What is the mechanism of the following reaction?

\[
\text{Nitrohalogen + HBr} \rightarrow \text{Nitrogen + Br-Br}
\]

Pass your answer sheet to the course interns for 2 points toward your total of 600!

How can Br₂ react with hydrocarbons?

\[
\text{Br₂ + C-H} \rightarrow \text{Br-H + Br-H}
\]

rate \sim [\text{Br₂}]^2

How can we create low concentrations of Br₂?

\[
\text{Br₂ + C-H} \rightarrow \text{Br-H + Br-H}
\]

high concentrations Br₂ → low concentrations

What is the mechanism of the following reaction?

\[
\text{Nitrohalogen + HBr} \rightarrow \text{Nitrogen + Br-Br}
\]

What is the major product of the following reaction?

AAB BC CD DE EF F
What is the major product of the following reaction?

\[
\begin{align*}
\text{A} & \quad \text{B} & \quad \text{C} \\
\text{D} & \quad \text{E} & \quad \text{F}
\end{align*}
\]

The Diels-Alder reaction has often been called organic chemistry's most important synthetic reaction.

\[
\text{\begin{align*}
\text{\ce{\text{CCl}_3}} & \quad \text{\ce{\text{CCl}_3}} \\
\text{\ce{\text{C}}^* & \quad \text{\ce{\text{H}}} \\
\text{Diels-Alder reaction}
\end{align*}}
\]

Why? What important structural features are created in the Diels-Alder reaction?

\[
\begin{align*}
\text{\ce{\text{CO} + \text{\text{U}^+} + \text{\text{H}_2\text{O}}^-}} & \quad \text{\ce{\text{OH}}} \\
\text{An important synthetic reaction}
\end{align*}
\]

Who was the graduate student?

Diels-Alder reaction (1928)

\[
\begin{align*}
\text{Otto Diels} & \quad \text{Kurt Alder}
\end{align*}
\]

What is the mechanism of this reaction?

Diels-Alder reaction (1928)

Which of the following reactions is faster?

\[
\begin{align*}
\text{A} & \quad \text{B}
\end{align*}
\]

Which of the following reactions is faster?

\[
\begin{align*}
\text{A} & \quad \text{B}
\end{align*}
\]
Which of the following reactions is faster?

A

B

What is the mechanism of the Diels-Alder reaction?

concerted

two step

Are there other models of the Diels-Alder reaction?

concerted

two step

Would the LUMO of C=C be (A) higher or (B) lower in energy than C=C of acrolein?

Which HOMO(diene)-LUMO(dieneophile) combination would be important in the Diels-Alder reaction?

A. $\Psi_1 - \pi^*$
B. $\Psi_2 - \pi^*$
C. $\Psi_3 - \pi$
D. $\Psi_4 - \pi$