

(1) STRAND DISPLACEMENT:



1: SHORT DOMAIN ≈ 8 nt

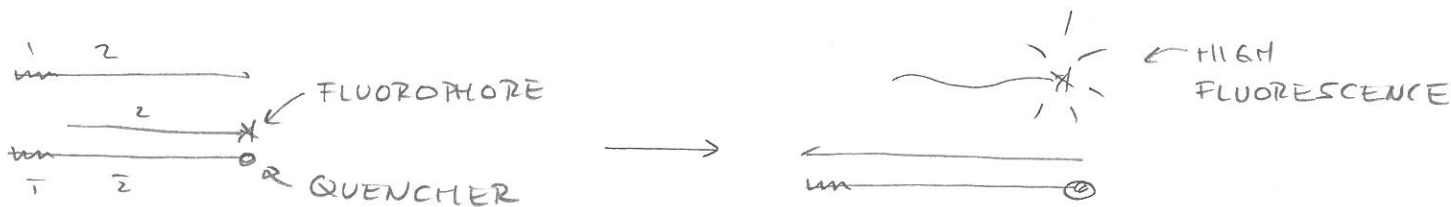
2: LONG DOMAIN ≈ 15 nt

BASE PAIRS INCREASES IN REACTION ($\Delta G \propto n\Delta G_1$)

