1. Give the degrees of unsaturation in the following:

a. $C_7H_6ClNO_2$

\[ \begin{align*}
\text{b. } &\text{ }
\end{align*} \]

2. Name the following:

a. \[ \begin{align*}
\text{b. } &\text{ }
\end{align*} \]

\[ \begin{align*}
\text{c. } &\text{ }
\end{align*} \]

3. Draw the following:

a. (3Z,5E)-4-methyl-3,5-nonadiene

b. (3E,5E)-2,5-dibromo-3,5-octadiene
4. Identify the following as a nucleophile or an electrophile:

a. H₂O  b. Br⁻  c. H⁺  d. CH₂=CH₂  e. CH₃CH⁺CH₃  f. BH₃

5. Use curved arrows to show the flow of electrons in the following reaction:

CH₃CH=CH₂ + HBr → CH₃CHBrCH₃

6. Given the reaction coordinate diagram:

![Reaction Coordinate Diagram]

a. How many intermediates are formed in the reaction?
b. How many transition states?
c. Which is the rate-determining step?
d. Is the overall reaction exergonic or endergonic?
e. Which is the most stable intermediate?
f. Which forward step has the smallest rate constant?
g. Which forward step has the largest rate constant?

7. Put in order of increasing heat of hydrogenation:

\[ \text{Compounds} \]

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