

Additional Problems for practice:

1. Identify any Bredt's rule violators from the following:



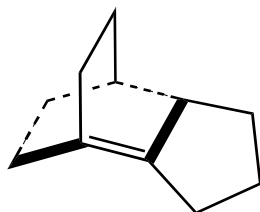
a

Trans bonds
are in a nine-membered
ring, so no violation



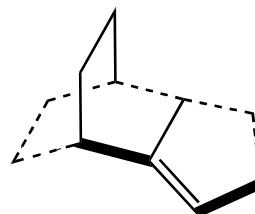
b

Violation:
trans bond in a
five-membered ring



c

Violation:
trans bonds are in a
six-membered ring

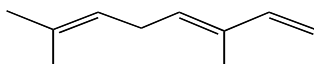


d

No Violation:
trans bonds are in a
nine-membered ring

2. Give correct IUPAC names for the following compounds:

a

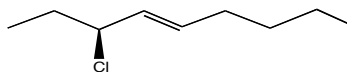


(*E*)-3,7-dimethylocta-1,3,6-triene

(3*E*)-3,7-dimethyl-1,3,6-octatriene

(*E*)-3,7-dimethyl-1,3,6-octatriene

c



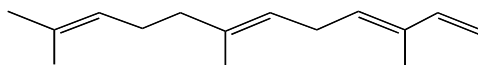
(*S,E*)-3-chloronon-4-ene

(3*S,4E*)-3-chloronon-4-ene

(3*S*)-chloro-(4*E*)-non-4-ene

(3*S*)-chloro-(4*E*)-nonene

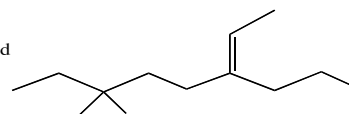
b



(3*E,6E*)-3,7,11-trimethyldodeca-1,3,6,10-tetraene

(3*E,6E*)-3,7,11-trimethyl-1,3,6,10-dodecatetraene

d



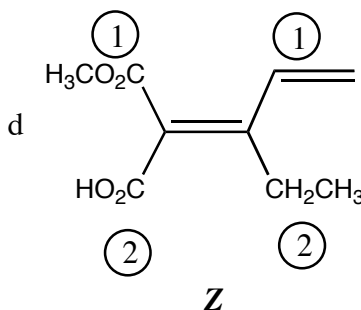
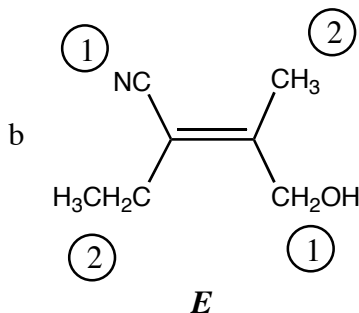
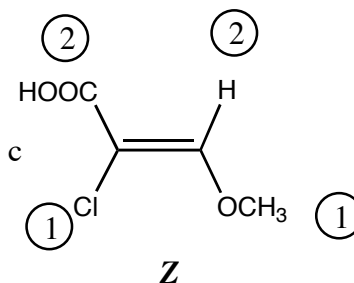
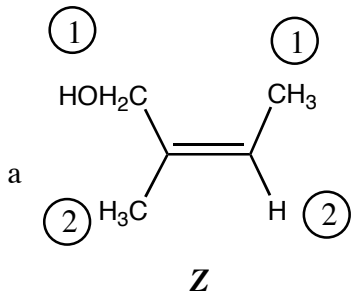
(2*E*)-6,6-dimethyl-3-propyl-2-octene

