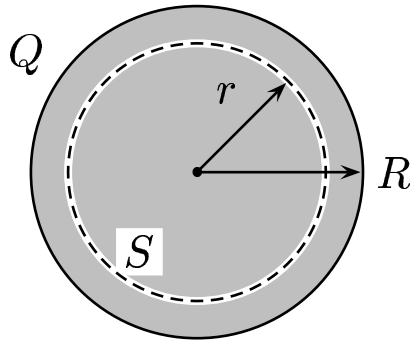


Consider an electrostatic situation. A sphere (insulator) has a uniform charge Q and radius R . Its charge density is therefore $\rho = \frac{Q}{V}$.



Construct a Gaussian surface S having concentric spherical surface with radius r .

Determine the charge enclosed by S .

A) $Q_{\text{enclosed}} = \frac{4}{3} \pi r^3 \rho$

B) $Q_{\text{enclosed}} = \pi r^2 \rho$

C) $Q_{\text{enclosed}} = 2 \pi r^2 \rho$

D) $Q_{\text{enclosed}} = \frac{4}{3} \pi R^3 \rho$

E) $Q_{\text{enclosed}} = 2 \pi R^2 \rho$

For an electrostatic case, the charge(s) inside of a conductor. The volume

of a sphere is $V = \frac{4}{3} \pi r^3$.

$$Q_{inside} = \rho V$$

$$= \rho \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \pi r^3 \rho.$$

Answer **A**.

24.03-03 Uniformly Charged Sphere 2006-9-14