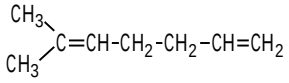
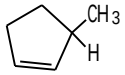
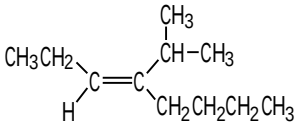
CHEMISTRY 2401
Exam # 3, November 1, 2000

(10) I. Name each of the following including stereochemical designations where appropriate.

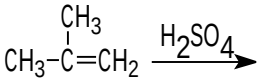
A. 

B. 

C. 

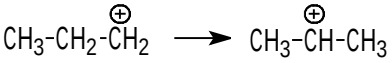
(18) II. Draw structural formulas for each of the following:

A. The carbocation intermediate produced from isobutylene and and sulfuric acid (below).

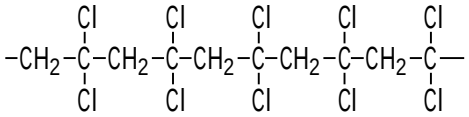


B. A hydrocarbon with a molecular formula of C_8H_{10} that would react with H_2/Pd to produce a new compound with a molecular formula of C_8H_{14}.

C. The transition state for the carbocation rearrangement shown below.



D. The monomer used to produce the polymeric packaging material known as saran. (shown below)

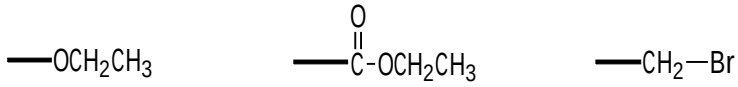


E. E-3-*tert*-butyl-1,3-hexadiene

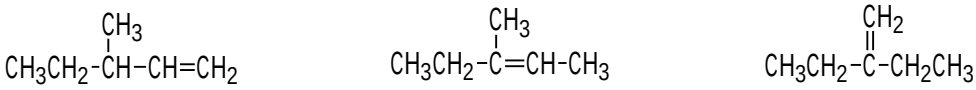
F. 3-ethyl-cyclohexene

(16) III. For each of the following questions **circle** the structure with the larger value and <u>underline</u> the structure that has the smaller value. One right is worth 1 point, both right is worth 4 points.

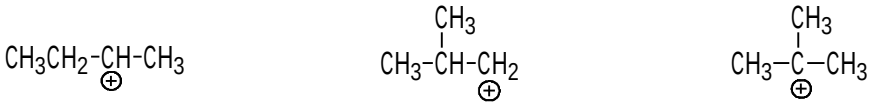
A. Cahn-Ingold-Prelog priority (circle the one with highest priority)



B. Amount of heat evolved upon hydrogenation with H_2/Pd.



C. Thermodynamic stability (circle the one that is most stable)



D. Number of degrees of unsaturation

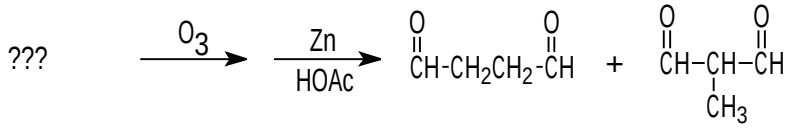
cholesterol, $C_{27}H_{46}O$ DDT, $C_{14}H_9Cl_5$ caffeine, $C_8H_{10}N_4O_2$

(7) IV. When 1.2 mmoles of a hydrocarbon with a formula of C_8H_{12} is exposed to H_2 gas in the presence of Pd, it absorbs 2.4 mmoles of the hydrogen gas.

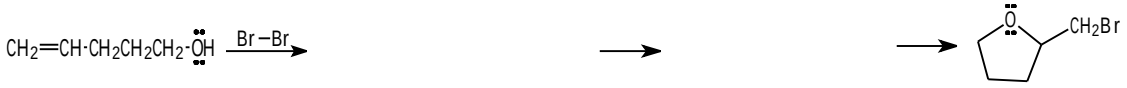
A. How many double bonds does the compound contain? _____

B. How many rings does the compound contain? _____

C. Ozonolysis of the hydrocarbon produces the two products shown below. Draw a structural formula for the original hydrocarbon.

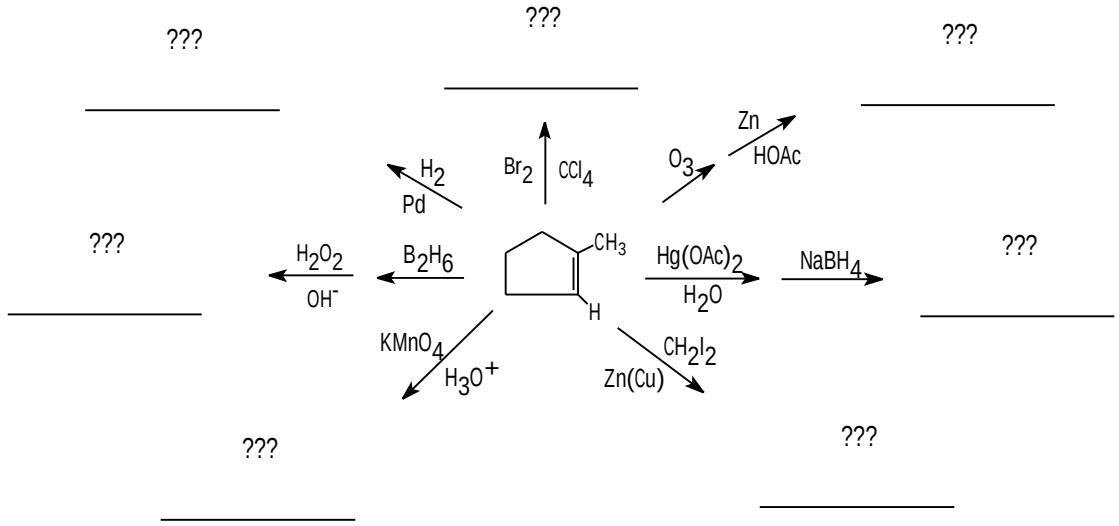


(4) V. (BONUS) When 4-penten-1-ol is treated with aqueous Br_2, a cyclic bromo ether is formed, rather than the expected bromohydrin. Propose a mechanism (two intermediates) using curved arrows to curved arrows to show electron movement.



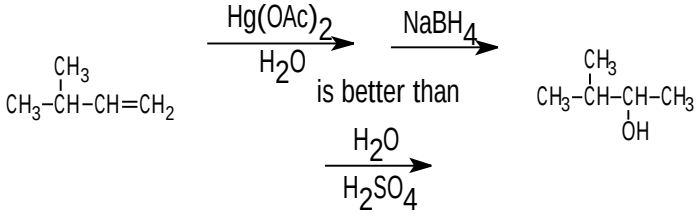
intermediate 1 intermediate 2

(21) VI. Predict the major product of each of the following reactions, indicating both regiochemistry and stereochemistry where appropriate.



(8) VII. Explain each of the following in enough detail to make me happy.

A. Why oxymercuration-demercuration is a better procedure for the reaction shown below than is hydration using a sulfuric acid catalyst.



B. The observation that base catalyzed E2 elimination using 2-bromo-2-methylbutane produces more 2-methyl-2-butene than 2-methyl-1-butene can be rationalized using Hammond's postulate. Do that.