**Homework 1.) For PHY2061, Chaps. 25-26, Fall 2016**

**Due Aug. 30**

**Show work on problems to get credit – the answer is not enough.**

**1.)  Make up one possible test problem (not too hard, not too easy) based on this homework, the lectures, and examples given in the book for Chaps. 25-26.  Include a solution.**

**Chap. 25:**

**2.)  Two electrons are held a fixed distance ‘r’ apart.  melectron=9.11 10-31 kg**

**One electron is released, and under the influence of the Coulomb repulsive force from the other electron moves away initially with an acceleration, a, = 9.8 m/s2 (our old friend, ‘g’, the acceleration at the surface of the earth due to gravity.)  What is ‘r’ to three significant figures?  Include units.**

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**3.)  We discussed in class doing the integral for a square plate of charge to find FCoulomb.  Suppose instead of a solid square we take (in analogy to the ring of charge done in the text starting on page 577) a square ‘frame’ of charge (see picture above) in the x-y plane (0,0 is in the center of the frame)  where the sides are ‘L’ long with each side having charge ‘q’ uniformly distributed.  Take a point a distance ‘z’ = L/2 above the center of this frame.  Write down an expression (all integrals solved please) for the Coulomb vector force (Fx,Fy,Fz) on a test charge q0 at this point L/2 above the center of the frame of charge.**

1. **Two identical, small, conducting spheres are separated by a distance ‘r’, where ‘r’ is large with respect to the size of the spheres. The spheres originally have the same positive charge, and the force between them is F1.  ¼ of the charge of one sphere is now moved to the other sphere.  What is the force between the spheres now, in terms of F1 ?  (Please show your work, not just an answer.)**

1. **See Figure below. What is the electric field on the z-axis (which passes thru the charges shown – all charges are all on the z-axis) at a position ‘z’ above the origin, where z is >> d, the spacing between the charges?  The charge distribution shown is made up of two dipoles, each with equal (but opposite in sign) charges q and –q and separation d for each dipole, and each dipole is aligned with its dipole moment pointing in the +z direction (unlike the quadrupole example we did in class on Thursday, where the two dipoles were arranged in opposite directions.)**

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**Points**

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