

# ORGANIC CHEMISTRY

EIGHTH EDITION

L. G. WADE JR.

# Solutions Manual

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*California Polytechnic State University*

## ORGANIC CHEMISTRY

EIGHTH EDITION

L. G. WADE, JR.

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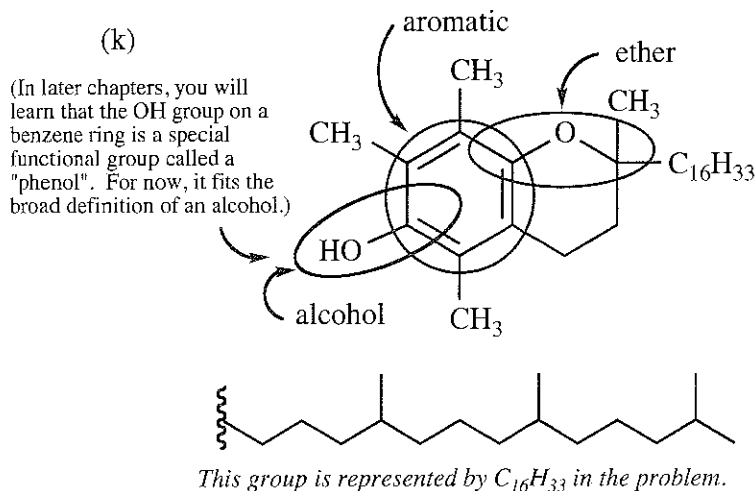
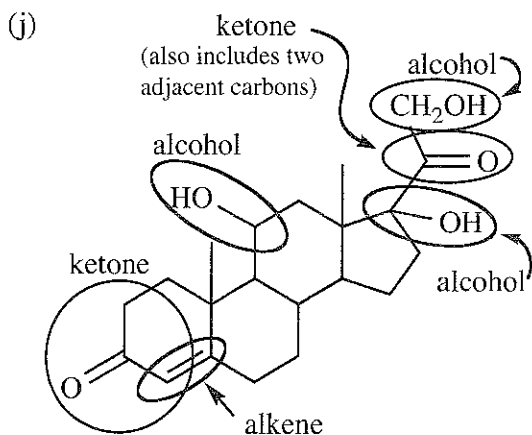
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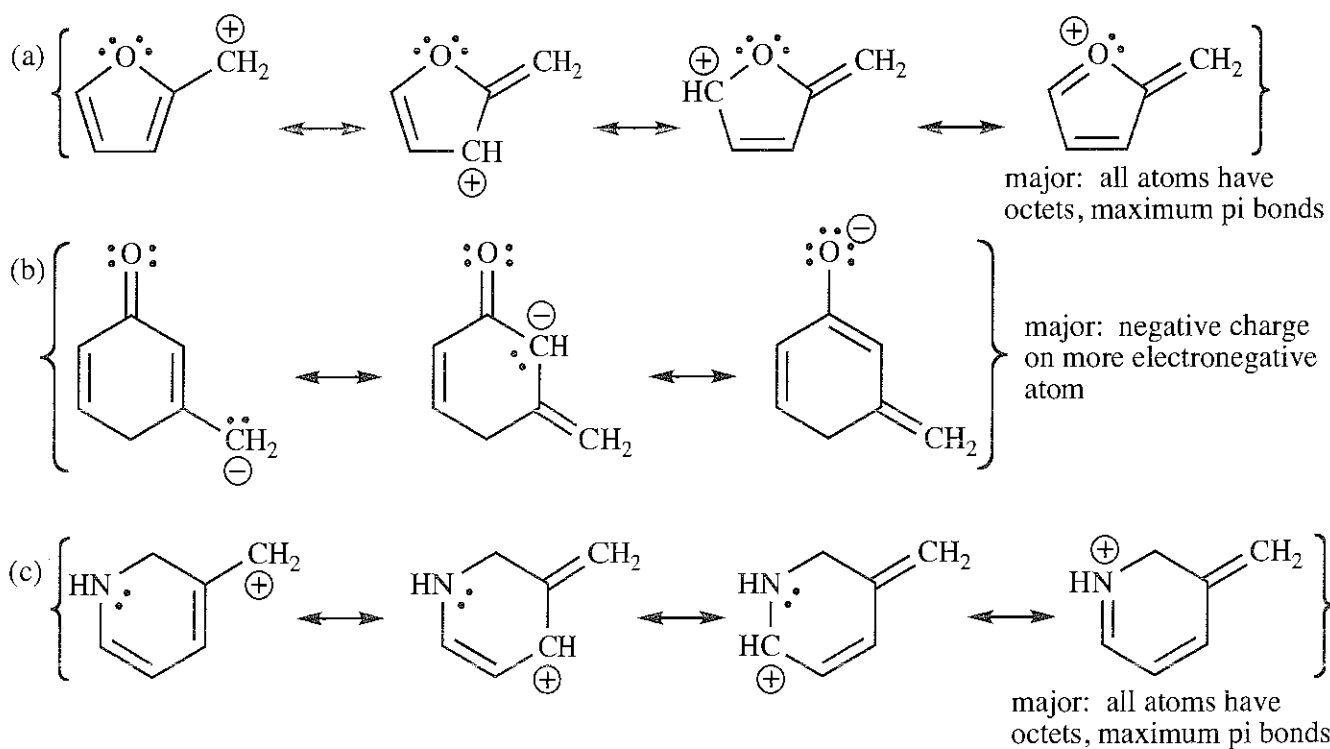
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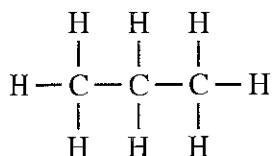