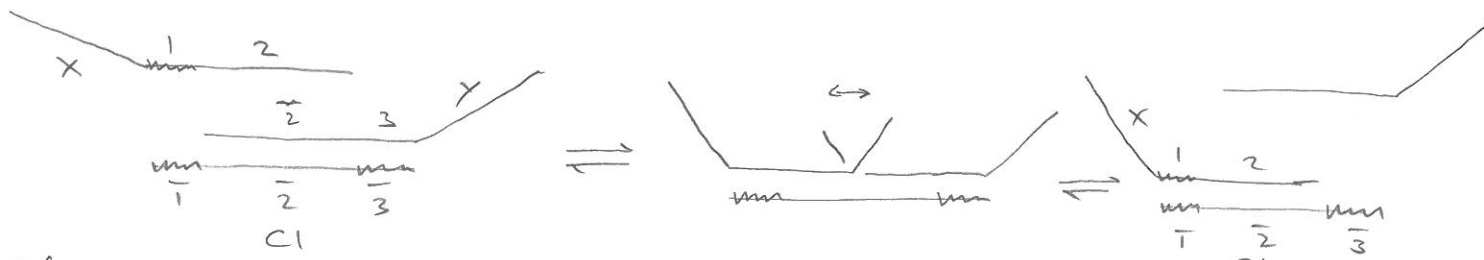
$k \sim 10^6 / M \cdot s$

$\Delta G \sim 1.2 \text{ kcal/base} = 2kT/\text{base}$

(2) DETECTION

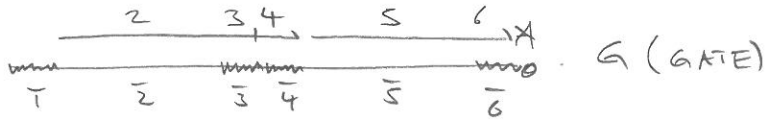


(3) REVERSIBLE REACTION

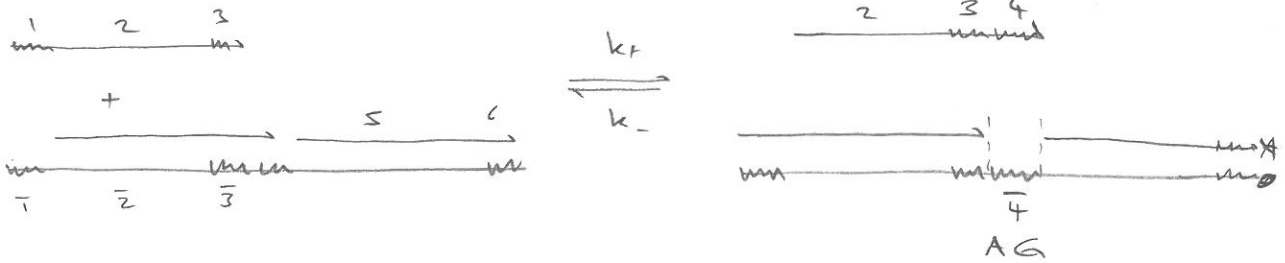


If DOMAINS 1, 3 HAVE SAME LENGTH: $[C1] \sim [C2]$

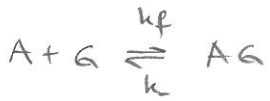
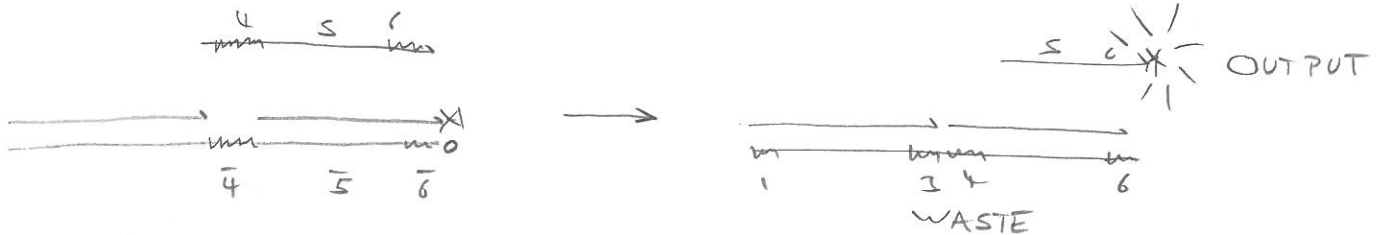
(4) AND LOGIC: $A \cdot B = \overline{\overline{A} \cdot \overline{B}}$



(a) $A + G \rightleftharpoons AG$



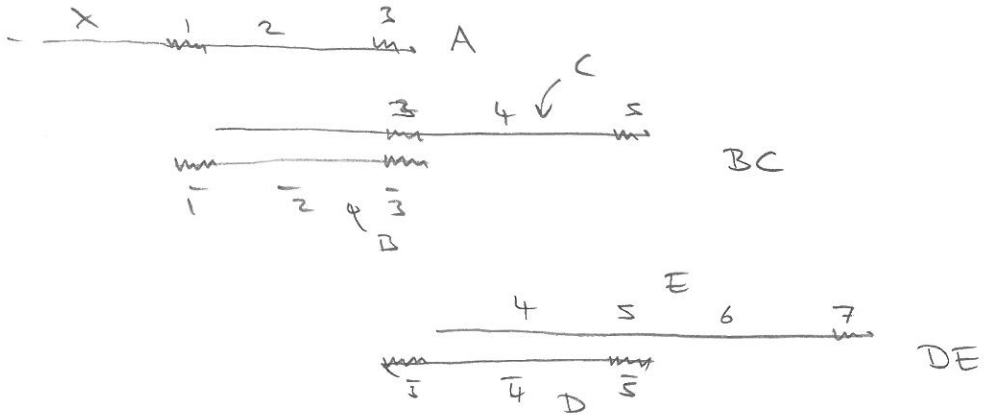
(b) $AG + B \rightarrow \text{O}$



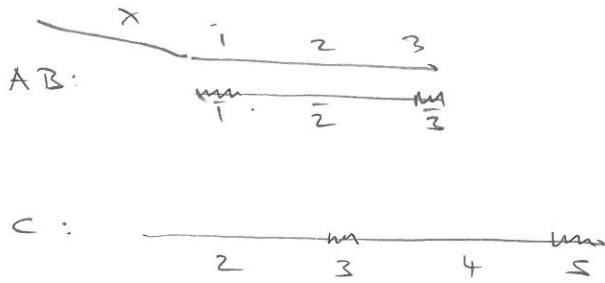
PROBLEM: SEQ. OF OUTPUT DEPENDS ON B!

NET ENERGY GAIN: BASEPAIRS IN 1

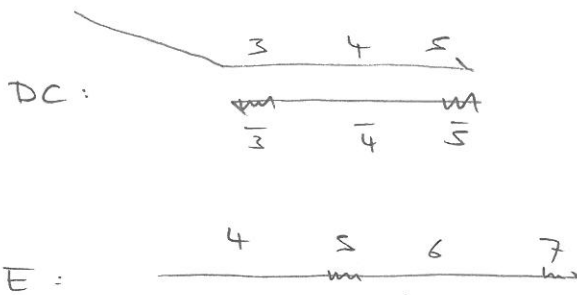
(5) CASCADING $A \rightarrow D \rightarrow D$



(a) $A + BC \rightarrow AB + C$



(b) $C + DE \rightarrow DC + E$



COMPLETE SEQ. INDEPENDENCE!

(6) OR LOGIC

$A \rightarrow C$
 $B \rightarrow C$

} IMPLEMENT AS TWO STAGE CASCADERS