SPH202: ELECTRICITY & MAGNETISM II

TUTORIAL I DUE: 10/03/2020 AT 3PM

1. A disk of radius 0.1m is oriented with its normal unit vector $\hat{n}$ at 30° to a uniform electric field $\vec{E}$ of magnitude ~~3x10^3~~ ~~2x10^3~~ 2×10^3 N/C.
   (a) What is the electric flux through the disk?
   (b) What is the flux through the disk if it is turned, so that $\hat{n}$ is perpendicular to $\vec{E}$?
   (c) What is the flux through the disk if $\hat{n}$ is parallel to $\vec{E}$?

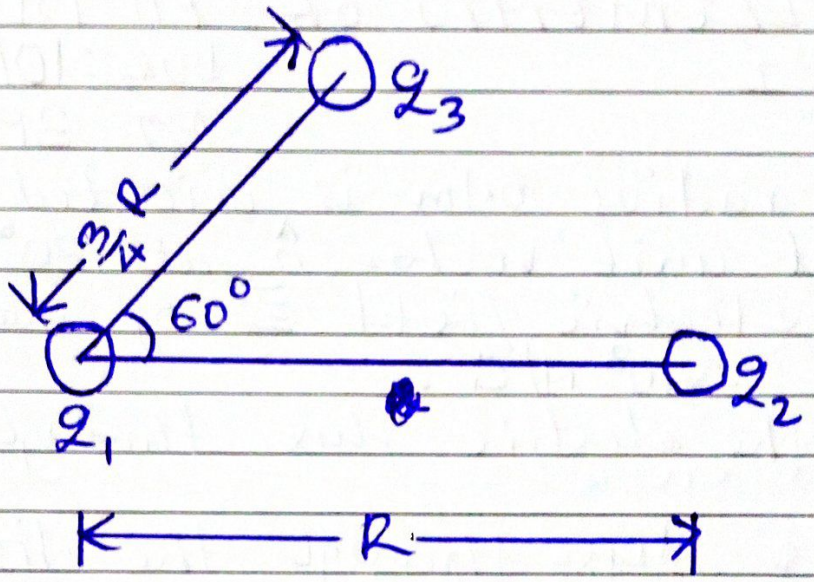
2. A point charge $q = 3\mu C$ is surrounded by an imaginary sphere of radius $r = 0.2m$ centered on the charge. Find the resulting electric flux through the sphere.

3. A spherical shell of radius $R = 3m$ has its center at the origin and carries a surface charge density $(\sigma) = 3nC/m^2$. A point charge $(q) = 250nC$ is on the y-axis at $y = 2cm$.
   Find the electric field on the x-axis at
   (a) $x = 2cm$, and
   (b) $x = 4cm$.

4. The Figure below shows three charged particles. The charges are $q_1 = 1.6\times10^{-19}C$, $q_2 = 3.2\times10^{-19}C$, and $q_3 = -3.2\times10^{-19}C$.

   What is the net electrostatic force on particle 1 due to particles 2 and 3?

   Where $R = 0.02m$.



5. List the properties of tan-A position and Tan-B position.

6. Two charged conducting spheres of radius r and R connected to each other by a wire.
Find the ratio of electric fields at the surfaces of the two spheres.