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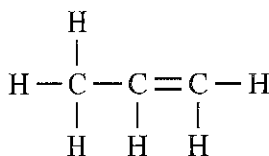


2-24 The examples here are representative. Your examples may be different and still be correct. What is important in this problem is to have the same functional group.

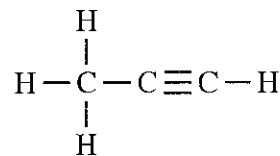
(a) alkane: hydrocarbon with all single bonds; can be acyclic (no ring) or cyclic

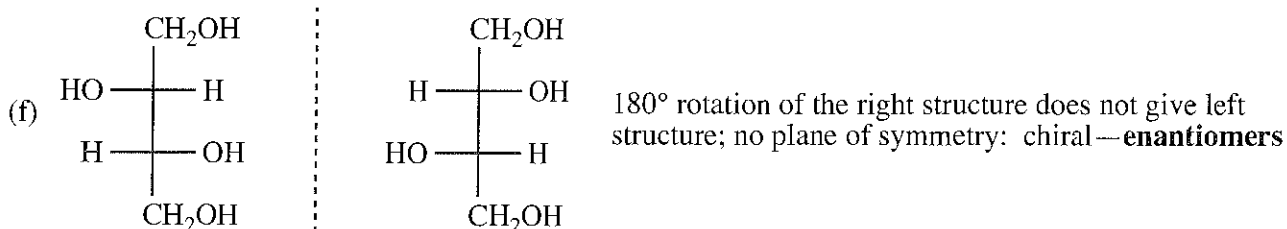
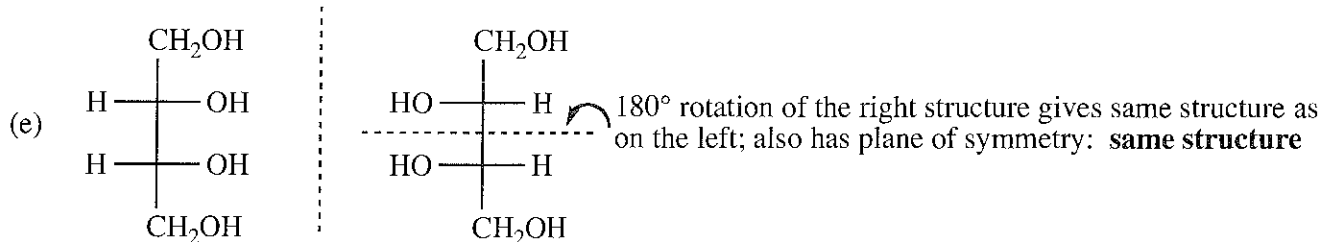
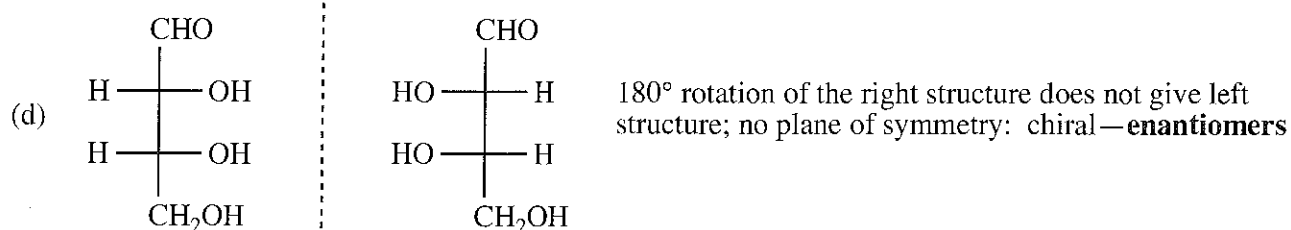
