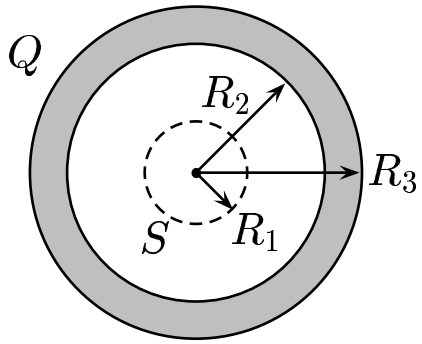
A hollow thick spherical shell (made of an insulating material) has an inner radius of R_2 and an outer radius of R_3. The net charge on the shell is $Q > 0$, and the charge is uniformly distributed throughout the shell. Let S (dashed circular line) be a concentric spherical surface (Gaussian surface) with a radius R_1.



Find the direction of the electric field at a point R_1 from the center of the spherical conducting shell.

A) $\vec{E}$ is directed radially inward.

B) $\vec{E}$ is directed radially outward.

C) The direction of $\vec{E}$ is undetermined since $E = 0$.

Since the charge distribution is spherically symmetric, $\|\vec{E}\|$ must be the same everywhere on S. And by symmetry $\vec{E}$ must be directed radially, either outward or inward. However there is no charge enclosed in the Gaussian surface, therefore $\Phi_S = \oint_S \vec{E} \cdot \vec{A} = 0$, or specifically $E = 0$.

Answer **C**.