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$r = R \sin \theta$
 $s = R \sin \theta$



$dq = \sigma (r n R \sin \theta R d\theta)$ (انت) (✓)

$I = \frac{dq}{dt} = \omega \sigma R^2 \sin \theta d\theta$

$t = \frac{r n}{\omega}$

$dM = I A = \omega \sigma R^2 \sin \theta n R^2 \sin \theta d\theta$
 $= \omega \sigma R^4 \sin^2 \theta d\theta$

$M = \int_0^\pi dM = \omega \sigma R^4 \int_0^\pi \sin^2 \theta d\theta$
 $M = \omega \sigma R^4 \left(\frac{1}{2} \cos^2 \theta - \frac{1}{2} \cos \theta \right) \Big|_0^\pi$
 $M = \frac{1}{2} \omega \sigma R^4 = \frac{\omega R^4 \sigma}{2}$

$\vec{M} \parallel \hat{k} \Rightarrow \vec{M} \parallel \vec{\omega}$

$B = \frac{\mu_0}{4\pi} \frac{\vec{M}}{r^3}$

$B = \frac{\mu_0}{4\pi} \frac{R^4}{r^3} \frac{\omega \sigma}{2} = \frac{\mu_0 \omega \sigma R^4}{8\pi r^3} \hat{k}$
 $\vec{B} \parallel \vec{M}$