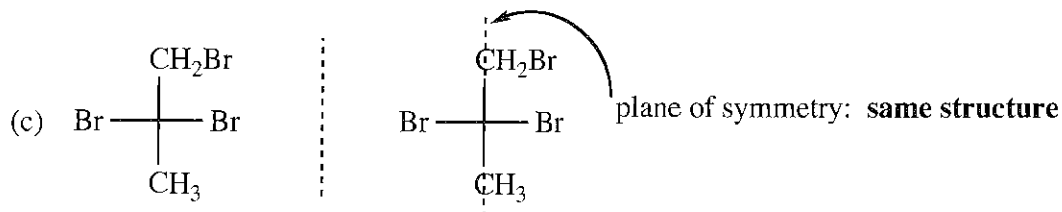
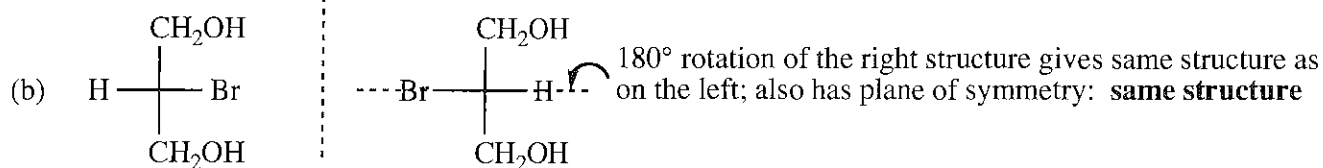
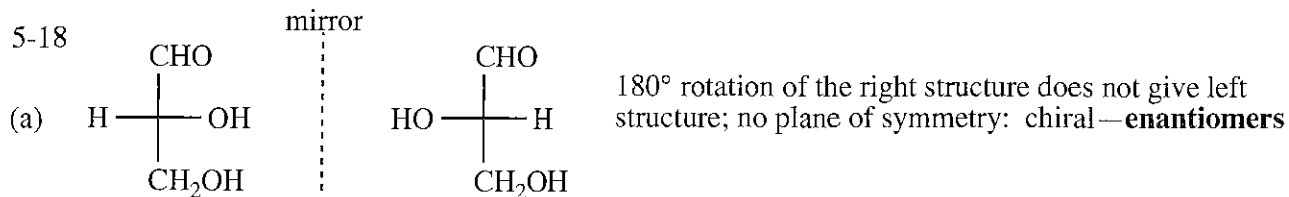


(b) alkene: contains a carbon-carbon double bond



(c) alkyne: contains a carbon-carbon triple bond



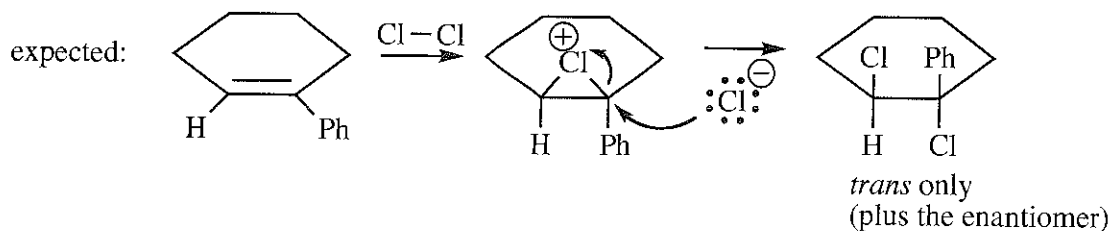


5-19 If the Fischer projection is drawn correctly, the most oxidized carbon (most bonds to oxygen) will be at the top; this is the carbon with the greatest number of bonds to oxygen. Then the numbering goes from the top down.

