An charged particle has a mass of 10 kg and a charge of \(-5 \text{ C}\). This particle is accelerated through a potential difference of 100 V and it passes horizontally into a region in which there is a uniform magnetic field of magnitude 4 T pointing into the page as shown in the picture.

(a) What is the radius of the resulting circular motion?
(b) Will this particle go clockwise or counterclockwise?
(c) What is the period of the circular motion?

\[
\begin{align*}
\text{Velocity:} & \quad \text{charge} \times \text{Voltage} = \frac{1}{2} m v^2 \\
& \quad \frac{v^2}{2} = \frac{m}{2} (10 \text{ C} \times 100 \text{ V}) \\
& \quad v = \sqrt{\frac{m \times 10 \text{ C} \times 100 \text{ V}}{2}} \\
& \quad = \sqrt{\frac{10 \times 5 \times 100}{2}} \\
& \quad = 10 \text{ m/s}
\end{align*}
\]

\[
R = \frac{mv}{\varepsilon B} = \frac{(10)(10)}{(5)(4)} \\
= 5 \text{ m}
\]

(b) \(\vec{v} \times \vec{B}\) is up\((-5 \text{ C}) \vec{v} \times \vec{B}\) is down \(\Rightarrow\) clockwise

(c) \(T = \frac{2\pi m}{\varepsilon B} = \frac{2\pi (10)}{(5)(4)} = \frac{\pi}{2}\)