TOKYO J. MATH.
VOL. 5, No. 2. 1982

Ambiguous Numbers over $P(\zeta_3)$ of Absolutely Abelian Extensions of Degree 6

Hisako FURUYA

Tsuru University
(Communicated by J. Kojima)

Let K be an abelian number field of degree 6 over the rational number field P and suppose K contains a primitive 3rd root ζ_3 of unity. Then the ambiguous number of $K/P(\zeta_3)$ is 3^{2t-2} when 3 unramifies in $K/P(\zeta_3)$ and it is 3^{2t-1} when 3 ramifies in $K/P(\zeta_3)$ where $t+1$ is the number of prime numbers which ramify in K/P.

Let Γ be the genus field of K/P, then Γ/K is unramified and the number of these ideal classes of K which are principal in Γ is a multiple of $(\Gamma: K)$ and it is larger than $(\Gamma: K)$ if $t \geqq 2$.

§1. Preliminaries.

Throughout this paper we shall use the following notations.

P The rational number field.

ζ_n A primitive n-th root of unity.

In this paper, the conductor of K is the minimal number f such that $K \subset P(\zeta_f)$ when K is abelian over P.

I_K	The group of ideals in K.
P_K	The group of principal ideals in K.
$h_K=[I_K: P_K]$	The class number of K.
$\mathfrak{A} \sim 1$	An ideal $\mathfrak{A}$ is principal in the field.
$\mathfrak{A} \sim \mathfrak{B}$	Ideals $\mathfrak{A}$ and $\mathfrak{B}$ are contained in a same ideal class in the field.

We call $\mathfrak{A} \in I_K$ an ambiguous ideal if $\mathfrak{A}^\sigma = \mathfrak{A}$ for all $\sigma \in \mathrm{Gal}(K/k)$ and we call $\mathfrak{A} \in I_K$ an ambiguous class ideal if $\mathfrak{A}^{1-\sigma} \in P_K$ for all $\sigma \in \mathrm{Gal}(K/k)$.

$A_{0,K/k}$	The subgroup of I_K/P_K consisting of classes each of which contains an ambiguous ideal for K/k.
$a_{0,K/k}$	The order of $A_{0,K/k}$.
$A_{K/k}$	The subgroup of I_K/P_K consisting of classes each of which

Received May 21, 1981