Answer on Question #45433-Physics-Electromagnetism

If 8 coulomb charge present in a sphere. The radius of sphere is 8cm. the electron moves from one point diameter to another point of diameter in that sphere. Then find the work done by moving electron.

Solution

Potential of charged sphere outside the sphere is the same as that of a point charge:

$$V = \frac{kQ}{r},$$

where k is Coulomb's constant, Q is charge of a sphere, r is the distance from the center of a sphere.

The electric field inside a conducting sphere is zero, so the potential remains constant at the value it reaches at the surface:

$$V = \frac{kQ}{R},$$

where R is a radius of a sphere.

The work done by moving electron from one point diameter to another point of diameter is

$$W = e(V_1 - V_2) = e\left(\frac{kQ}{R} - \frac{kQ}{R}\right) = 0.$$

Answer: 0.