

Physics 102-Rec
Quiz#6
Chapter 25

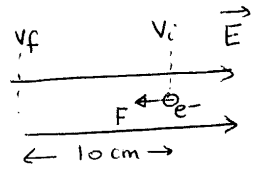
Name: Key Id#: _____ Sect#: _____

1. An electron starting from rest is accelerated in an electric field of $3 \times 10^5 \text{ N/C}$ through a distance of 10 cm. $e = -1.6 \times 10^{-19} \text{ C}$ and $m = 9.1 \times 10^{-31} \text{ kg}$. Find the change in potential energy of the electron.

$$\Delta U = q \Delta V$$

since E is uniform $\Rightarrow \Delta V = -E d \cos 180^\circ$

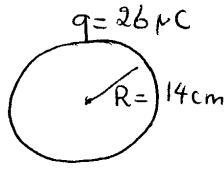
$$= E d = 3 \times 10^5 \times 0.1 = 3 \times 10^4 \text{ V}$$

$$\Delta U = (-1.6 \times 10^{-19}) (3 \times 10^4) = \underline{\underline{-4.8 \times 10^{-15} \text{ J}}}$$


2. A spherical conducting shell has a radius of 14 cm and a charge of $26 \mu\text{C}$. Calculate the electric potential at

(a) $r = 10 \text{ cm}$

$$V = \frac{kq}{R} = \frac{(9 \times 10^9) (26 \times 10^{-6})}{0.14}$$

$$= \underline{\underline{1.67 \times 10^6 \text{ V}}}$$


(b) $r = 20 \text{ cm}$ from the center of the sphere.

$$V = \frac{kq}{r} = \frac{(9 \times 10^9) (26 \times 10^{-6})}{0.2}$$

$$= \underline{\underline{1.17 \times 10^6 \text{ V}}}$$