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CEM 351 –Quiz 2	
Fall 2025	
NAME	NO DOT KEY

Score		

1	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)
	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)
	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)
	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)

(0)	(0)	(0)
(1)	(1)	(1)
(2)	(2)	(2)
(3)	(3)	(3)
(4)	(4)	(4)
(5)	(5)	(5)
(6)	(6)	(6)
(7)	(7)	(7)
(8)	(8)	(8)
(9)	(9)	(9)

READ THIS!

Bubble in your PID in the space above. Write your answer for each question in the space provided.

LEAVE THIS COVER SHEET ATTACHED TO THE Quiz!

1. _____/10

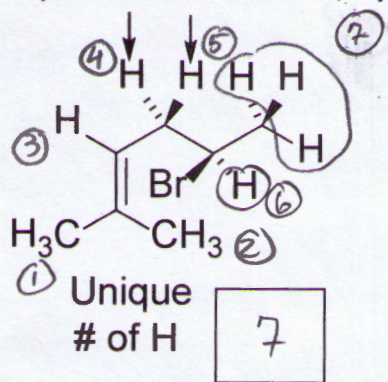
2. _____/14

3. _____/10

4. _____/16

TOTAL: _____/

- 1) How many kinds of nonequivalent protons (H) are present in the following? That is, how many different proton signals will you observe in a ^1H -NMR? Hint: remember topicity and draw out new "molecules" with a "replacement atom" for H's, if you need to. (2 pts)



- ①/② Diastereotopic
 ③ Unrelated to any other H
 ④/⑤ Diastereotopic
 ⑥ Unrelated to any other H
 ⑦ Identical (i.e., Homotopic)

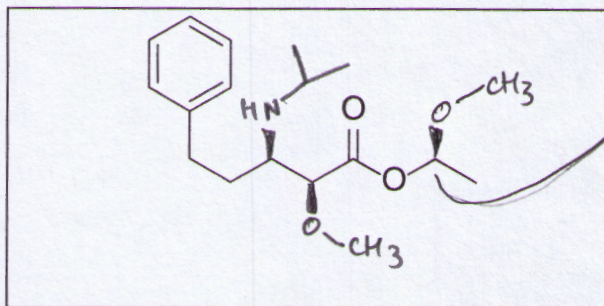
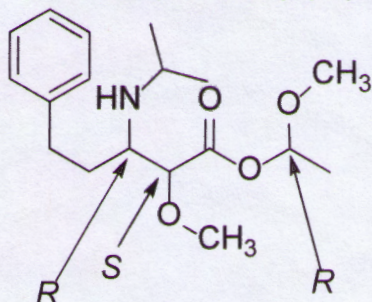
The arrows are for the next problem!

- 2) Identify the indicated sets of protons designated with arrows in the problem above as (U)nrelated, (I)dentical (also called Homotopic), (E)nantiotopic, or (D)ia stereotopic (2 pts)

D

Write U, I, E, or D

- 3) CLEARLY Draw the compound below with wedged (—) and/or dashed (.....) lines to show the 3-D aspect of the chirality centers. (3 pts)



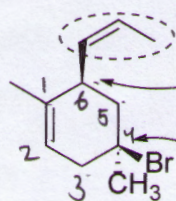
- 4) Naming: (3 pts)

What is the name of the circled substituent above?
 (Hint: a number is included in the name)

1-propenyl

suffix required because this is a substituent

NOT 1-propene
 (incorrect for a substituent)



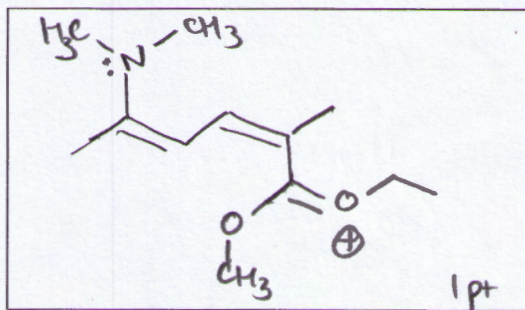
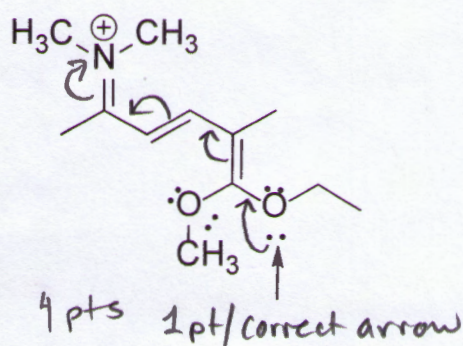
What is the location number for the attached substituent?