(2*E*)-6,6-dimethyl-3-propyloct-2-ene

6,6-dimethyl-3-propyl-(2*E*)-oct-2-ene

6,6-dimethyl-3-propyl-(2*E*)-octene

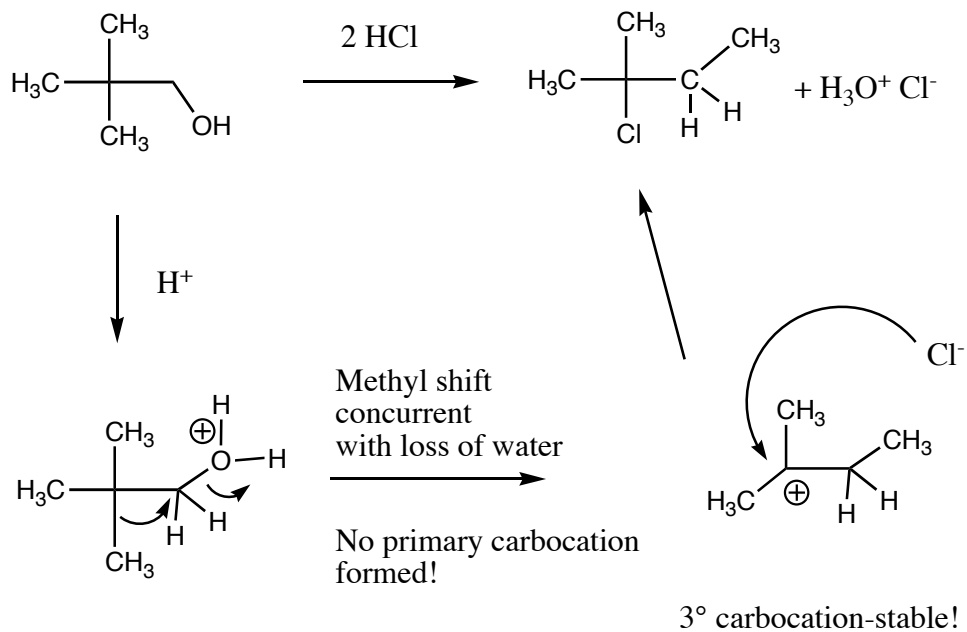
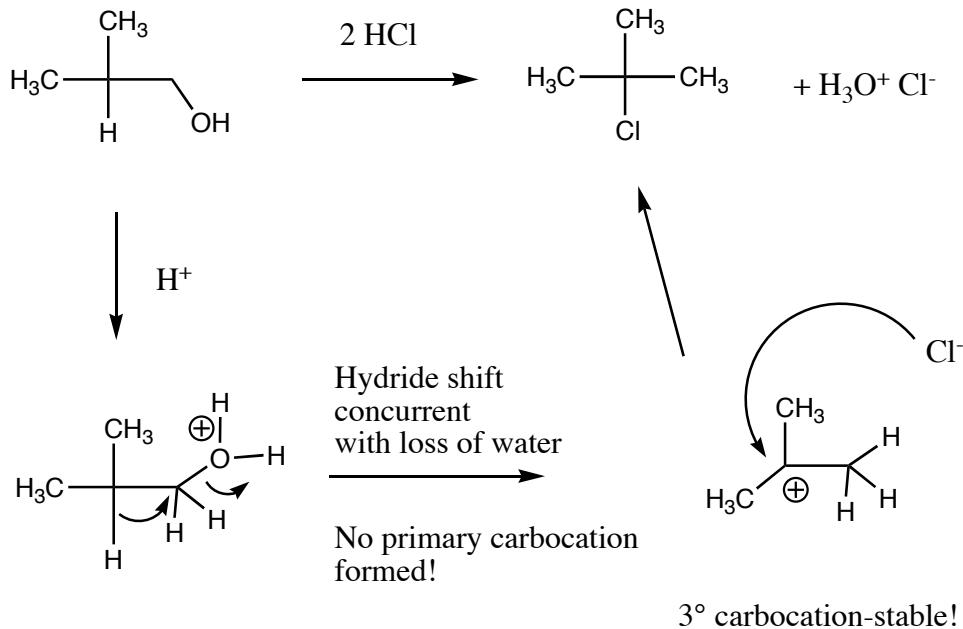
3. Assign E or Z configuration to the following alkenes:



