

CONCEPT: RATES OF INTRAMOLECULAR REACTIONS

- **Recall:** The rate constant is defined as:

of collisions per second with proper orientation

$$k = A \cdot e^{\frac{-E_a}{RT}}$$

$A = Z \cdot \rho$


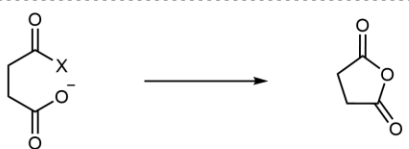
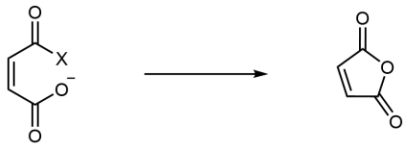
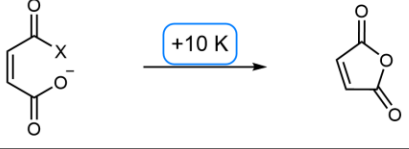
collisions with sufficient energy

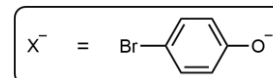
A = Frequency Factor
Z = Collision Frequency
ρ = _____ Factor
 E_a = Activation Energy
 R = Gas Constant
 T = Temperature in Kelvin

- Intramolecular reactions are _____ than analogous intermolecular reactions due to _____ **Z** and **ρ**.

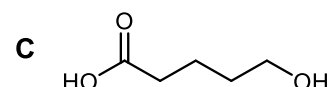
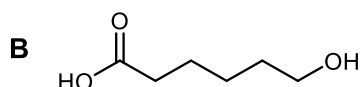
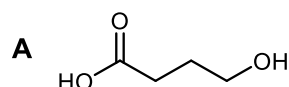
Intramolecular vs Intermolecular Reactions

- **Recall:** Intramolecular reactions that form ____ and ____ membered rings are faster than intermolecular reactions.
 - Presence of both reacting groups within the same molecule _____ the probability of collision (**Z**).
 - Molecules with reacting groups _____ in proper orientation (**ρ**) react at very high rates.

Intramolecular vs Intermolecular Reactions			
Contributing Factor	Reaction		Relative Rate
_____		+	_____
_____		+	_____
_____		+	_____
_____		+	_____



EXAMPLE: Which one of these molecules will form a lactone faster in an acidic solution?



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PRACTICE: Which one of the following compounds cyclizes the fastest in a basic solution?

- i) 4-bromobutan-1-ol
- ii) (Z)-4-bromobut-2-en-1-ol
- iii) (E)-4-bromobut-2-en-1-ol

PRACTICE: Which of the following compounds will undergo elimination the fastest in a basic solution?

