

Answer on Question #60895-Physics – Mechanics | Relativity

An electron in an oscilloscope is uniformly accelerated from rest to a final speed of 6.00×10^6 m/s in a distance of 1.50cm. Determine a) the final kinetic energy of the electron, b) the average force on the electron, and c) the power required

Solution

a)

$$K = \frac{mV^2}{2} = \frac{1}{2} \cdot 9.11 \cdot 10^{-31} \cdot 6 \cdot 10^6 = 2.73 \cdot 10^{-21} J.$$

b)

$$F = \frac{W}{d} = \frac{K - 0}{d} = \frac{2.73 \cdot 10^{-21}}{1.5 \cdot 10^{-2}} = 1.82 \cdot 10^{-19} N.$$

c)

$$P = Fv = 1.82 \cdot 10^{-19} \cdot 6 \cdot 10^6 = 1.09 \cdot 10^{-12} W.$$