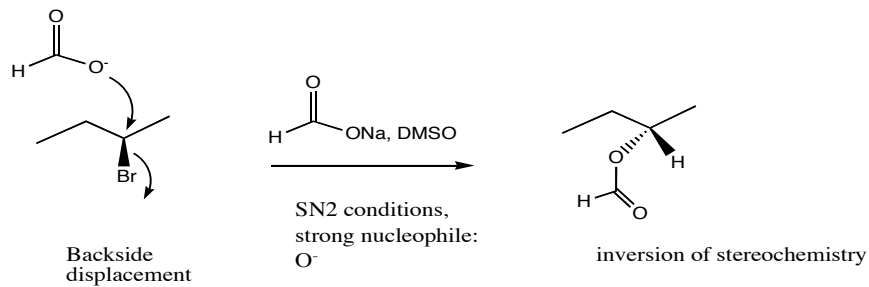
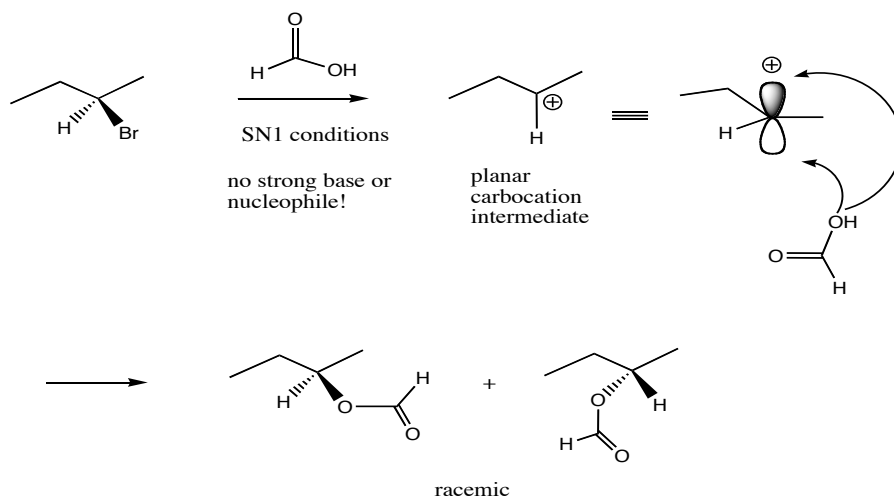
4. Calculate the degrees of unsaturation in these formulas and suggest structures:

- $C_8H_{10}N_4O_2$ ($-N_4H_4 - O_2 = C_8H_6$; normally C_8H_{18} for fully saturated, thus missing 12 H or six degrees of unsaturation.)
- $C_{14}H_9Cl_5$ (count Cl as H, thus $C_{14}H_{14}$, normally $C_{14}H_{30}$ for fully saturated, thus missing 16 H, or 8 degrees of unsaturation)
- $C_{17}H_{23}NO_3$ ($-NH, -O_3 = C_{17}H_{22}$, normally $C_{17}H_{36}$ for fully saturated, thus missing 14 H or 7 degrees of unsaturation)