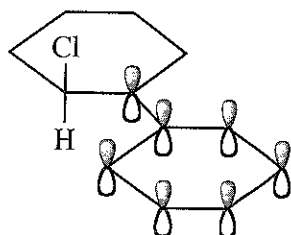
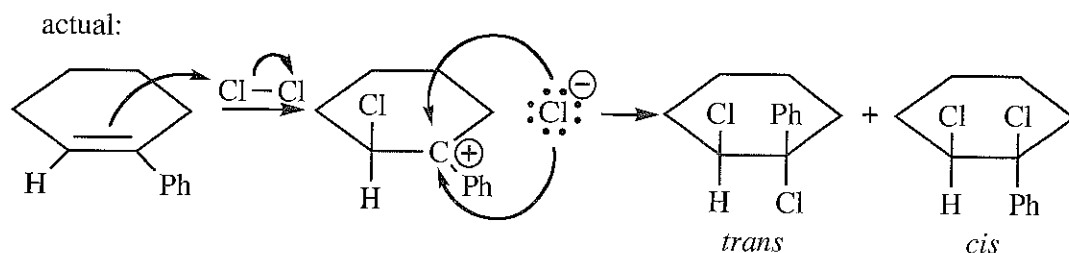
- |                  |                                   |                      |
|------------------|-----------------------------------|----------------------|
| (a) <i>R</i>     | (b) no chiral center              | (c) no chiral center |
| (d) <i>2R,3R</i> | (e) <i>2S,3R</i> (numbering down) | (f) <i>2R,3R</i>     |
| (g) <i>R</i>     | (h) <i>S</i>                      | (i) <i>S</i>         |

8-72 First, we explain *how* the mixture of stereoisomers results, then *why*.

We have seen many times that the bridged halonium ion permits attack of the nucleophile only from the opposite side.

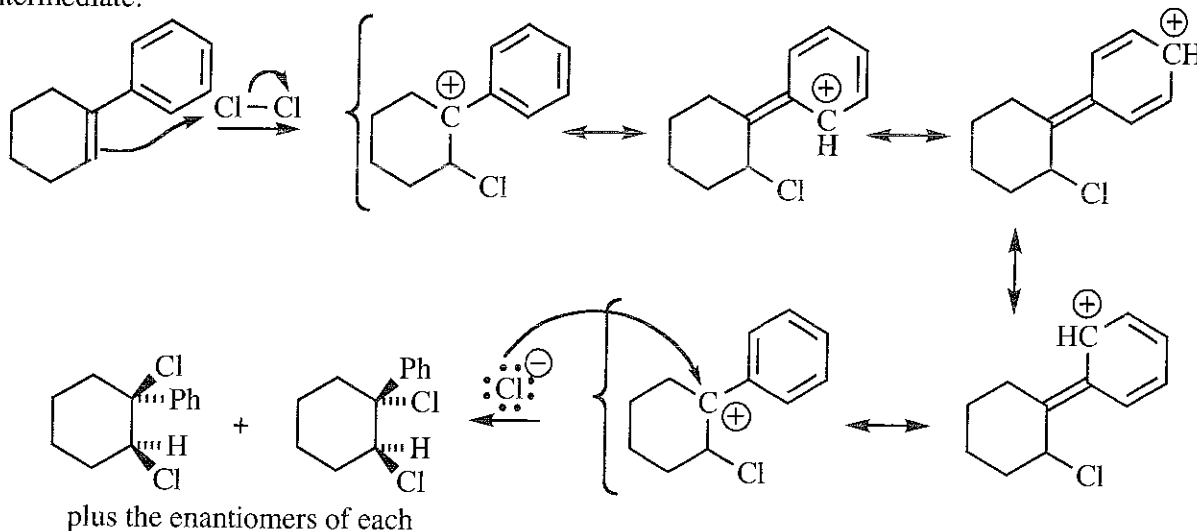


A mixture of *cis* and *trans* could result only if attack of chloride were possible from both top and bottom, something possible only if a *carbocation* existed at this carbon.



This picture of the p orbitals of benzene shows resonance overlap with the p orbital of the carbocation. The chloride nucleophile can form a bond to the positive carbon from either the top or the bottom.

