5. $\lim_{n \to \infty} \frac{f(n)}{g(n)} = \frac{n^n}{e^{n\ln(n)}} = \frac{e^{n\ln n}}{e^{n\ln n}} = 1$

Therefore $f(n) = \Theta(g(n))$

6. $\lim_{n \to \infty} \frac{f(n)}{g(n)} = \frac{a_0 + a_1 n + \dots a_k n^k}{n^{k-1}} = \frac{a_k \cdot k! n + a_{k-1} \cdot (k-1)!}{(k-1)!}$

Therefore, let $h(n) = n$

Proof.

$\lim_{n \to \infty} \frac{\frac{f(n)}{g(n)}}{h(n)} = \frac{a_k \cdot k! n + a_{k-1} \cdot (k-1)!}{(k-1)! \cdot n} = \frac{a_k \cdot k!}{(k-1)!}$

Since $k, a_k > 0$, $\lim \frac{\frac{f(n)}{g(n)}}{h(n)} = L$, where $0 < L < \infty$

Now $\frac{f(n)}{g(n)} = \Theta(h(n))$