Name:_____Key_____ (please print)
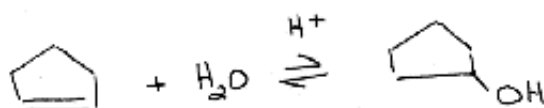
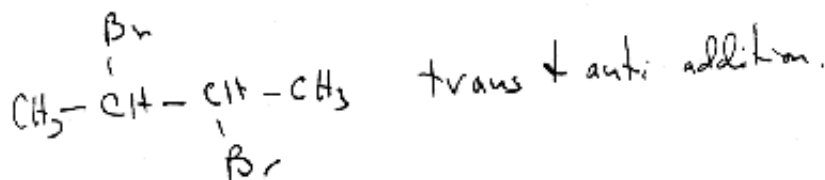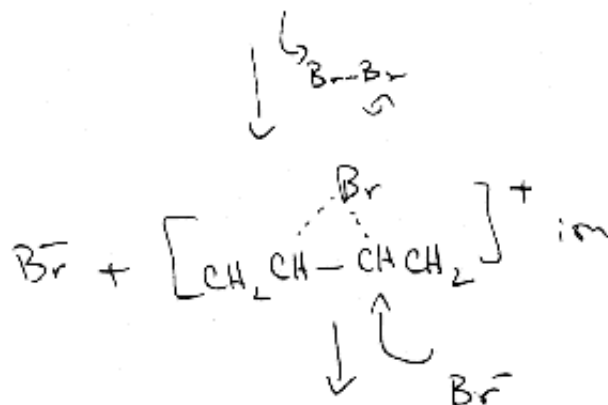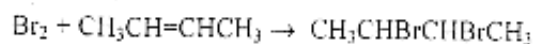1.   2.   3.   4.   5.   6.   Total_____

1. (10 pts) Alcohol dehydration and alkene hydration is an equilibrium process.

- Suggest conditions that favor cyclopentene.

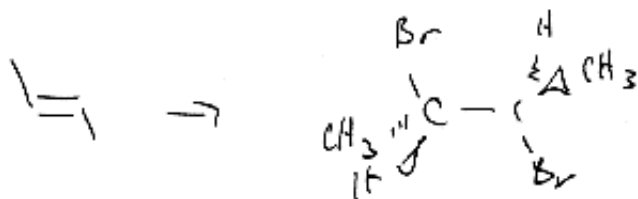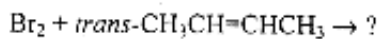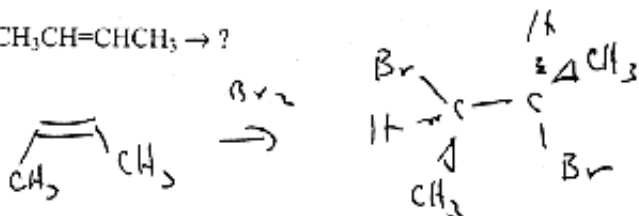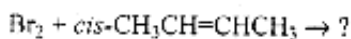- Suggest conditions that favor cyclopentanol.