6

What is the *R/S* stereoisomerism of this location?

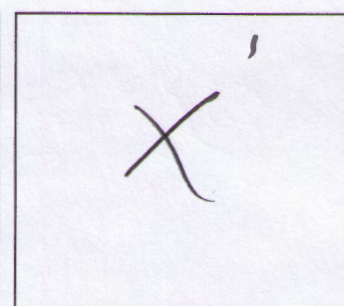
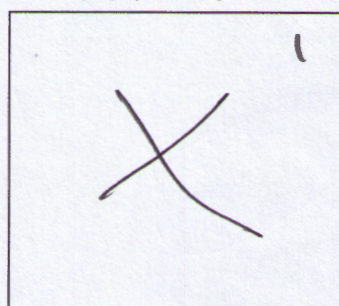
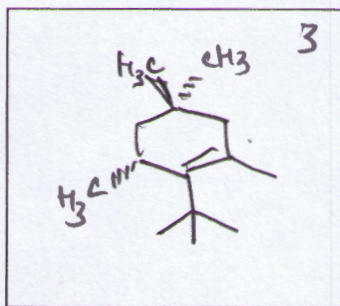
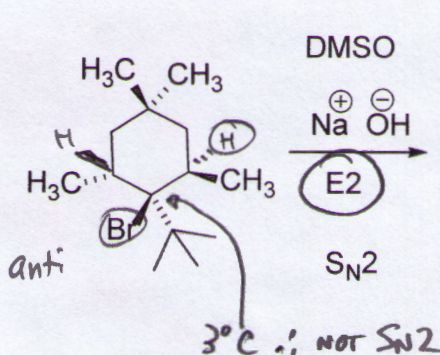
R

5) (5 pts total) Resonance Revisited. Draw a resonance structure in the box (1 pt) where the oxygen (arrowed) gains a formal charge and the nitrogen loses its charge – no other atom should gain a charge. Draw CURVED ARROWS on the structure on the left to show the movement of electrons that yield the resonance structure you drew. (5 pts)



6) (6 pts total) Using the conditions shown, draw ALL the product(s) for the MOST LIKELY reaction mechanism below (E2 or S_N2 below) (Include stereoisomerism, if necessary). (5 pts)

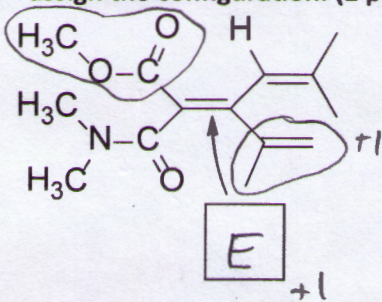
Circle the MORE FAVORABLE reaction mechanism below the arrow. (1 pt) Take your time.



