

46. We use $\tau_{\max} = |\vec{\mu} \times \vec{B}|_{\max} = \mu B = i\pi a^2 B$, and note that $i = qf = qv/2\pi a$. So

$$\tau_{\max} = \left(\frac{qv}{2\pi a}\right) \pi a^2 B = \frac{1}{2} qvaB .$$