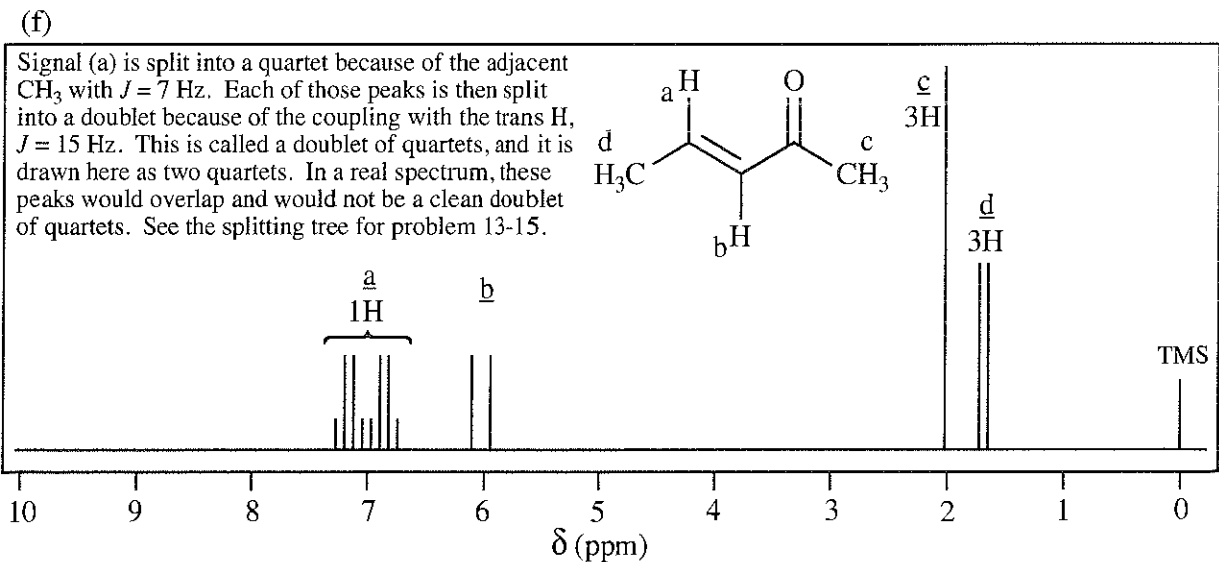
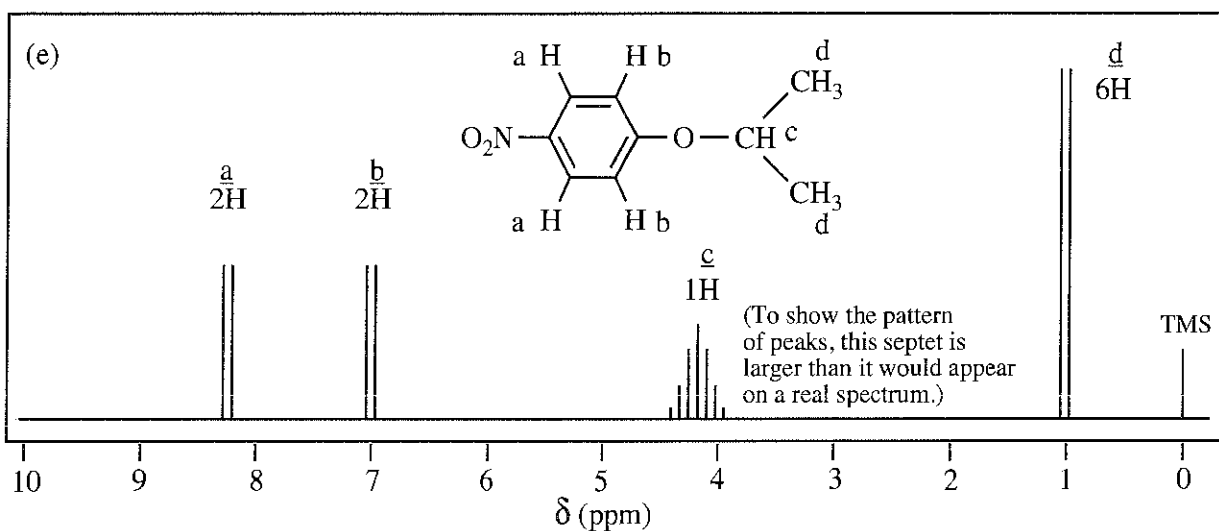
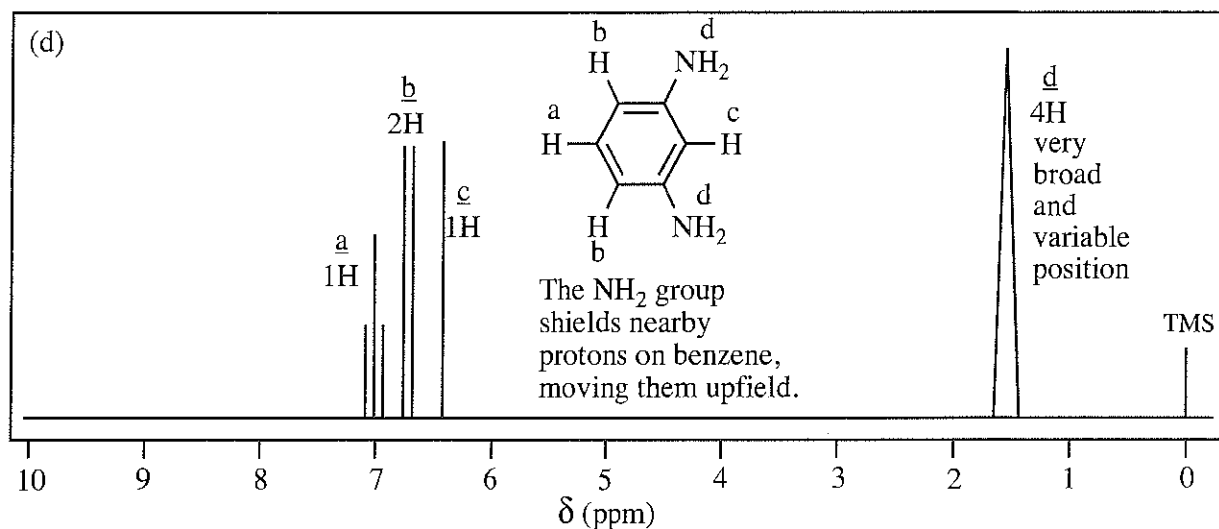
Why does a carbocation exist here? Not only is it 3°, it is also next to a benzene ring (*benzylic*) and therefore resonance-stabilized. This resonance stabilization would be forfeited in a halonium ion intermediate.



