Some Conventions

The notation $X \subset Y$ means that $X$ is a subset of $Y$.

For an abelian group $A$ written additively denote by $A/m$ the quotient group $A/mA$ where $mA = \{ma : a \in A\}$ and by $_mA$ the subgroup of elements of order dividing $m$. The subgroup of torsion elements of $A$ is denoted by $\text{Tors} A$.

For an algebraic closure $F^{\text{alg}}$ of $F$ denote the separable closure of the field $F$ by $F^{\text{sep}}$; let $G_F = \text{Gal}(F^{\text{sep}}/F)$ be the absolute Galois group of $F$. Often for a $G_F$-module $M$ we write $H^i(F, M)$ instead of $H^i(G_F, M)$.

For a positive integer $l$ which is prime to characteristic of $F$ (if the latter is non-zero) denote by $\mu_l = \langle \zeta_l \rangle$ the group of $l$th roots of unity in $F^{\text{sep}}$.

If $l$ is prime to char of $K$ denote by $\mathbb{Z}/l(m)$ the $G_F$-module $\mu_l^{\otimes m}$ and put $\mathbb{Z}_l(m) = \lim_{\rightarrow} \mathbb{Z}/l^i(m)$; for $m < 0$ put $\mathbb{Z}_l(m) = \text{Hom}(\mathbb{Z}_l, \mathbb{Z}_l(\zeta_l(-m)))$.

Let $A$ be a commutative ring. The group of invertible elements of $A$ is denoted by $A^\times$. Let $B$ be an $A$-algebra. $\Omega^1_{B/A}$ denotes as usual the $B$-module of regular differential forms of $B$ over $A$; $\Omega^n_{B/A} = \wedge^n \Omega^1_{B/A}$. In particular, $\Omega^n_k = \Omega^n_{A/\mathbb{Z}_A}$ where $1_A$ is the identity element of $A$ with respect to multiplication. For more on differential modules see subsection A1 of the appendix to the section 2 in the first part.

Let $K_n(k) = K^M_n(k)$ be the Milnor $K$-group of a field $k$ (for the definition see subsection 2.0 in the first part).

For a complete discrete valuation field $K$ denote by $\mathcal{O} = \mathcal{O}_K$ its ring of integers, by $\mathfrak{M} = \mathfrak{M}_K$ the maximal ideal of $\mathcal{O}$ and by $k = k_K$ its residue field. If $k$ is of characteristic $p$, denote by $\mathcal{R}$ the set of Teichmüller representatives (or multiplicative representatives) in $\mathcal{O}$. For $\theta$ in the maximal perfect subfield of $k$ denote by $[\theta]$ its Teichmüller representative.

For a field $k$ denote by $W(k)$ the ring of Witt vectors (more precisely, Witt $p$-vectors where $p$ is a prime number) over $k$. Denote by $W_r(k)$ the ring of Witt vectors of length $r$ over $k$. If char$(k) = p$ denote by $F_r: W(k) \rightarrow W(k)$, $F_r: W_r(k) \rightarrow W_r(k)$ the map $(a_0, \ldots) \mapsto (a_0^p, \ldots)$.

Denote by $v_K$ the surjective discrete valuation $K^* \rightarrow \mathbb{Z}$ (it is sometimes called the normalized discrete valuation of $K$). Usually $\pi = \pi_K$ denotes a prime element of $K$: $v_K(\pi_K) = 1$.

Denote by $K_{ur}$ the maximal unramified extension of $K$. If $k_K$ is finite, denote by Frob$_K$ the Frobenius automorphism of $K_{ur}/K$.

For a finite extension $L$ of a complete discrete valuation field $K$ $\mathcal{D}_{L/K}$ denotes its different.

If char$(K) = 0$, char$(k_K) = p$, then $K$ is called a field of mixed characteristic. If char$(K) = 0 = \text{char}(k_K)$, then $K$ is called a field of equal characteristic.

If $k_K$ is perfect, $K$ is called a local field.