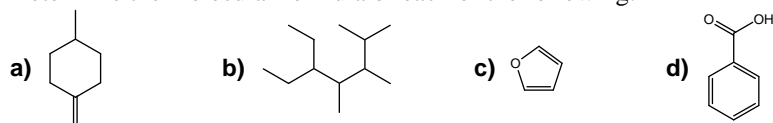


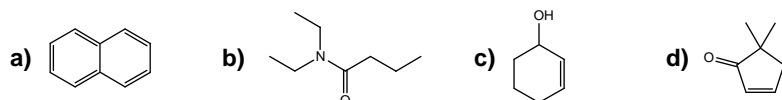
Chapter 13 Exercises

- What is the difference between saturated and unsaturated hydrocarbons?
- Differentiate between alkane, alkyl, and alkene.
- How do a condensed structure and a skeletal structure differ?
- There are two different propyl groups. Suggest the way in which they differ.
- Why are alkenes more reactive than alkanes? Are alkenes Lewis acids or Lewis bases? Explain.

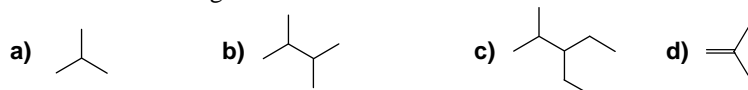
6. Determine the molecular formula of each of the following:



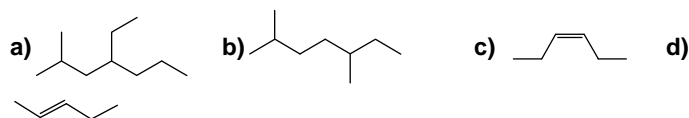
7. Determine the molecular formula of each of the following:



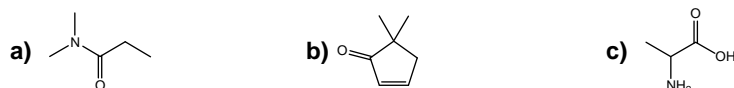
8. Name the following alkanes and alkenes:



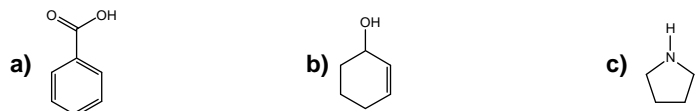
9. Name the following alkanes and alkenes:



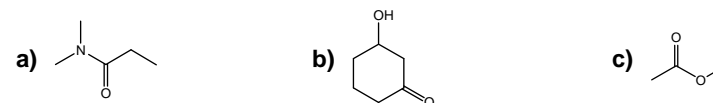
10. Identify the functional groups in the following:



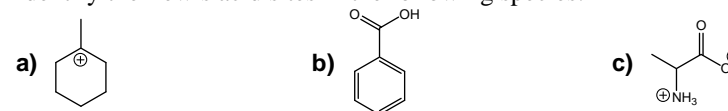
11. Identify the functional groups in the following:



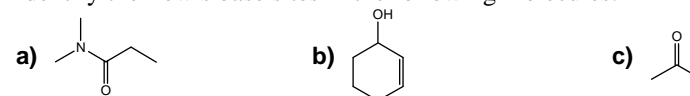
12. Identify the Lewis acid sites in the following molecules:



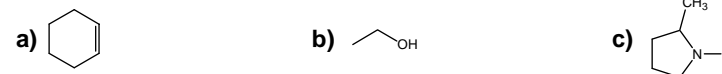
13. Identify the Lewis acid sites in the following species:



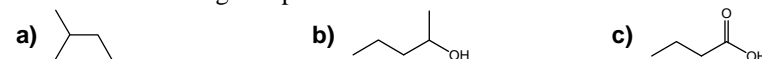
14. Identify the Lewis base sites in the following molecules:



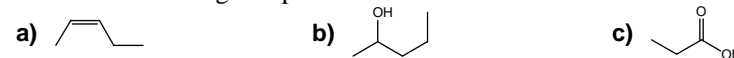
15. Identify the Lewis base sites in the following molecules:



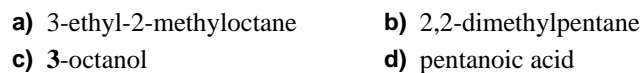
16. Name the following compounds:



