1. Show how each of the following compounds might be synthesized starting from 2-bromobutane.

<table>
<thead>
<tr>
<th>(a) CH₃CH₂CH₂CH₂OH</th>
<th>(b) 1-bromobutane</th>
<th>(c) Butane</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d) 1-butyne</td>
<td>(e) 2-butyne</td>
<td>(f) CH₃COCH₂CH₃</td>
</tr>
</tbody>
</table>

2. Synthesis: Propose a synthetic pathway for the following conversions. More than one step will be necessary.

A)  

B)  

C)  

D)
3. Show how you would make each of the following (racemic) alcohols by the addition of a Grignard reagent to a ketone or aldehyde.

(2 ways)

(3 ways)

4. Suggest a short sequence of reactions to carry out the following synthesis.

5. Suggest a sequence of reactions to carry out the following synthesis.

6. Suggest a sequence of reactions to carry out the following synthesis. You may use other sources of carbon for this synthesis.
7. Suggest sequence of reactions to carry out the following synthesis.

8. Suggest sequence of reactions to carry out the following synthesis.

Starting with only cyclopentanol and methanol

9. Suggest sequence of reactions to carry out the following synthesis.

Starting with only cyclopentanol and methanol