Vector potential $\vec{A}$ in $d \ll \frac{w}{c} = \frac{\lambda}{2\pi} \ll r$ (2)

$$\vec{A}(\bar{x},t) = \int_{\bar{x}'} d^3\bar{x}' \; \frac{\mu_0}{4\pi} \; \frac{1}{R} \; \bar{j}(\bar{x}',t')$$

$R = |\bar{x} - \bar{x}'|$

$$\approx -\frac{\mu_0}{4\pi} \int_{-\frac{d}{2}}^{\frac{d}{2}} dz \; \frac{q_0 \, w \sin(wt') \, \hat{z}}{r_+} \qquad \hat{z} \parallel \bar{j}(\bar{x},t)$$

$$= -\frac{\mu_0}{4\pi} \int_{-\frac{d}{2}}^{\frac{d}{2}} dz \; \frac{q_0 \, w \sin\left(w\left(t + \frac{r_\pm}{c}\right)\right) \hat{z}}{r_+} \; .$$

Find $\bar{A} = \bar{A}(r, \theta, t)$