17. Name the following compounds:



18. Draw skeletal structures for the following:



19. Draw skeletal structures for the following:

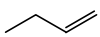
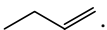


20. Use skeletal structures to show the constitutional isomers of C_5H_{12} (an alkane).

21. Use skeletal structures to show six constitutional isomers of $C_5H_{12}O$ that are alcohols.

22. Distinguish between addition and condensation reactions. Give an example of each.

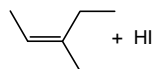
Chapter 13 Exercises

23. Predict the product reaction of  with HBr.
24. Write a step-wise mechanism for the reaction of the polar molecule I-Cl and .

25. Draw skeletal structures of the products of the following reactions:



26. Draw the skeletal structure of the product of the following reaction:

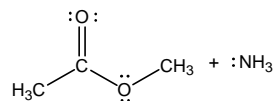


27. Define *polymer*. Why is nylon 66 called a *condensation polymer*?

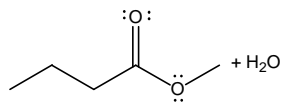
28. What is the difference between a polyamide and a polypeptide?

29. Name five common polymers and describe their uses.

30. Show the step-wise mechanism for the following reaction. Be sure to include all nonzero formal charge.



31. An important reaction of esters is the reverse of the esterification reaction shown in Figure 13.26. In this reaction, an ester reacts with water to produce a carboxylic acid and an alcohol. Write a step-wise mechanism for the following reaction:



32. Draw the Lewis structure of the product of the reaction of a proton and a carboxylic acid. What affect would this reaction have on the reactivity of the carbonyl carbon center?

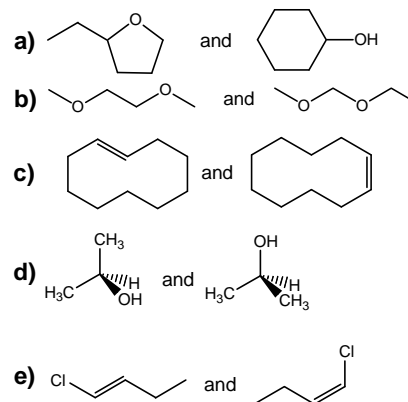
33. Hydrogen chloride can add to formaldehyde (H₂CO).

- Draw the Lewis structure of formaldehyde.
- Draw the resonance form of formaldehyde that accounts for its reactivity
- Use arrows to suggest how the HCl might attack formaldehyde.
- Draw the Lewis structure of the reaction product.

34. What force is responsible for the formation of the α -helix structure in proteins?

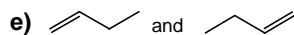
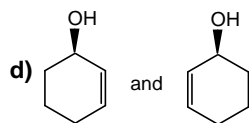
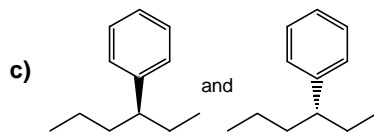
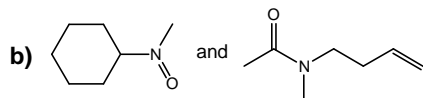
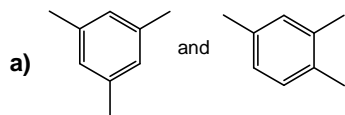
35. The double helix of DNA is held together by interactions between base pairs. Draw the base pairs and explain why they are 'pairs'.

36. Identify each of the following pairs of molecules as constitutional isomers, stereoisomers, or identical molecules:

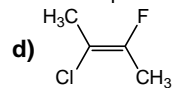
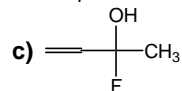
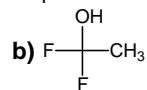
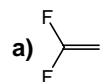


Chapter 13 Exercises

37. Identify each of the following pairs of molecules as constitutional isomers, stereoisomers, or identical molecules:



38. Indicate whether or not each of the following molecules has a stereoisomer. For those that do, indicate whether the isomer is a geometrical isomer or an enantiomer.



39. Indicate whether or not each of the following molecules has a stereoisomer. For those that do, indicate whether the isomer is a geometrical isomer or an enantiomer.

