

7. If f is the frequency and λ is the wavelength of an electromagnetic wave, then $f\lambda = c$. The frequency is the same as the frequency of oscillation of the current in the LC circuit of the generator. That is, $f = 1/2\pi\sqrt{LC}$, where C is the capacitance and L is the inductance. Thus

$$\frac{\lambda}{2\pi\sqrt{LC}} = c .$$

The solution for L is

$$L = \frac{\lambda^2}{4\pi^2 C c^2} = \frac{(550 \times 10^{-9} \text{ m})^2}{4\pi^2 (17 \times 10^{-12} \text{ F})(2.998 \times 10^8 \text{ m/s})^2} = 5.00 \times 10^{-21} \text{ H} .$$

This is exceedingly small.