4.4

(1) 以 T_{pipe} 为最长延时 $\therefore T_{pipe} = 2ns + 0.1ns = 2.1ns$

流水化后时钟周期为 2.1 ns

(2) $S = \frac{T_{pipe}}{T_{cycle}} \times \frac{CPI_{pipe}}{CPI_{cycle}} \approx \frac{2.1ns}{1ns} \times = \frac{3}{10}$

加速比 $S = \frac{3}{10}$

(3) 设有 K 个流水级，且 K 足够大，

可近似为均匀分割。$\therefore T_{pipe} = \frac{T_{cycle}}{K} + 0.1ns$

$$S \approx \frac{T_{cycle}}{T_{pipe}} = \frac{1}{K} + \frac{0.1}{T_{cycle}}$$

$$\lim_{K \to \infty} S = \frac{0.1ns}{0.7ns} = \frac{1}{7}$$