Homework 34

1. Let $K$ have characteristic $p \neq 0$, and let $f \in K[x]$ be irreducible. Let $m$ be the largest nonnegative integer such that $f$ is a polynomial in $x^{p^m}$ but is not a polynomial in $x^{p^{m+1}}$. Then $n = n_0 p^m$. If $u$ is a root of $f$, then $[K(u) : K]_n = n_0$ and $[K(u) : K]_i = p^m$.

2. Prove that the following are equivalent.
   (a) $L/K$ is purely inseparable.
   (b) $L/K$ is algebraic and for every extension field $M/L$, the only $K$-embedding of $L$ into $M$ is the identity map.