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 $\operatorname{Tors} A$.

For an algebraic closure F^{alg} of F denote the separable closure of the field F by F^{sep}; let $G_F = \operatorname{Gal}(F^{\text{sep}}/F)$ 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 lth roots of unity in F^{sep}.

If l is prime to $\operatorname{char}(F)$, for $m \geqslant 0$ denote by $\mathbb{Z}/l(m)$ the G_F-module $\mu_l^{\otimes m}$ and put $\mathbb{Z}_l(m) = \varprojlim_r \mathbb{Z}/l^r(m)$; for $m < 0$ put $\mathbb{Z}_l(m) = \operatorname{Hom}(\mathbb{Z}_l, \mathbb{Z}_l(-m))$.

Let A be a commutative ring. The group of invertible elements of A is denoted by A^*. 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, $\Omega^n_A = \Omega^n_{A/\mathbb{Z}1_A}$ 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 $K_n(k) = K_n^M(k)$ 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 $\mathcal{M} = \mathcal{M}_K$ 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 θ 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 $\operatorname{char}(k) = p$ denote by $\mathbf{F}\colon W(k) \to W(k)$, $\mathbf{F}\colon W_r(k) \to W_r(k)$ the map $(a_0, \dots) \mapsto (a_0^p, \dots)$.

Denote by v_K the surjective discrete valuation $K^* \to \mathbb{Z}$ (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 $\operatorname{char}(K) = 0$, $\operatorname{char}(k_K) = p$, then K is called a field of *mixed characteristic*. If $\operatorname{char}(K) = 0 = \operatorname{char}(k_K)$, then K is called a field of *equal characteristic*.

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