$$\vec{p} = \mu_0 \epsilon_0 \int \vec{S}\, d\tau$$

By Gauss' Law, inner sphere can be treated as a point charge.

$$\vec{E} = \frac{1}{4\pi\epsilon_0} \frac{Q}{r^2} \qquad \vec{B} = \frac{2}{3}\mu_0 \vec{M}$$

$$\vec{S} = \epsilon_0 (\vec{E} \times \vec{B})$$

$$= \cancel{\epsilon_0}\left(\frac{1}{{}_2\cancel{4}\pi\cancel{\epsilon_0}} \frac{Q}{r^2} \times \frac{\cancel{2}}{3}\mu_0 \vec{M}\right)$$

$$\vec{S} = \frac{Q\mu_0 \vec{M}}{6\pi r^2}$$

$$\vec{p} = \mu_0 \epsilon_0 \int \vec{S} \cdot d\tau$$

$$= \mu_0 \epsilon_0 \frac{Q\mu_0 \vec{M}}{6\pi} \int \frac{1}{r^2}\, d\tau$$

$$= \frac{Q\mu_0^2 \epsilon_0 \vec{M}}{6\pi} \int_0^{2\pi}\int_0^{\pi}\int_0^{R} \frac{1}{r^2}\, dr\, d\phi\, d\theta$$

$$=$$