a) Treat ☐—OH with a trace H_2SO_4 + distill alkene

b) Add alkene to soln of H_2O + H_2SO_4; huge excess of H_2O drives equilibrium to the alcohol
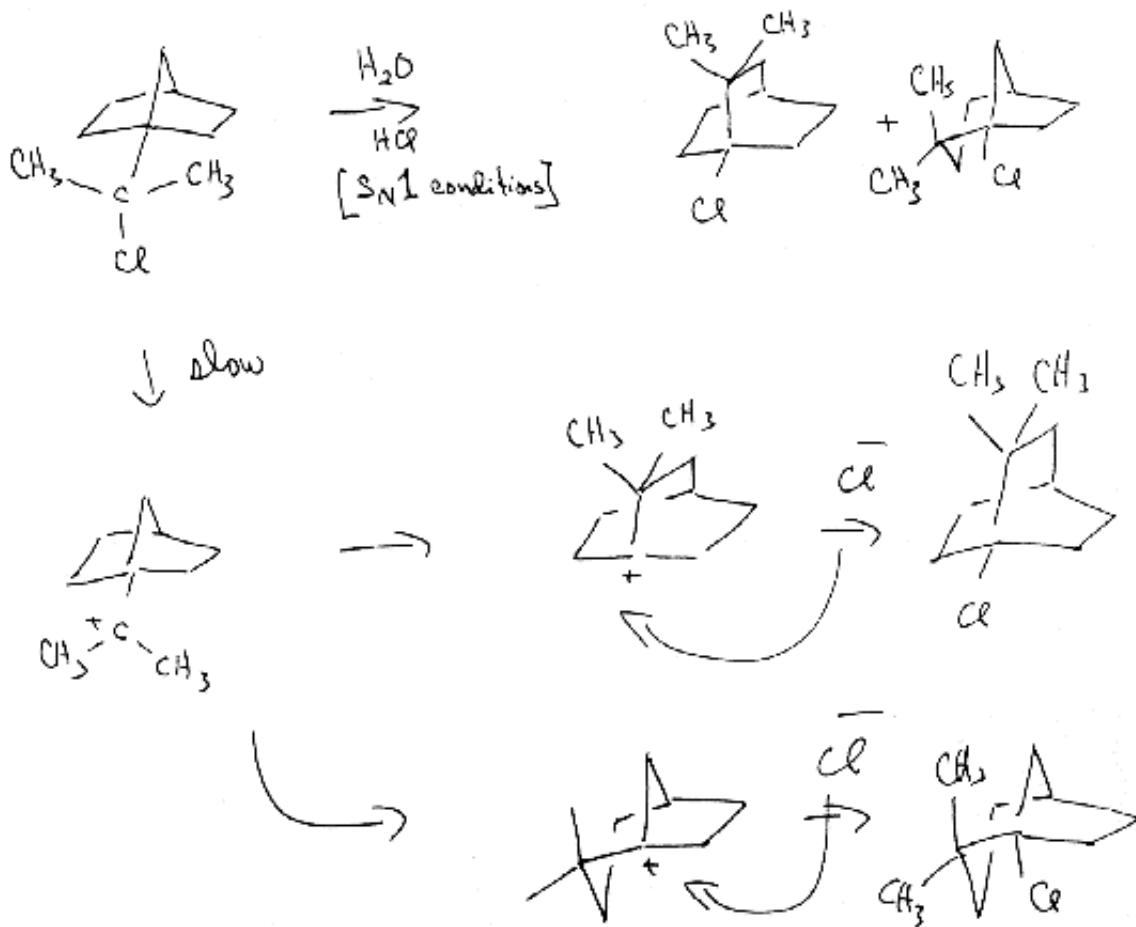
2. (15 pts) What is the mechanism for the addition of Br_2 addition in CCl_4 solvent?

$$Br_2 + CH_3CH=CHCH_3 \rightarrow CH_3CHBrCHBrCH_3$$

$Br^- + \left[CH_2 CH - CH CH_2 \right]^+$ im
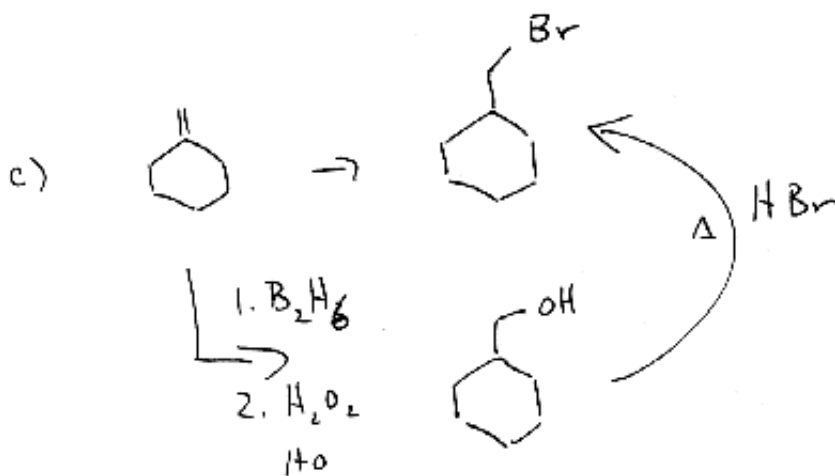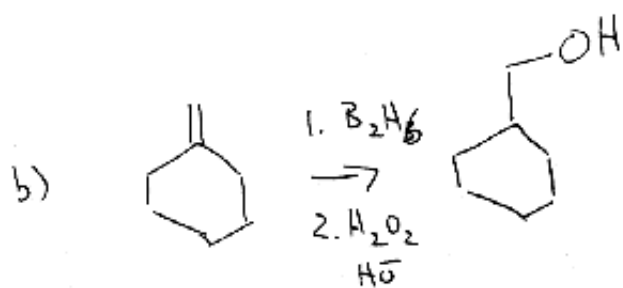

$CH_3 - CH - CH - CH_3$ trans + anti addition.