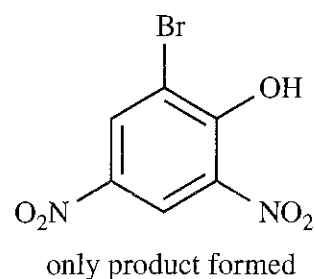
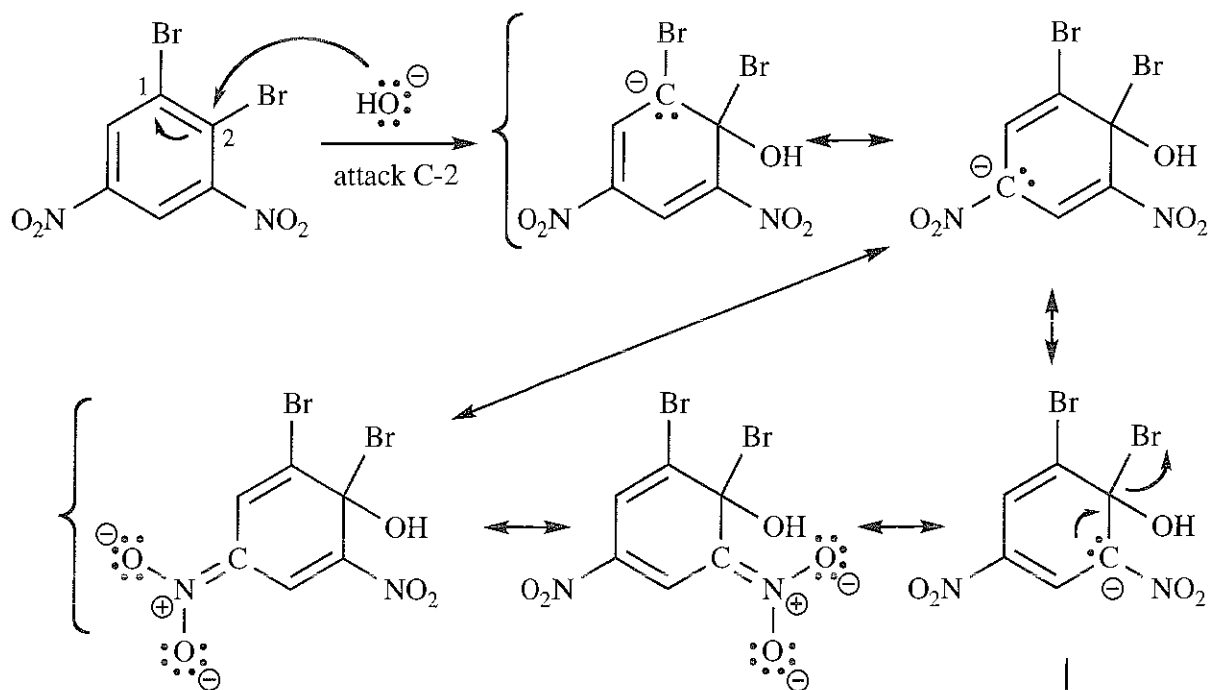
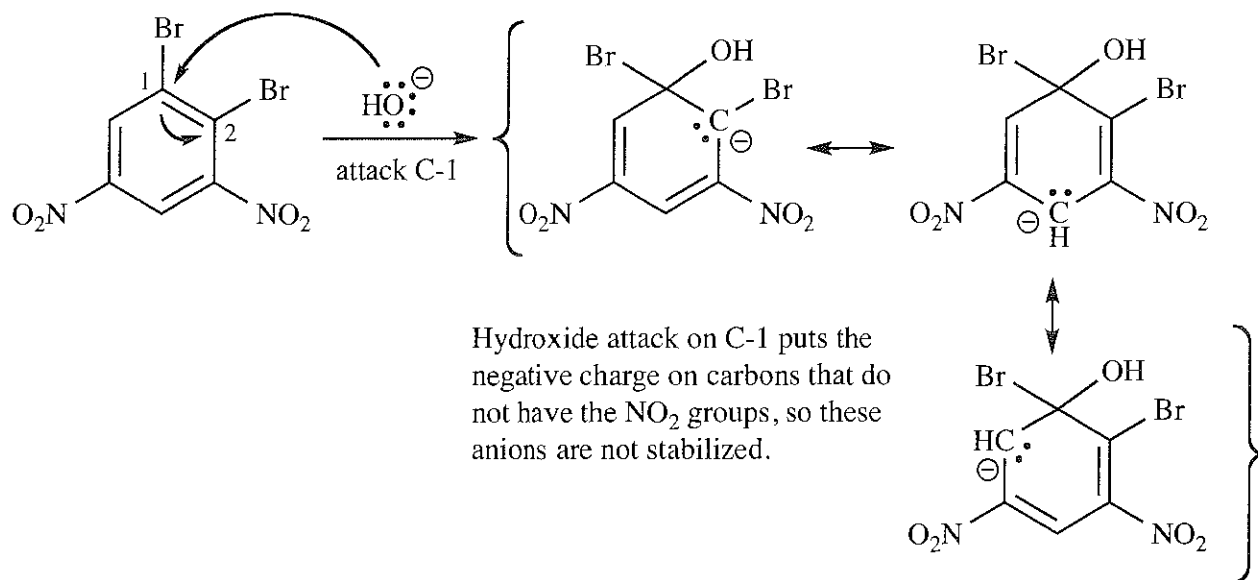
Refer to Appendix 3 in this manual for a format to organize reactions for studying.



