Phys 222 SI Session #8

**Topics:** Electric Potential Energy, Electric Potential

Intro discussion: Is cereal a soup?

1. Is electric potential an absolute or relative quantity?

2. A negative charge, if free to move, will tend to move
   A. In the direction of the electric field
   B. From high potential to low potential
   C. From low potential to high potential
   D. In a direction perpendicular to the electric field
   E. Along an equipotential line

3. A hollow, thin-walled metal sphere of radius $R_2$ has a net charge of $+Q$. A second hollow, thin-walled metal sphere of radius $R_1$ is inside and concentric with the first sphere and has net charge $-2Q$. If the electric potential at infinity is zero, what is the electric potential at the common center of the spheres?

4. A charge +40 μC is fixed at $x = 0$ and a charge −40 μC is fixed at $x = 3.0$ m. A third charge of +40 μC with mass 2.0 kg starts at $x = 1.0$ m with initial velocity 3.3 m/s $\hat{i}$. What is the speed of the third charge, in m/s, when the particle reaches the point $x = 2.0$ m?

5. A thin ring of radius 8.0 cm has −4.0 μC uniformly distributed on it. How much energy is required, in J, to bring a −2.0 μC charge from infinity to a point on the axis of the ring 4.0 cm from the center of the ring?

6. Consider the group of three +2.4 nC point charges shown in the figure. What is the electric potential energy of this system of charges relative to infinity?