What is the product of the reaction of Br_2 with:

$Br_2 + cis\text{-}CH_3CH=CHCH_3 \rightarrow ?$

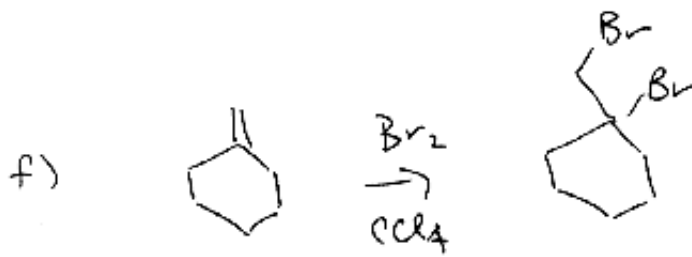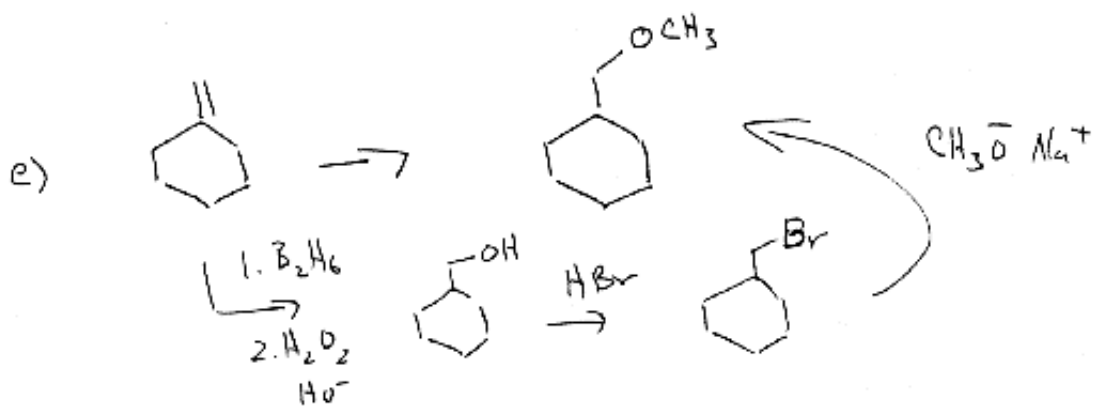
$Br_2 + trans\text{-}CH_3CH=CHCH_3 \rightarrow ?$

3. (10 pts) What is the mechanism for the following rearrangement?

H₂O
→
HCl
[S_N1 conditions]

↓ slow

4. (30 pts) Propose a synthesis for each of the following.

a)

$$H_2O$$
$$\xrightarrow{\quad\quad}$$
$$H_2SO_4$$

b)

1. B_2H_6
$$\longrightarrow$$
2. H_2O_2
HO^-

c)

