Answer on Question #59031, Physics / Electromagnetism |

A uniform electric field of 200 N/C is in the x-direction. A point charge of 3μC is released from rest at the origin. What is the kinetic energy of the charge when it is at x = 4 m?

2.4×10^{-2}J
1.6×10^{-2}J
3.6×10^{-2}J
4.8×10^{-2}J

Solution:

The work, done by the electric field is

$$W = qEx$$

According to the law of conservation of energy is equal to the kinetic energy.

Thus, kinetic energy of a charge is:

$$K = W = qEx$$

$$K = 3 \cdot 10^{-6} \cdot 200 \cdot 4 = 0.0024 \text{ J} = 2.4 \cdot 10^{-3} \text{ J}$$

Answer: $2.4 \cdot 10^{-3}$ J