A. What would be tthe latency and the throughput of the system, as functions of k?
$Throughput = \frac{1\,instruction}{\frac{300\,picoseconds}{k}+20\,picoseconds} \cdot \frac{1{,}000\,picoseconds}{1\,nanosecond}$
The total latency will become $300 + 20k\,ps$.

B. What would be the ultimate limit on the throughput?
As $\lim_{k\to+\infty}$ the throughput will approach to $50\,GIPS$.