Worksheet 3: **Electric Potential**

SI Leader: Stephen Iota (siota001@ucr.edu)
Course: Physics 40C (Fall 2018), Dr. Laura Sales
Date: 15 October 2018

Review: Faraday Cage

(i) Which Spherical Gaussian Surface has more flux?

(ii) Does flux depend on $1/r^2$ No, only on charge enclosed.

(iii) Which Gaussian Surface has a larger electric field?

(iv) Find the electric field within the cavity?

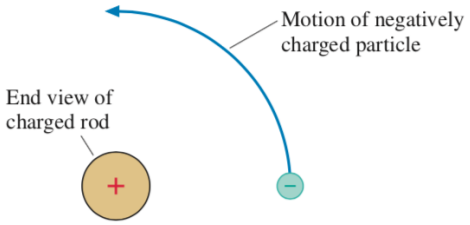
(v) What is the electric flux Φ_e within the cavity?

Electric Potential

(1) Is the electric force $\vec{F} = q\vec{E}(\vec{r})$ **(a) a conservative force**, **(b) a non-conservative force** or **(c) a mechanical force**?

(2) How do you determine if a force[1] is conservative?[2]

(3) A glass rod is positively charged. The figure below shows the end view of a rod. A negatively charged particle moves in a circular arc around the glass rod. Is the work done on the charged particle by the rod's electric field **(a) positive**, **(b) negative** or **(c) zero**?



(4) Rank in order, from largest to smallest, the potential energies U_a to U_d of these four charge pairs. Each + symbol represents the same amount of charge.

(a) **(b)** **(c)** **(d)**

[1] Or similarly, a "Vector Field."
[2] Later in the quarter we will encounter the Lorentz Force which will put these definitions to the test.

(5) A proton is released from rest at point B, where the potential is 0 V. Afterward, the proton

(a) Remains at rest at B.

(b) Moves toward A with a steady speed.

(c) Moves toward A with an increasing.

(d) Moves toward C with a steady speed.

(e) Moves toward C with an increasing speed.