In this problem, we have got that $n^2 = R, n^2 = L$ are the dispersion relations for the two possible electromagnetic waves. To plot n^2 vs $\frac{\omega}{\Omega_H}$, note that when $\omega \to 0$, $R = L \approx 1 + \gamma$, and after some algebraic work, the expression for γ is written as follow:

$$\gamma = \sum_{i=1}^{n} \frac{\omega^2_{pi}}{\Omega^2_i}\left(1 + \frac{m_e}{m_i}\right)$$

The above equation is exactly satisfied if we assume that all of the ions are singly charged. I didn't go further to the multiple-charged ions, and maybe it is also satisfied for that. Since the mass of electrons is much less than that of the ions. So the second term can be neglected. Then we get.

$$\gamma = \sum_{i=1}^{n} \frac{\omega^2_{pi}}{\Omega^2_i} = \frac{c^2}{V^2_A}$$

$$V^2_A = \frac{B^2}{4\pi \sum n_i m_i}$$