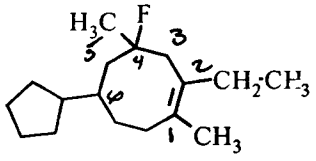
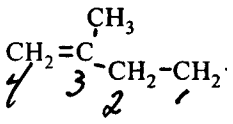
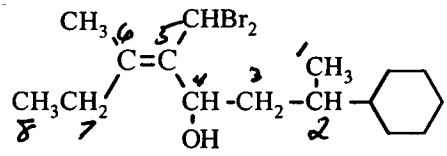
Ch 334 - Exam 2 **Name (please print)** **Key**
November 20, 2002

Note. Selected atomic numbers are given on the last page.

(15) Name the following.

a) 

b) 

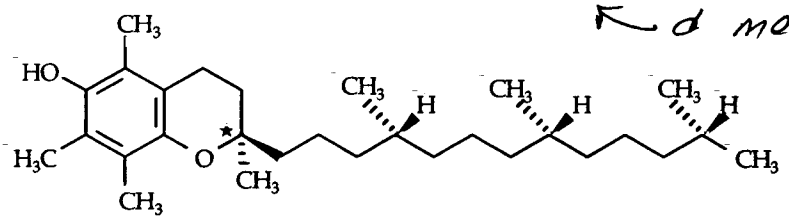
c) 

a) 6-cyclopentyl-2-ethyl-4-fluoro-1,4-dimethylcyclooctene

b) (name as a part structure) 3-methyl-3-butenyl

c) (include E or Z) (E)-5-dibromomethyl-2-cyclohexyl-6-methyl-5-octen-4-ol

2. Natural Vitamin E is a chiral molecule that is also known as *d*-α-tocopherol. Its structure is given below.



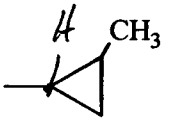
a) (3) The carbon atom that has a star is (circle one): not a chiral center (R) S can't tell

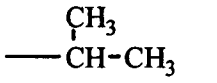
b) (2) The optical rotation of natural Vitamin E is (circle one): (+) (–) (+,–) can't tell other .

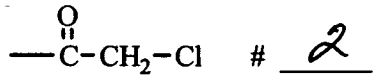
3. (2) Optical activity is measured using an instrument called a(an) polarimeter.

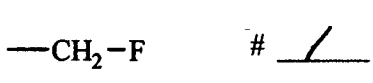
4. (2) The specific three-dimensional arrangement of the four groups at a chiral center is called the absolute configuration at that center.

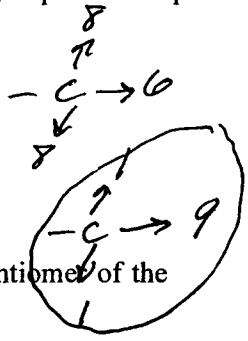
5. (4) Use the numbers 1 (higher) and 2 (lower) to indicate the relative R/S priorities of the two groups in each pair below.

a)  # 1

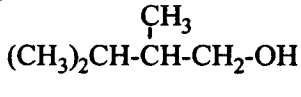
 # 2

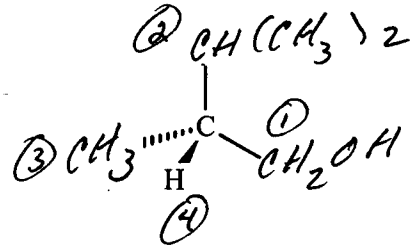
b)  # 2

 # 1



6. (3) Complete the dash/wedge diagram to show the arrangement of the four groups in the R enantiomer of the compound shown.





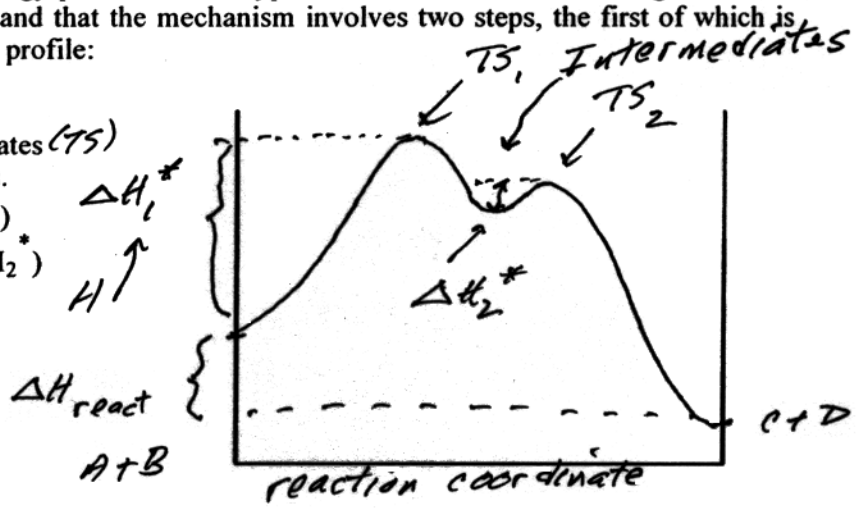
7. (3) The strength of ethanol as a Bronsted acid can be described as (circle one): strong moderate (weak)

