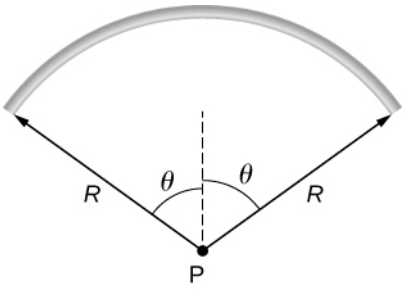
In-class practice, Feb. 3, 2022, Full Participation: +3 Bonus Points on Midterm #1

Name _____

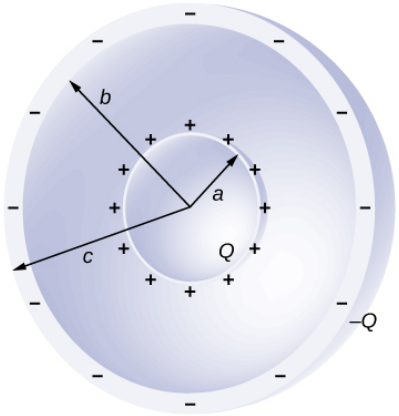
Note: This is an open-book, open-notes, collaborative group activity. Please work with a small group of 2-4 classmates. Detailed work must be shown for each problem in order to receive credit. You may use additional paper if needed for scratch work. Please staple scratch work to this page.

1. A proton moves in the electric field $\vec{\mathbf{E}} = 200\hat{\mathbf{i}}$ N/C. (a) What are the force on and the acceleration of the proton? (b) Do the same calculation for an electron moving in this field.

2. A rod bent into the arc of a circle subtends an angle $2\theta$ at the center *P* of the circle (see below). If the rod is charged uniformly with a total charge *Q*, what is the electric field at *P*?



3. Concentric conducting spherical shells carry charges $Q$ and $-Q$, respectively (see below). The inner shell has negligible thickness. Determine the electric field for (a) $r < a$; (b) $a < r < b$; (c) $b < r < c$; and (d) $r > c$.




4. (a) What is the electric field at the lower-right-hand corner of the square shown below? (b) What is the force on a charge $q$ placed at that point?