(a) Let the distance between the disks be l, where $l << R$. Since $Q = It$, we have, by Gauss Law,

$$E = \frac{It}{\pi R^2 \varepsilon_0},$$

with direction pointing from the positively charged plate to the negatively charged one. From

$$\vec{\nabla} \times \vec{B} = \mu_0 \varepsilon_0 \frac{\partial \vec{E}}{\partial t},$$

$$B \cdot 2\pi s = \mu_0 \varepsilon_0 \frac{I}{\pi R^2 \varepsilon_0} \pi s^2,$$

i.e.,

$$B = \frac{\mu_0 I s}{2\pi R^2}.$$

The direction of the B-field is tangential and clockwise when viewed along the direction of the E-field.

(b) Energy density $= \frac{1}{2}\varepsilon_0 \left|\vec{E}\right|^2 + \frac{1}{2\mu_0}\left|\vec{B}\right|^2$

$$= \frac{I^2\left(4t^2 + \mu_0 \varepsilon_0 s^2\right)}{8\varepsilon_0 \pi^2 R^4}.$$

Poynting vector $\vec{S} = \frac{1}{\mu_0}\vec{E} \times \vec{B}$.

i.e., $\left|\vec{S}\right| = \frac{I^2 st}{2\varepsilon_0 \pi^2 R^4}$.

The Poynting vector is pointing inward in the radial direction.

(c) Total energy

$$U = \iiint_V \left[\frac{1}{2}\varepsilon_0 \left|\vec{E}\right|^2 + \frac{1}{2\mu_0}\left|\vec{B}\right|^2\right] dV$$

$$= \int_0^R \frac{I^2\left(4t^2 + \mu_0 \varepsilon_0 s^2\right)}{8\varepsilon_0 \pi^2 R^4} 2\pi s l ds$$

$$= \frac{I^2 l}{12\varepsilon_0 \pi R^2}\left[6t^2 + \mu_0 \varepsilon_0 R\right].$$

Total power flowing into the gap

$$P = -\oiint_A \vec{S} \cdot \overrightarrow{da}$$

$$= \frac{I^2 st}{2\varepsilon_0 \pi^2 R^4} \times 2\pi R l$$

$$= \frac{I^2 lt}{\varepsilon_0 \pi R^2}$$

$$= \frac{dU}{dt}.$$