The strength of ethanol as a Bronsted base can be described as (circle one): strong moderate (weak)

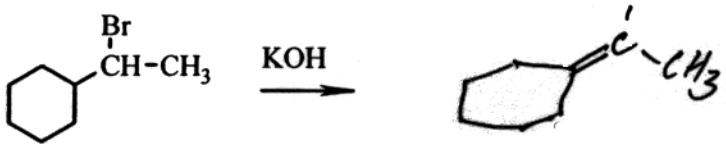
What effect would ethanol have on red or blue litmus paper? none

8. (8) In the space at the right, draw the energy profile for the hypothetical reaction A + B to give C + D. Assume that the overall reaction is exothermic, and that the mechanism involves two steps, the first of which is rate-limiting. Label the following on the energy profile:

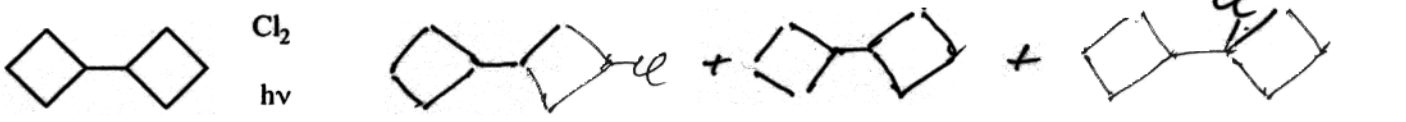
1. the vertical and horizontal axes
2. any and all places that represent transition states (TS)
3. any and all places the represent intermediates.
4. the activation energy for the first step (ΔH_1^*)
5. the activation energy for the second step (ΔH_2^*)
6. the overall heat of reaction (ΔH_{react})



9. (36) Complete the following reactions. (Note. *Mechanisms are not wanted here.*)

a) 

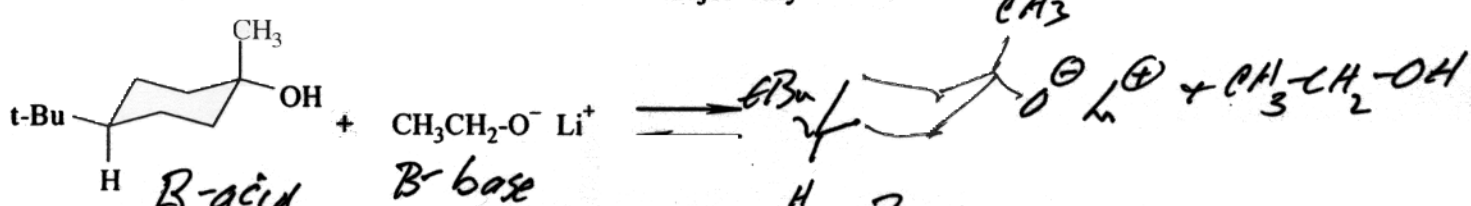
major minor

b) 

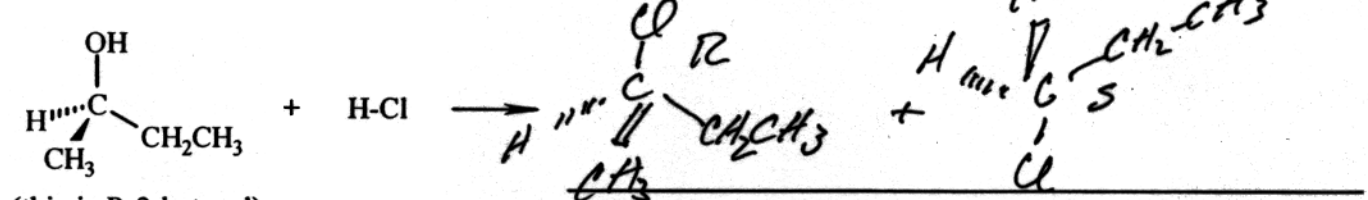
(Show all possible products having one Cl only. Ignore stereochemistry.)

c) 

major only

d) 

e) 

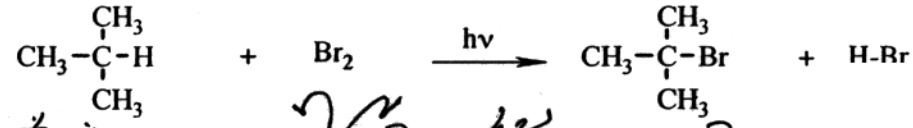
f) 

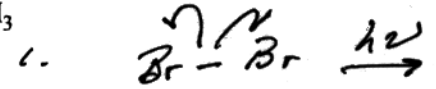
(this is R-2-butanol)

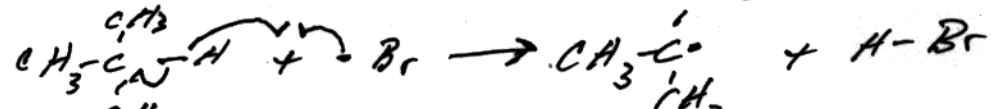
(Show the stereochemistry of the product.)

