In the figure at the right, the inner sphere of radius $b$ has $+Q$ uniformly distributed on its surface. At the radius $a$, there is a Gaussian surface (i.e. there is no physical object at this radius).

a) What is the magnitude of the electric field anywhere on the outer surface?

By spherical symmetry, we can simply write down

\[ E = \frac{+Q}{4\pi \varepsilon_0 a^2} \]

To use Gauss' Law:

\[ \oint E \cdot dA = \frac{q_{enc}}{\varepsilon_0} \]

\[ E \left( 4\pi a^2 \right) = \frac{+Q}{\varepsilon_0} \]

\[ E = \frac{+Q}{4\pi \varepsilon_0 a^2} \]

b) What is the net flux through the outer surface?

\[ \Phi = \oint E \cdot d\vec{n} = \frac{q_{enc}}{\varepsilon_0} \]

\[ \Phi = \frac{+Q}{\varepsilon_0} \]