHOOL**

Q-1) The thin glass rod is bent into a semicircle which has a radius R=10 cm as shown in Figure. It is charged uniformly with positive charge (line charge density is $\lambda=2\times10^{-6}$C/m).



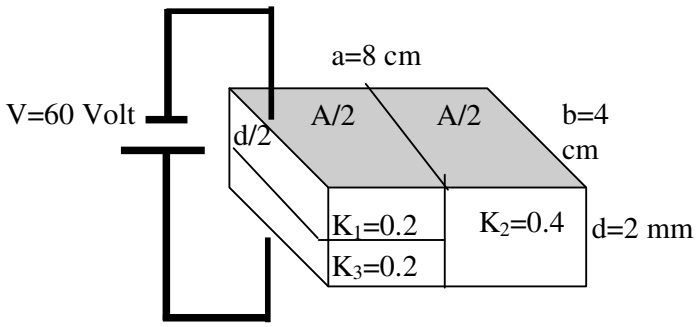
(a) Calculate the magnitude and direction of electric field at the center of semicircle (at point P).

(b) If an electron is placed at the center of the semicircle (at point P), determine the magnitude and direction of the electric force on the electron.

Q-2) A rectangular parallel plate capacitor is filled with three dielectric materials as seen in Figure. Determine:

(a) the equivalent capacitance value of the system,

(b) total stored energy of the system.



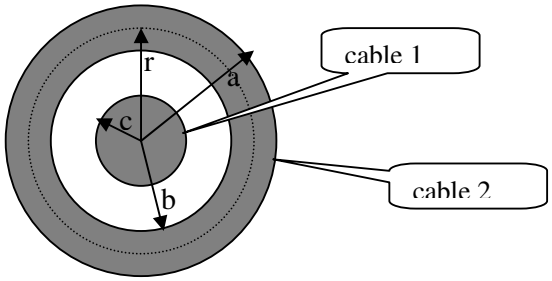
Q-3) Figure shows a cross section of a long conductor of a type called a coaxial cable. Its dimensions are labeled in the figure. There are equal but opposite currents i in the two conductors. Using the Amper's law calculate B in the ranges (a) r < c, (r = 0.2cm);

(b) c < r < b, (r =1.2cm);

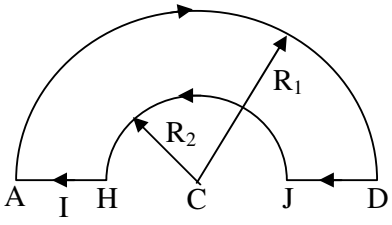
(c) b < r < a, (r = 1.9cm);

(d) r > a, (r=2.4cm).

Assume a=2cm, b=1.8cm, c=0.4cm, i=100A



Q-4) Use the Biot-Savart Law to calculate the magnetic field B at C, the common center of the semicircular area AD and HJ of radii R_1=8 cm and R_2=4 cm, forming part of the circuit ADJHA carrying current I=10 A, as seen figure.



Q-5) A conductor with a length of 50 m and diameter of 4 cm is connected to a potential difference of 100 volt. Find,

(a) the current,

(b) the current density,

(c) magnitude of the electric field,

(d) the resistivity of the wire,

Useful Constants: $e= 1.602\times10^{-19}$ C $\mu_0= 4\pi\times10^{-7}$ T-m/A $\pi=3.14$ $\varepsilon_0= 8.85\times10^{-12}$ C^2/Nm^2

$k= 9\times10^9$ Nm^2/C^2