Circle your Recitation Section:

001 Tue   8:30   Nistor
002 Tue   8:30   Sheek
003 Tue   9:30   Nistor
004 Tue   9:30   Sheek
005 Tue   10:30   Deligkaris
006 Tue   11:30   Boomsma
007 Tue   12:30   Boomsma
008 Tue   1:30   Wolff
022 Tue   2:30   Wolff
023 Tue   3:30   Wolff

PHYS 272 - Fall 2010
Hand-Graded part of Exam 1

Name (Print):_____

Signature:_____

PUID:_____

Note: In all the hand-graded problems below you **MUST explain your answer** in sufficient details, including all the major steps you used to arrive at your answer. Merely giving a final answer (even if correct) with no explanations will receive little or no points.   There are 2 problems (total 40 points) in this test. Mark your name/ID at the bottom of each page. If you use any additional pages to enter your answers (additional/scarp pages are available from the proctors), please number them and also mark your name, PUID and the problem number on the page.

Problem 9 [20 points]

A solid plastic sphere of radius R_1 has a charge $-Q_1$ uniformly distributed on its surface. A concentric spherical metal shell of inner radius R_2 and outer radius R_3 carries a uniform charge Q_2 on the inner surface and a uniform charge Q_3 on the outer surface. Q_1, Q_2, and Q_3 are positive numbers. At an observation location a distance r from the center determine the magnitude and direction of the electric field for the cases $r < R_1, R_1 < r < R_2, R_2 < r < R_3$, and $r > R_3$ respectively.
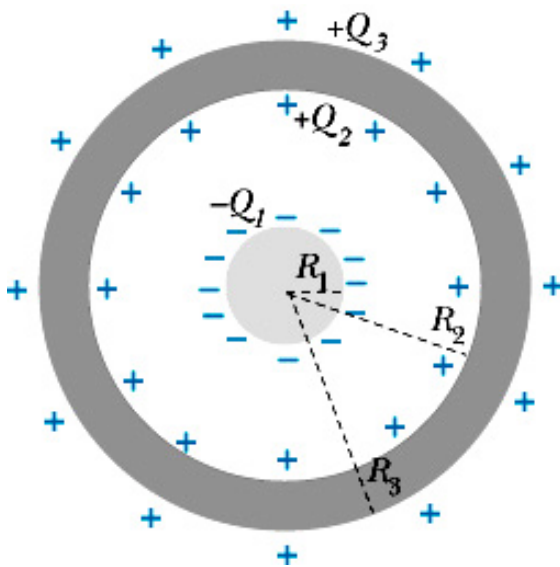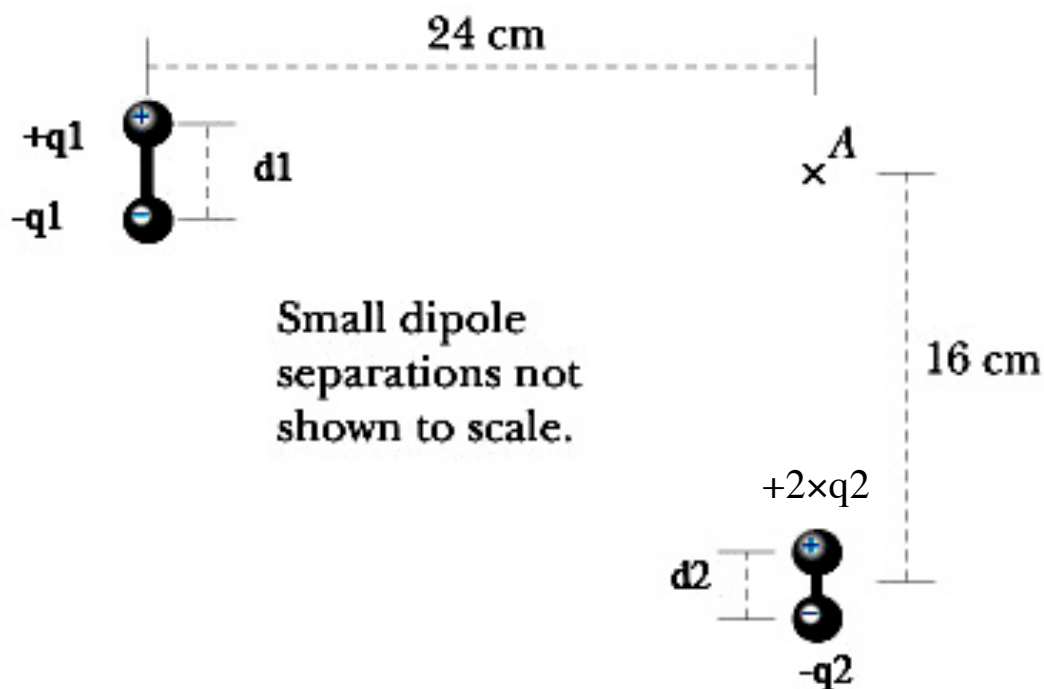
[you can use this blank space to enter your answer for Problem 9]