If fewer than 3 products place an X in the box(es) not used

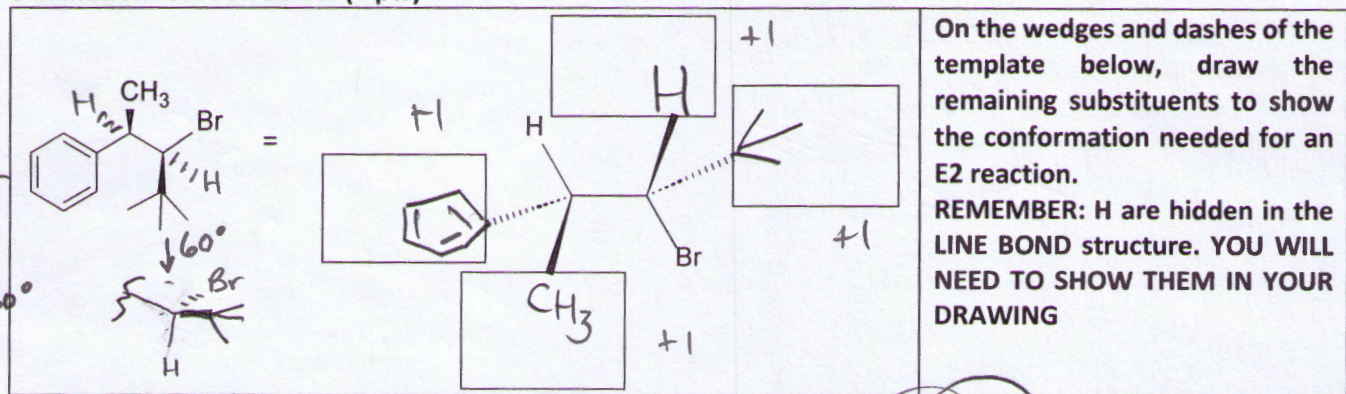
CIRCLE THE MORE FAVORABLE MECHANISM ABOVE

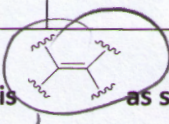
7) Assign E or Z configuration (1 pt each). CIRCLE the highest priority group attached to each sp² Carbon used to assign the configuration. (1 pt for each circle) (3 pts total)

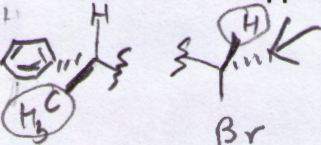


REM: CIRCLE the highest priority groups

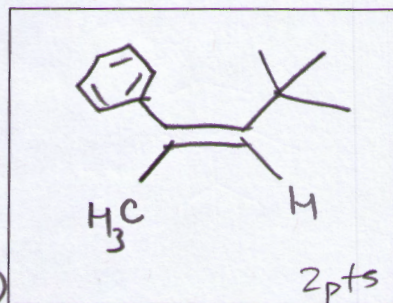
8) Rotate the molecule so that the H and Br are *anti* in the plane-of-the-paper (like this ) for the elimination reaction below (4 pts)



9) Now, draw the E2 product from the starting material (above) (like this ) as shown in class) with substituents in appropriate positions. (2 pts)



CH_3O^- DMSO



NOTE:

CH_3/H on same side w/ $\rightarrow$ (wedges)

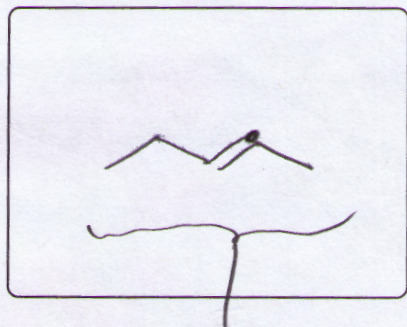
CH_3/H on same side w/ $\leftarrow$ (dashes)

Therefore alkene

10) (4 pts total) Draw the alkene reactant in BOX 1 that can give the product shown as one MAJOR. (2 pts)
In BOX 2, what is the other alcohol obtained, as an equally MAJOR product, from the alkene you drew in BOX 1 (2 pts)?

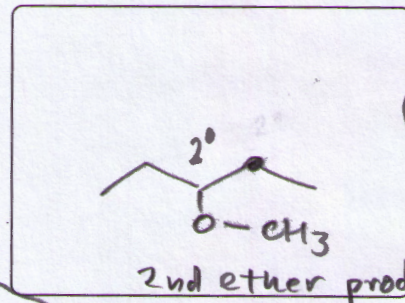
$\rightarrow$ this was a typo.

