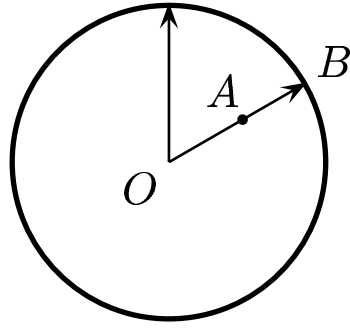


Given a uniformly charged sphere with a total charge  $Q$  and a radius  $R$ . It can be shown that the electric field  $E = \frac{\rho r}{3 \epsilon_0}$ .



Find the potential difference  $\Delta V$  between  $A$ , where  $OA = r < R$  and  $B$ , the point along the same radial line on the surface of the sphere.

A)  $\Delta V = - \int_R^r E dr$

B)  $\Delta V = \int_R^r E dr$

C)  $\Delta V = E (R - r)$

$\Delta V = -E \cdot \Delta s$ . For the present case  $E$  depends on  $r$ . So the potential difference must be evaluated through an integral. By inspection, answer **A** gives the desired positive potential difference.

Answer **A**.

25.05-02 Uniformly Charged Sphere 2004-3-24