What is the product of the following Cope Rearrangement?

1,5-diene \[ \xrightarrow{\text{heat}} \] The Cope Rearrangement

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Which is the weakest bond in a 1,5-diene?

1,5-diene \[ \xrightarrow{\text{heat}} \] The Cope Rearrangement

\[ \text{?} \]

Phenol, in contrast to cyclohexanol, reacts with aqueous hydroxide solutions.

\[ \text{Phenol} + \text{OH}^- \xrightleftharpoons{} \text{Phenoxide} + \text{H}_2\text{O} \]

\[ \text{pK}_a = 15.7 \]

What must be the value of the pK$_a$ of phenol?

A. greater than 15.7
B. less than 15.7

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Go to the Class home page for a link to the application
Why is phenol more acidic than cyclohexanol?

\[
\begin{align*}
\text{phenol} & \quad \text{cyclohexanol} \\
pK_a = 9.89 & \quad pK_a \sim 17
\end{align*}
\]

A. The phenoxide ion forms stronger hydrogen bonds with water.
B. The phenoxide ion is more stabilized by resonance.
C. The aromatic ring better repels the proton.

What must be true about the acidity of \( \text{H}_2\text{CO}_3 \)?

\[
\begin{align*}
\text{phenol} & \quad \text{benzoic acid} \\
pK_a = 9.89 & \quad pK_a = 9.89
\end{align*}
\]

A. \( \text{H}_2\text{CO}_3 \) is a stronger acid than phenol and benzoic acid.
B. \( \text{H}_2\text{CO}_3 \) is a weaker acid than phenol and benzoic acid.
C. \( \text{H}_2\text{CO}_3 \) is a stronger acid than phenol but a weaker acid than benzoic acid.
D. \( \text{H}_2\text{CO}_3 \) is a weaker acid than phenol but a stronger acid than benzoic acid.

Which of the following compounds is more acidic?

\[
\begin{align*}
\text{phenol} & \quad \text{benzoic acid} \\
pK_a = 9.89 & \quad pK_a = 7.15
\end{align*}
\]

How is the following reaction occurring?

\[
\begin{align*}
\text{phenol} & \quad \text{benzoic acid} \\
pK_a = 9.89 & \quad pK_a = 4.2
\end{align*}
\]

A. \( \text{H}_2\text{CO}_3 \) is a stronger acid than phenol and benzoic acid.
B. \( \text{H}_2\text{CO}_3 \) is a weaker acid than phenol and benzoic acid.
C. \( \text{H}_2\text{CO}_3 \) is a stronger acid than phenol but a weaker acid than benzoic acid.
D. \( \text{H}_2\text{CO}_3 \) is a weaker acid than phenol but a stronger acid than benzoic acid.
What experiment could be performed to eliminate two of these pathways?

\[
\begin{align*}
&\text{A} & \quad & \text{B} & \quad & \text{C} \\
&\text{Cl} + \overset{\ominus}{\text{OH}} & \quad & \overset{\ominus}{\text{Cl}} + \underset{\ominus}{\text{OH}} & \quad & \text{HO}_2^- + \text{Cl}^- \\
\end{align*}
\]

When a NO$_2$ group is present on the ring the temperature of the reaction is much lower. Why?

\[
\text{ClNO}_2 \quad 350^\circ C \quad \text{Cl}^- + \text{OH}^- \\
\]

Which of these mechanisms would be more favorable with a NO$_2$ group on the ring?

Which of the following is the more probable mechanism?

\[
\begin{align*}
&\text{A} & \quad & \text{B} & \quad & \text{C} \\
&\text{ClNO}_2 & \quad & \overset{\ominus}{\text{OH}} & \quad & \text{HO}_2^- + \text{Cl}^- \\
\end{align*}
\]

Which of the following reactions will occur at the faster rate?

\[
\begin{align*}
&\text{A} & \quad & \text{B} & \quad & \text{C} \\
&\text{ClNO}_2 & \quad & \overset{\ominus}{\text{OH}} & \quad & \text{HO}_2^- + \text{Cl}^- \\
\end{align*}
\]

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\end{align*}
\]
Glucose and its polymers (starch and cellulose) are the most abundant organic compounds on earth.

How many stereoisomers are there of glucose?

[A] 2  
[B] 4  
[C] 8  
[D] 16