Problem 10 [20 points]

(a) [10 points] Two dipoles are oriented as shown in the figure below. Each dipole consists of charges held apart by a short rod (not shown to scale). If $q1 = \mathbf{25}$ nC, $q2 = \mathbf{12}$ nC, $d1 = \mathbf{0.43}$ mm, and $d2 = \mathbf{0.38}$ mm what is the electric field at the location A. Consider $+x$ to the right, $+y$ upwards, and $+z$ coming out of page.
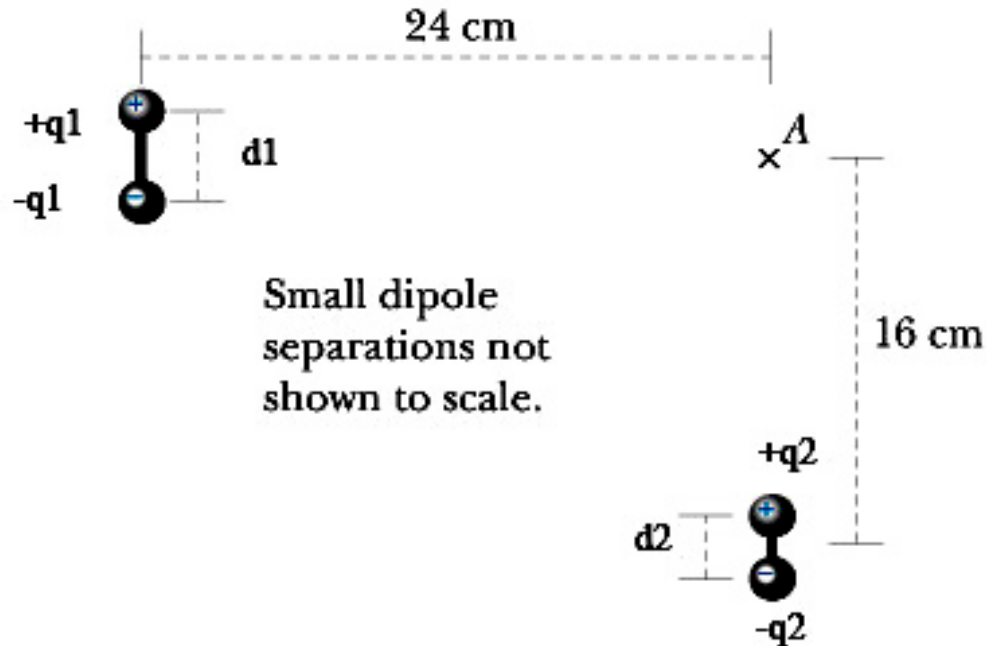
(b) [10 points] If the positive charge in the previous 2nd dipole is doubled (becomes $+2 \times q2$, while the negative charge $-q2$ remains the same), and an electron is placed at location A. What will be the direction of the force on the electron?

[you can use this blank space to enter your answer for Problem 10]