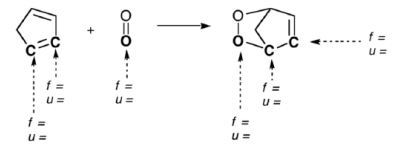
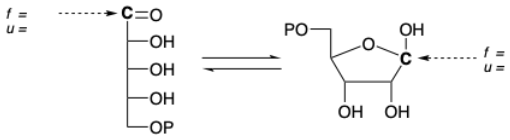
1.7: Study Questions

1. Indicate the functionality and unsaturation levels of the boldface atoms in the reactants and products of the following reactions.

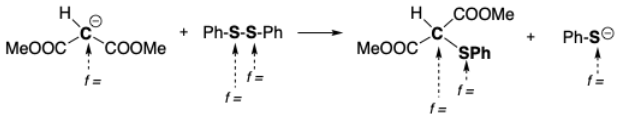
(a)



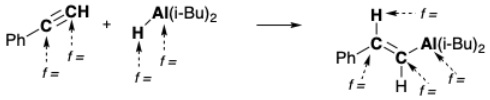
(b)



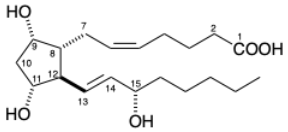
(c)



(d)



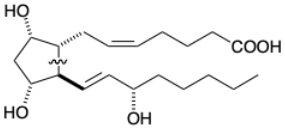
2. Consider possible strategies for construction of the $PGF_{2\alpha}$ carbon skeleton exploiting the functional groups at the 9, 11, and/or 15 positions to activate formation of various bonds in the cyclopentane ring by polar reactions.

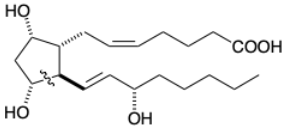


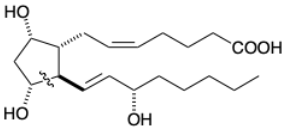
PGF_{2a}

(a) Categorize each of the following circuits as consonant or dissonant:

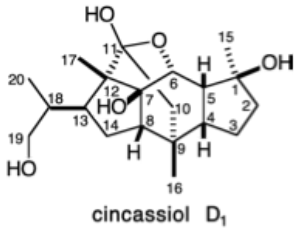
Circuit	Type
1-2-3-4-5-6-7-8-9	
9-10-11	
9-8-12-11	
9-8-12-13-14-15	
11-12-13-14-15	







3. Perform a thorough polar analysis of cincassiol D_1, a natural product of the "terpene" family.

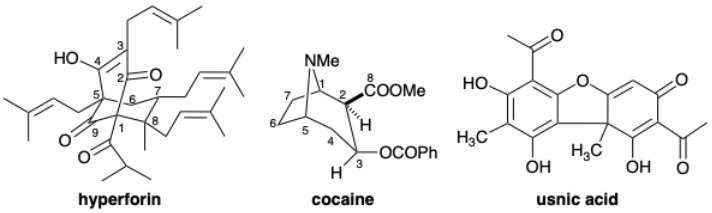


For all circuits consisting only of carbon chains of 14 carbons or less, list the polar relationships between functional groups with a table in the following format:

Positions	Circuit	Relationship
1 + 6	1-5-6	consonant
	1-2-3-4-5-6	dissonant
	1-2-3-4-9-8-7-6	dissonant

4.

(a) Find the dissonant polar reactivity circuits, if any, between functional groups in the natural products hyperforin and cocaine. List them in the table format described above for question 4.

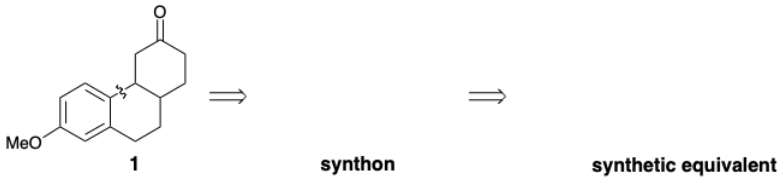


(b) Disconnection of one, and only one, C-C bond in usnic acid eliminates all dissonant circuits. Which is this unique bond in usnic acid that is incorporated in every dissonant circuit?

(d) What type of reaction could generate usnic acid directly from the subtarget identified in c?

5.

(a) With (+) and (-) next to appropriate atoms, indicate on structure **66** the polar activation provided to all atoms in a curcuit connecting the functional groups that could allow polar formation of the bond that is disected with a wavy line. Then draw structures for a synthon and a synthetic equivalent of the synthon for an immediate precursor of **66**.



(b) Draw structures of three alternative monomeric products that might be formed during an attempt at converting the above synthetic equivalent into the synthetic target **1**.