Box 1



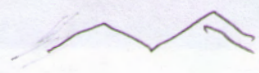
only this alkene gives 2 MAJOR products

Box 2



2nd ether product

this was the correct reagent because of ETHER product. Consistency was here
3B

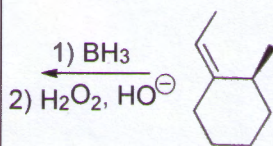
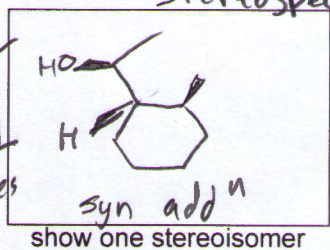
 gives only 1 major product

11) Draw the MAJOR (most abundant) product made in the reaction. USE WEDGED AND DASHED BONDS TO DEMONSTRATE SYN/ANTI ADDITION.

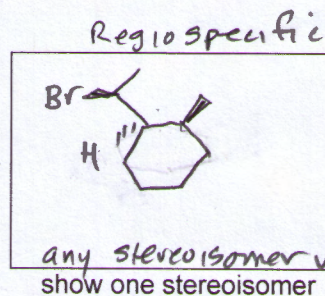
(16 pts)

Stereospecific + Regiospec.

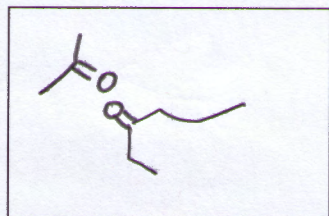
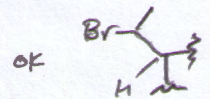
also
H and
wedged



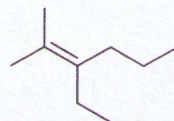
HBr



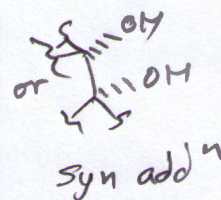
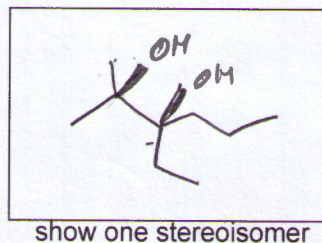
straight lines



1) O_3
2) H_3CSCH_3

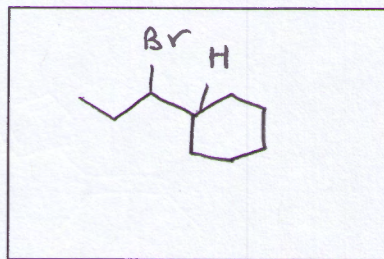


1) OsO_4
2) NMO



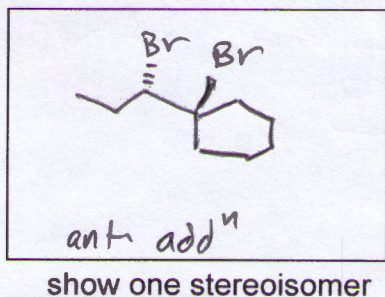
Draw all final products coming from alkene skeleton

Show More Abundant Product

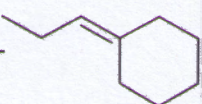


Regio- but
NOT stereospecific
"ANTI-MARKOVNIKOV"

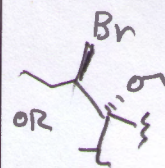
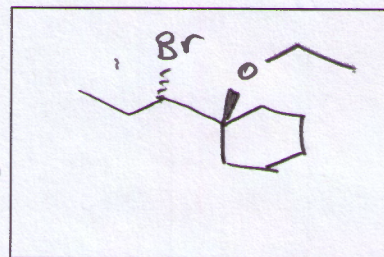
HBr
peroxides



Br_2

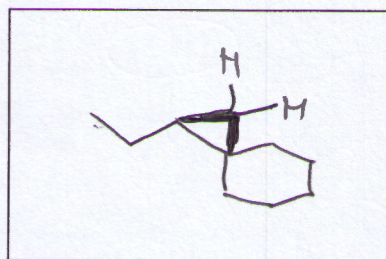


Br_2
diluted in
 $\text{CH}_3\text{CH}_2\text{OH}$

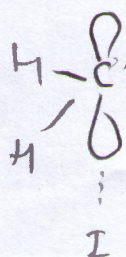


CH_2I
 Zn/Cu

$\text{CH}_3\text{CH}_2\text{OH}$



Carbene



show one stereoisomer

4B

clearly this should have been ethanol.