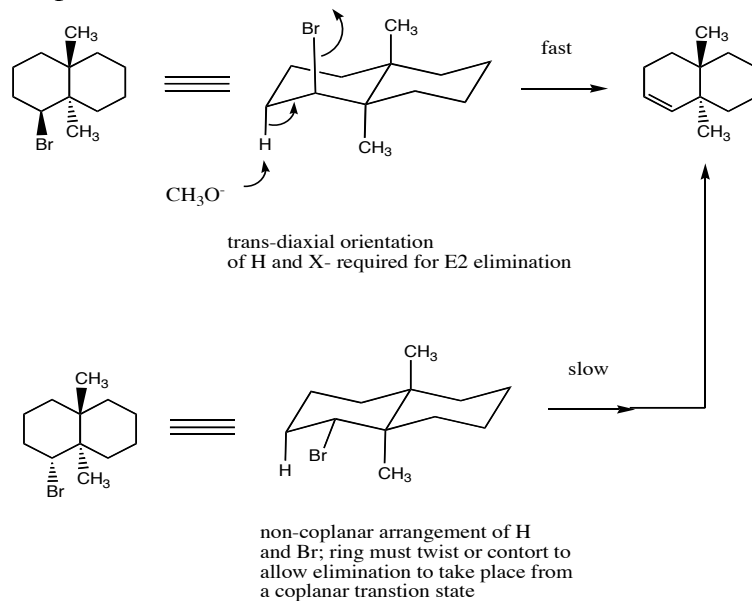
1. Draw a mechanism for each of the following reactions:



2. Two substitution reactions are shown below. Predicts the comparative stereochemical results of these two reactions:

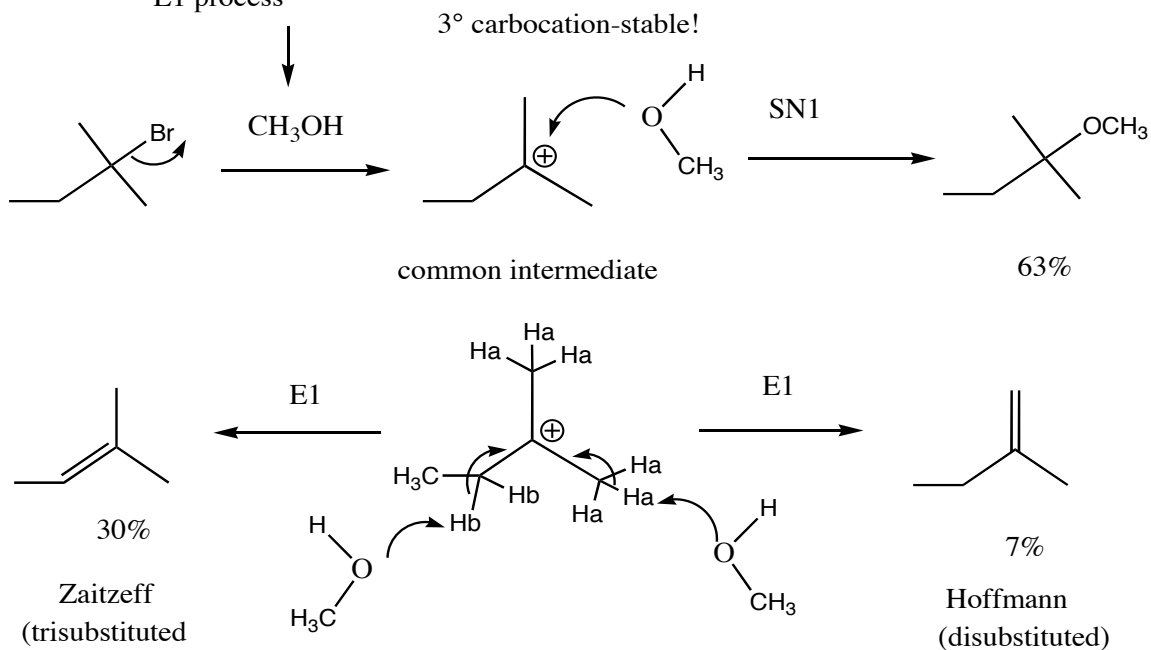


3. One of the following molecules undergoes E2 reaction with NaOCH_3 considerably faster than the other. Identify which is which and explain. Draw the product. Hint: draw the chair form of each.



4. Draw a mechanism and a qualitative potential energy diagram for the following reaction. Indicate the locations of the rate-determining and the product-determining transition states. Explain the ratio of alkenes observed.

non-nucleophilic, non-basic conditions indicates SN1 or E1 process



More substituted alkene is produced in excess since it is more stable!