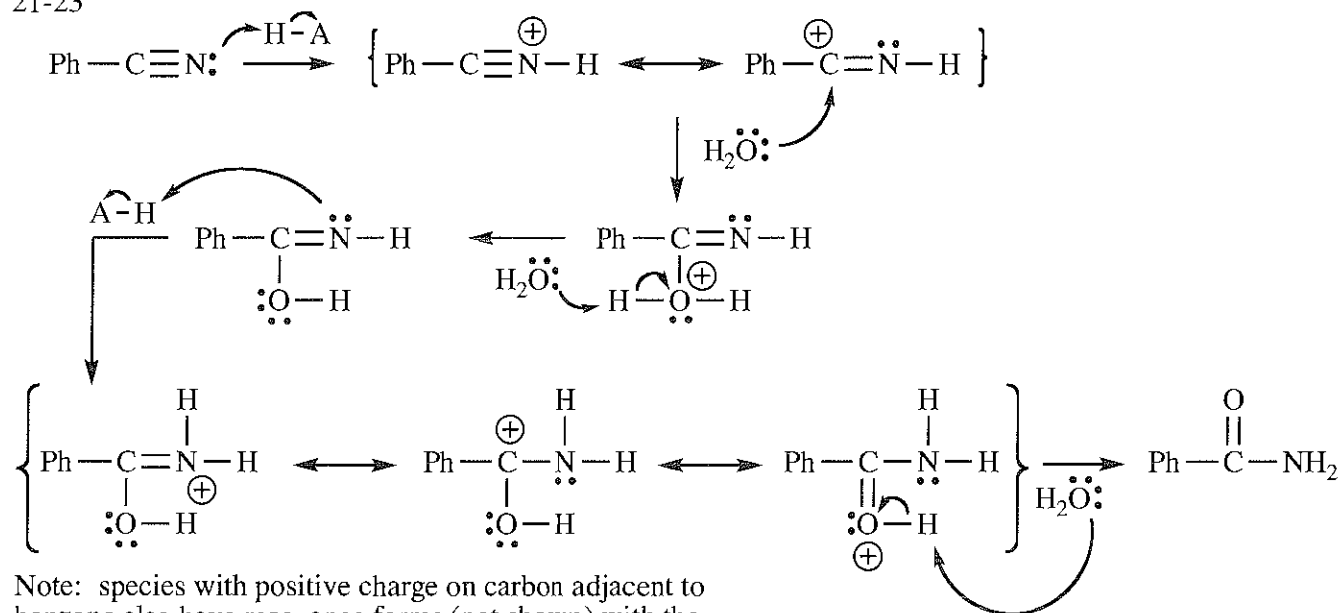
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17-61 Solve the problem by writing the mechanism. (See the solution to problem 17-23(a) for an identical mechanism.)



