Kida and Iwasawa proved number theoretic analogs of the Riemann-Hurwitz formula where the lambda invariant of a $\mathbb{Z}_p$-field plays the role of (twice) a genus of a curve. We can derive special formulas in the case of cyclic $p$-extensions of $\mathbb{Z}_p$-fields which yield extra information about lambda invariants that cannot be gleaned from the previously known formulas. (Received September 15, 2011)