Physics 2321. Electricity and Magnetism

Quiz 2. Name:_____

Constant: $k = 9 \times 10^9 N\frac{m^2}{C^2}$

1. **(1pt) Valid units for electric field are: _____.**

2. **(1pt) T or F. Electric field lines will coincide with the trajectories of charged particles so long as the particles start at rest on a field line.**

3. **(1pt) Compute the magnitude of the force exerted by a 1200 N/C electric field on a .05 C point charge. (Show work.)**

4. **(1pts) A charged sphere of radius 0.18 m has a uniform surface charge density of $\sigma = 2\ \mu C\ m^{-2}$. How much charge is on just its top hemisphere? (Hint: A=$4\pi r^2$.)**

   (a) 2.1$\times 10^{-6}$ **C (b) 1.8**$\times 10^{-7}$ **C (c) 2.6**$\times 10^{-7}$ **C (d) 3.6**$\times 10^{-7}$ **C**
   (e) 4.1 $\times 10^{-7} C$

5. **(1pts) A point P lies on the same axis as a uniformly charged straight wire segment. The E-field due to a differential charge on that wire a distance x away from the point P has a magnitude of**

   (a) $\mathbf{dE = k\frac{dq}{x}}$
   (b) $\mathbf{dE = k\frac{\sigma dA}{x}}$
   (c) $\mathbf{dE = k\frac{\rho dV}{x^2}}$
   (d) $\mathbf{dE = k\frac{\sigma dA}{x^2}}$
   (e) $\mathbf{dE = k\frac{\lambda dx}{x^2}}$

6. **(1pt) A spherical, styrofoam bob has a mass of 5**$\times 10^{-4}$ **kg and a charge of 20μC. What is its acceleration in a 820 N/C uniform electric field? (No air resistance.)**

   (a) 3.2 m/s^2 (b) 3.3$\times 10^7$ **m/s^2 (c) 9.8 m/s^2 (d) 33 m/s^2**
   (e) none of these