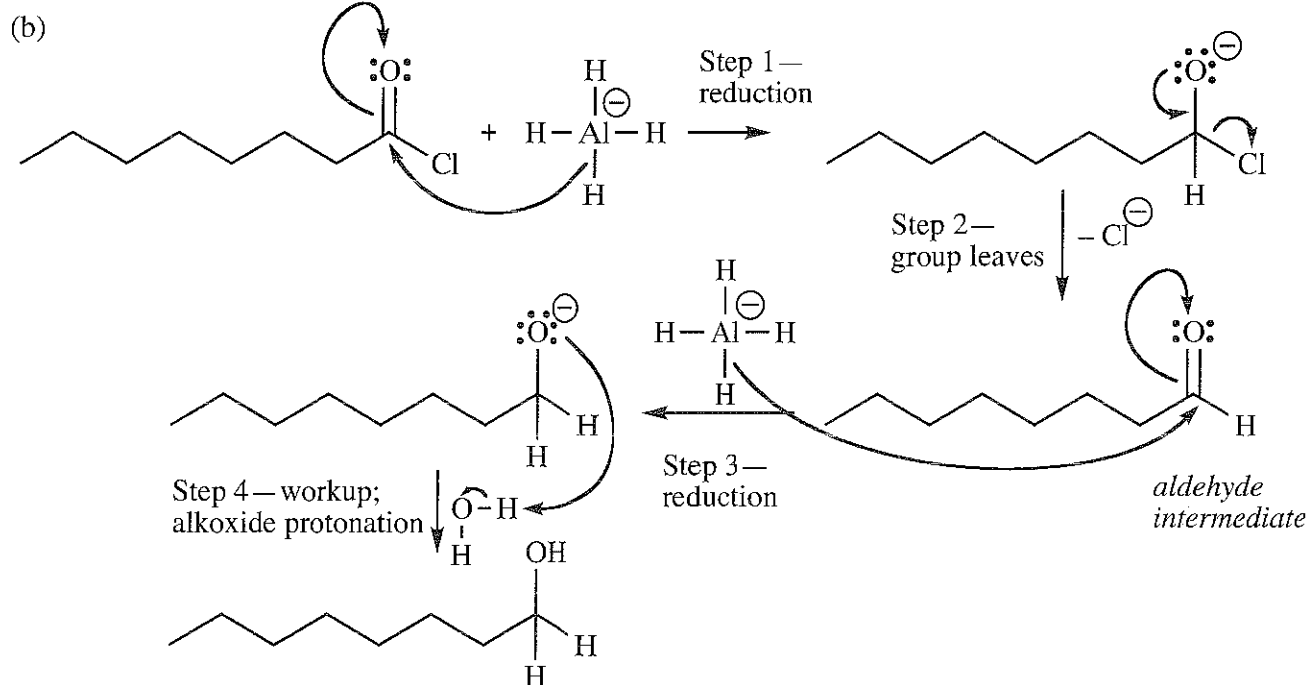
21-23



Note: species with positive charge on carbon adjacent to benzene also have resonance forms (not shown) with the positive charge distributed over the ring.

21-24

(a) Reduction occurs when a new C—H bond is formed. In ester reduction, a new C—H bond is formed in the first step and in the third step. This can also be seen in this mechanism where the steps are similarly labeled.



21-25