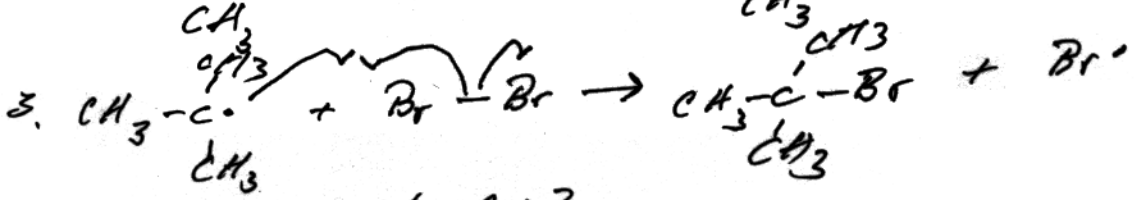
(the carbocation is planar)

10. (10) Write a reasonable mechanism for the following. Show all steps clearly, include any formal charges, and use correct electron pushing.

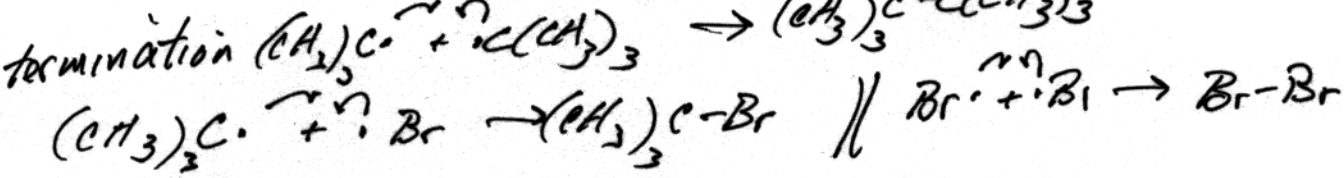


initiation 1. 

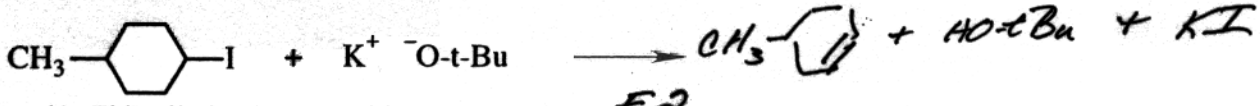
propagation 2 

3. 

repeat 2 + 3

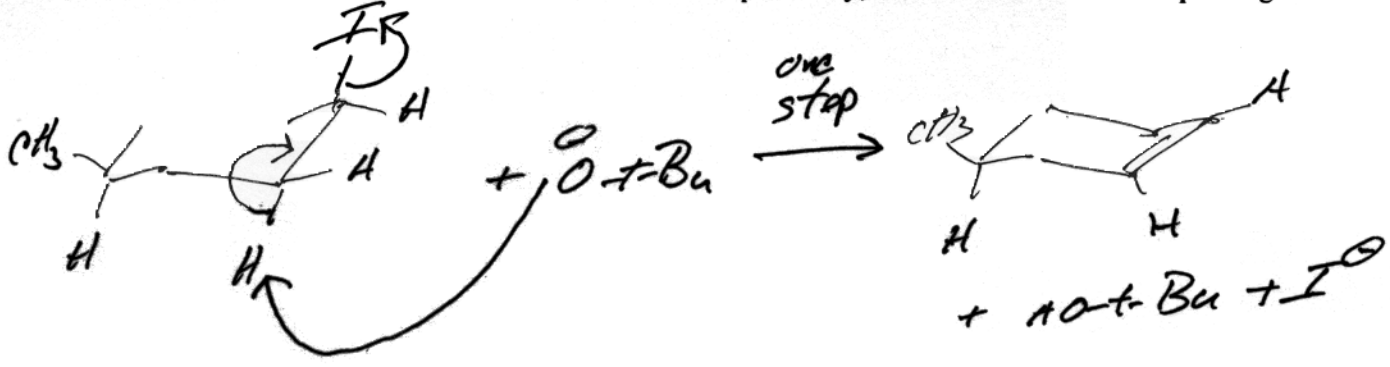
termination 

11. (12) a) Complete and balance the following, assuming an *elimination* reaction:



b) This elimination probably occurs with an E2 mechanism. The stereochemistry for this type of elimination is usually anti.

c) For the cis isomer of the above iodide, there are two possible chair conformations, but only one reacts rapidly in the elimination reaction. Carefully draw the structure of this chair conformation, and use this structure to illustrate the mechanism for elimination. Show individual steps clearly, and use correct electron pushing.



Selected Atomic Numbers	H (1)	Li (3)	Be (4)	B (5)	C (6)	N (7)	O (8)	F (9)
Na (11)	Mg (12)	Al (13)	Si (14)	P (15)	S (16)	Cl (17)	K (19)	Br (35)	I (53)