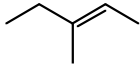
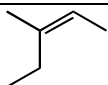
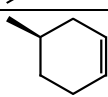


## Chemistry 218, Problem Set 4

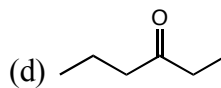
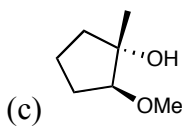
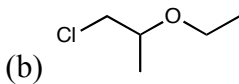
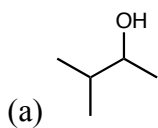
Recommended problems from the text: 12.18, 12.20-12.22, 12.29, 12.37 (f, i), 12.43 (a, b, c, f), 12.44-12.47, 12.49-12.50, 12.66, 16.1-16.2, 16.3-16.7 (review), 16.9-16.10, 16.18-16.24, 16.28, 16.32-16.33, 16.46-16.56.

Recommended problems from the text: 12.18, 12.20-12.21, 12.25, 12.35 (f, i), 12.41 (a, b, c, f), 12.42-12.45, 12.47-12.48, 12.60, 16.1-16.2, 16.3-16.7 (review), 16.8, 16.16-16.22, 16.26, 16.30-16.31, 16.43-16.54.

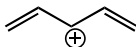
1. Fill in the products which form when the reactants (vertical row) are treated with the reagents (horizontal row). Indicate relevant stereochemistry in the product. Draw the mechanism for each reaction.

	OsO <sub>4</sub>	O <sub>3</sub> ; Me <sub>2</sub> S	9-BBN; H <sub>2</sub> O <sub>2</sub> , NaOH	mCPBA
				
				
				

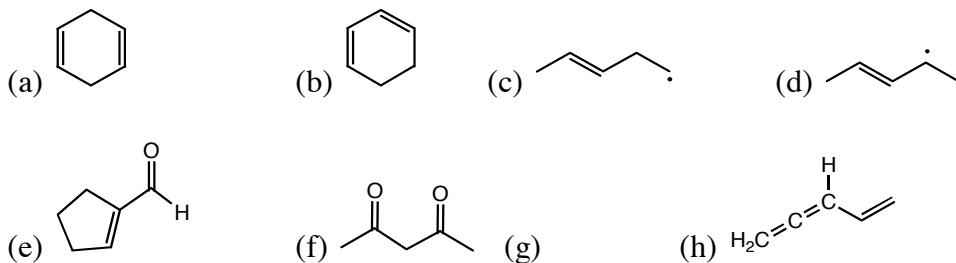
2. Show how you can make the following compounds from any alkene that only contains carbons and hydrogens. All reactions can be performed in a single step.



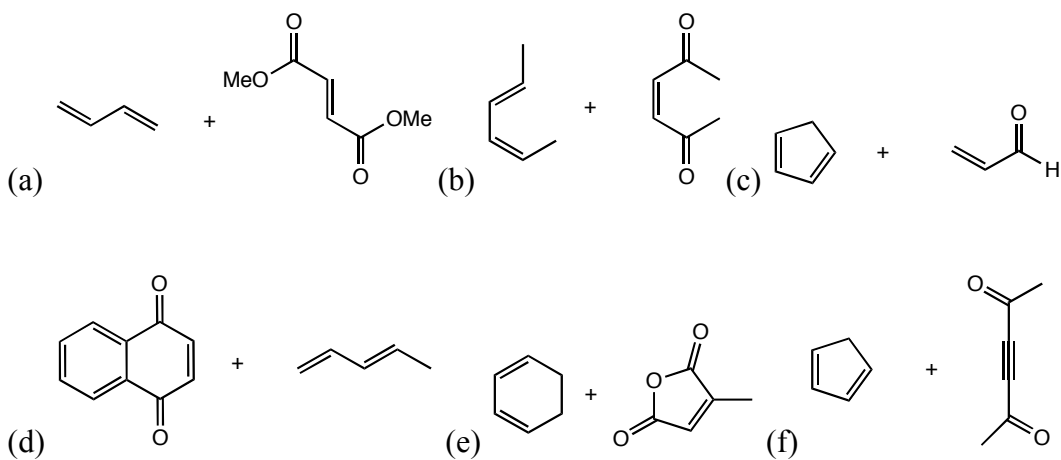
3. Draw the molecular orbitals and fill in the electrons for the following molecule:



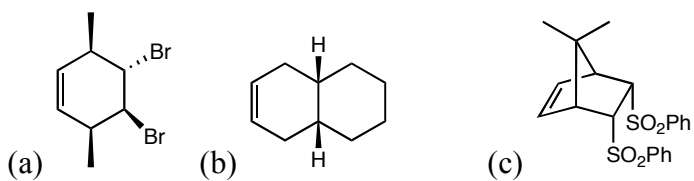
4. Determine which of the following compounds are conjugated. If a compound is conjugated, sketch the  $\pi$ -molecular orbitals and fill in the orbitals with the appropriate number of electrons.



5. Give the Diels-Alder product(s) of the following reactions. Keep in mind you may have to do a bond rotation first.

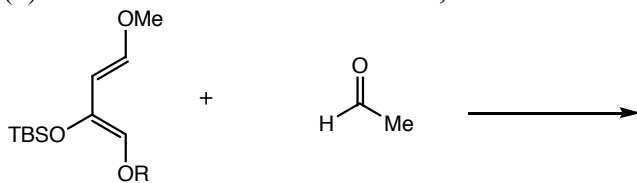


6. Choose the appropriate diene and dienophile to prepare the following compounds:

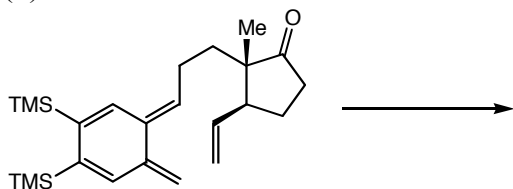


7. The following are Diels-Alder reactions which have appeared in the literature. Predict the products for each one.

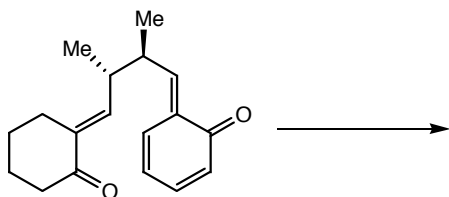
(a) A hetero-Diels-Alder reaction, where an aldehyde is the dienophile:



(b) An intramolecular Diels-Alder reaction, where the diene and dienophile are attached:



(c) An intramolecular hetero-Diels-Alder reaction:



(d) A Diels-Alder reaction using an alkyne as the dienophile:

