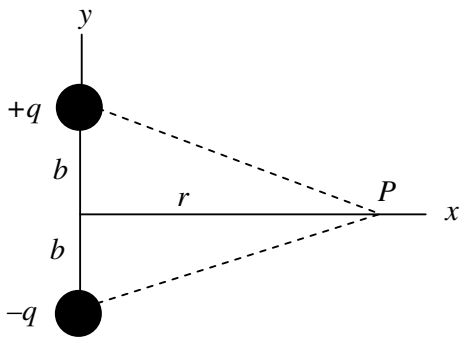
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 106 General Physics II** **First Midterm Exam Questions**	**08/04/2004** **TIME 100 min.**

Q-1)- Figure shows a positive and negative charge of equal magnitude q placed a distance $2b$ apart, a configration is called an electric dipole. Find:
(a) the Coulomb Force between the charges
(b) the direction an magnitude of electric field at point P
(c) the electric potential at point P
(d) the electric potential energy of the system



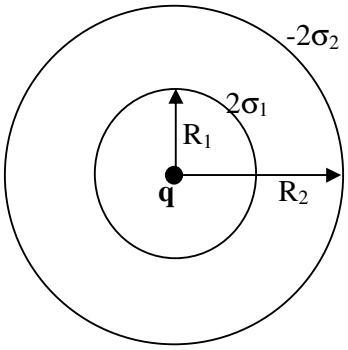
Note that, <u>all quantites</u> must be expressed in terms of charge, q, and geometric parameters.

Q-2)- In some region of space, the electric field is the following function of x, y, and z:

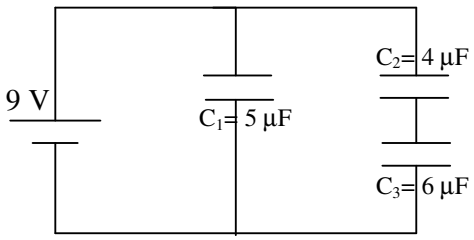
$$\mathbf{E} = 3x^2\,\mathbf{i} + 2y\,\mathbf{j} - \mathbf{k} \quad \mathbf{(V/m)}$$

where the electric field is measured in volt per meter. Find the electric potential between the (2, 1, 0) m and (3, 2, 1) m.

Q-3)- There are two concentric spherical thin metal shells which have radii R_1=5 cm and R_2=10 cm. They have surface charge densities $2\sigma_1$ (σ_1=2.0x10^{-6} C/m^2) and $-2\sigma_2$ (σ_2=1.0x10^{-6} C/m^2) respectively. If a point charge of 5q (q=2x10^{-6} C) is placed at the center of the inner shell, determine the electric field at;
a)- r=3 cm, b)- r=8cm and c)- r=14cm



Q-4)- What are the charge on and the potential difference across each capacitor shown in figure below.



<u>Useful constants:</u> $\pi = 3.14$ $\varepsilon_0 = 8.85\text{x}10^{-12}\ Nm^2/C^2$ $k = 9\text{x}10^9\ C^2/Nm^2$ $1\mu = 10^{-6}$