$$\longrightarrow$$

1. B_2H_6
2. H_2O_2
HO^-

Δ HBr
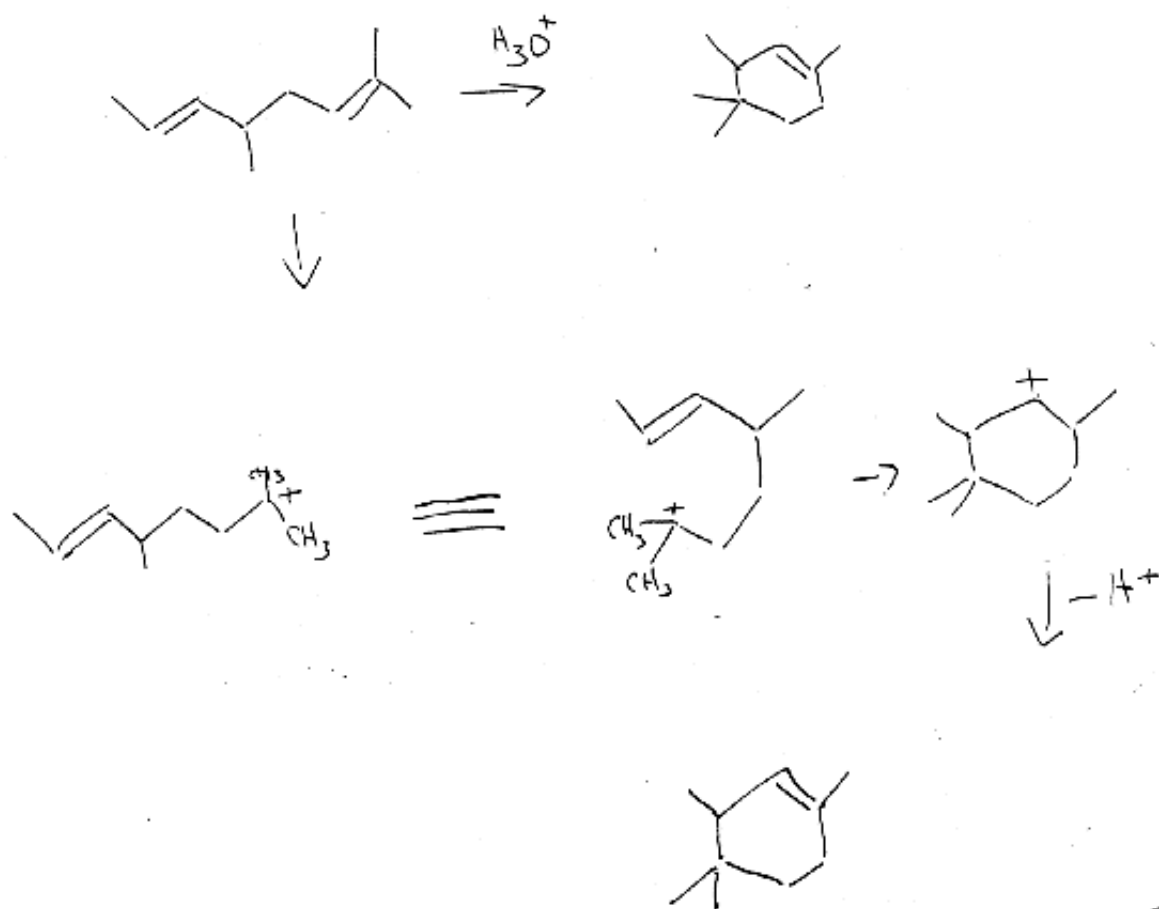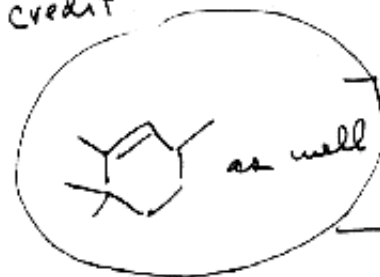
d)

e)

f)
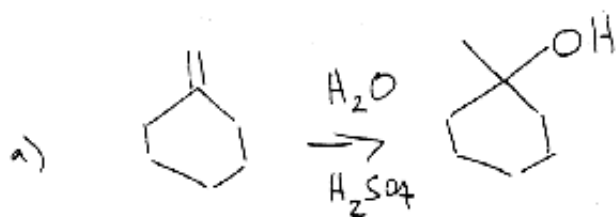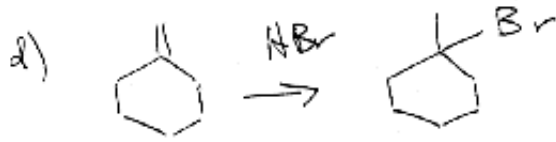
5. (15 pts) What is the mechanism for the following transformation?

credit for

as well

6. (20 pts) What are products of the following reactions?

a)

$\bigwedge CH_3$ $\xrightarrow{HBr}$

(product with Br)

b)

$Br \diagdown \bigwedge CH_3$ $\xrightarrow{HBr}$

(product with Br and Br)

c)

HCl

d)

HCl