$\leq K^{2K}+K^{2K} \leq (K+1)^{2K} \leq (K+1)^{2K+1}$ $\square$.

$\boxed{n^{2^n}+6\cdot 2^n \geq n^{2^n}}$ for all $n \geq 0$.

$\therefore \boxed{n^{2^n} \leq n^{2^n}+6\cdot 2^n \leq 2n^{2^n} \text{ for all } n \geq 3}$

$c_1=1$ $c_2=2$, $n_0=3$ $\therefore n^{2^n}+6\cdot 2^n = \Theta(n^{2^n})$

g) $n^3+10^6n^2=\Theta(n^3)$ $\quad n^3+10^6n^2 \geq n^3$ for all $n\in N$, $n \geq 0$

$n^3+10^6n^2 = n^3+(1000n)^2 \leq n^3+10^6n^3=(10^6+1)n^3$

$n^3 \leq n^3+10^6n^2 \leq (10^6+1)n^3$, $n \geq 1$, $n\in N$

$\therefore c_1=1$ $c_2=10^6+1$ $n_0=1$ $\boxed{\therefore n^3+10^6n^2=\Theta(n^3)}$

h) $6n^3/(\log n+1)=O(n^3)$

Suppose, $\dfrac{6n^3}{\log n+1} > 6n^3$ for $n\in N$, $n \geq 1$

$1 > \log n+1 \Rightarrow \log n < 0 \Rightarrow n < 1$ (Contradiction)

$\therefore \dfrac{6n^3}{\log n+1} \leq 6n^3$ for $n\in N$, $n \geq 1$

$n_0=1$ $c=6$ $\therefore 6n^3/(\log n+1)=O(n^3)$

i) $n^{1.001}+n\log n=\Theta(n^{1.001})$ $\quad n^{1.001}+n\log n \geq n^{1.001}$ for $\forall n\in N$, $n \geq 1$

$n^{1.001}+n\log n=(n^{\frac{1}{1000}})^{1001}+n\log n \leq (n^{\frac{1}{1000}})^{1001}+(n^{\frac{1}{1000}})^{1001}$ $\quad \forall n\in N$, $n \geq 2^{1000}$

$\boxed{n^{1.001} \leq n^{1.001}+n\log n \leq 2(n^{\frac{1}{1000}})^{1001}}$ $\quad c_1=1$, $c_2=2$, $n_0=2^{1000}$

for $n\in N$, $n \geq 2^{1000}$ $\quad \boxed{\therefore n^{1.001}+n\log n=\Theta(n^{1.001})}$

j) $n^K+n+n^K\log n=\Theta(n^K\log n)$ for all $K \geq 1$

$n^K+n+n^K\log n \geq n^K\log n$ $\forall n\in N$ $n \geq 1$. $K \geq 1$ is given.

$\therefore n^K+n+n^K\log n \leq n^K\log n+n^K\log n+n^K\log n=3n^K\log n$, $\forall n\in N$, $n \geq 1$

$n^K\log n \leq n^K+n+n^K\log n \leq 3n^K\log n$, $n \geq 1$ $\therefore c_1=1$, $c_2=3$, $n_0=1$

$\boxed{\therefore n^K+n+n^K\log n=\Theta(n^K\log n)}$