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CEM 351 –Quiz 2

Fall 2025

NAME	

Score		

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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

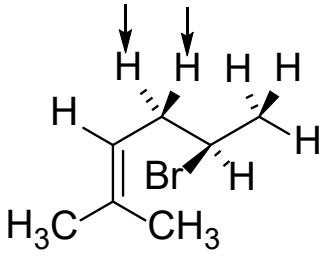
2. _____/14

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 ^{1}H-NMR? Hint: remember topicity and draw out new "molecules" with a "replacement atom" for H's, if you need to. (2 pts)



Unique # of H ☐

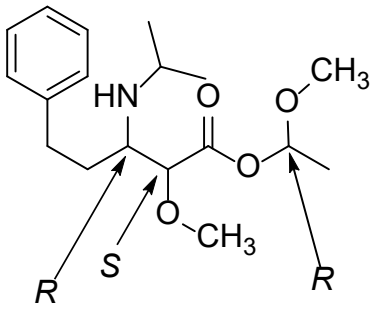
The arrows are for the next problem!

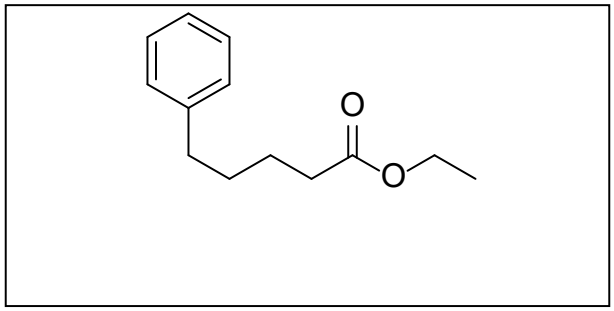
2) Identify the indicated sets of protons designated with arrows in the problem above as (U)nrelated, (I)dentical (also called Homotopic), (E)nantiotopic, or (D)iastereotopic (2 pts)

☐

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)

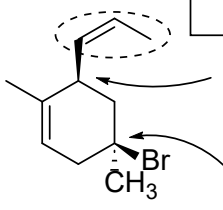




4) Naming: (3 pts)

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

☐



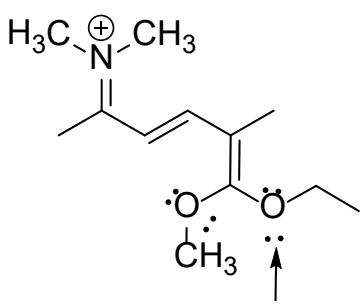
What is the location number for the attached substiuent?

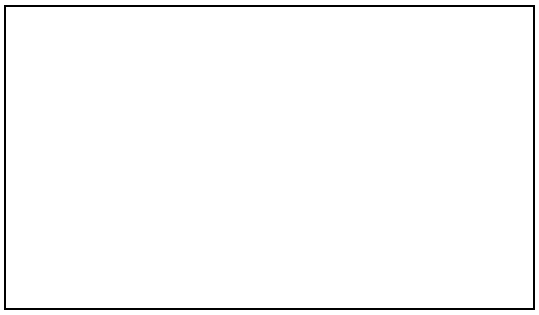
☐

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

☐

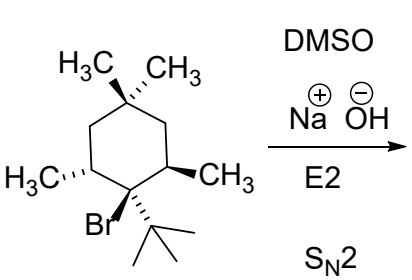
5) (<u>5 pts total</u>) Resonance Revisited. Draw a resonance structure in the box (<u>1 pt</u>) where the oxygen (arrowed) gains a formal charge and the nitrogen loses its charge – no other atom should gain a charge. Draw CURVED ARROWS on the structure on the left to show the movement of electrons that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

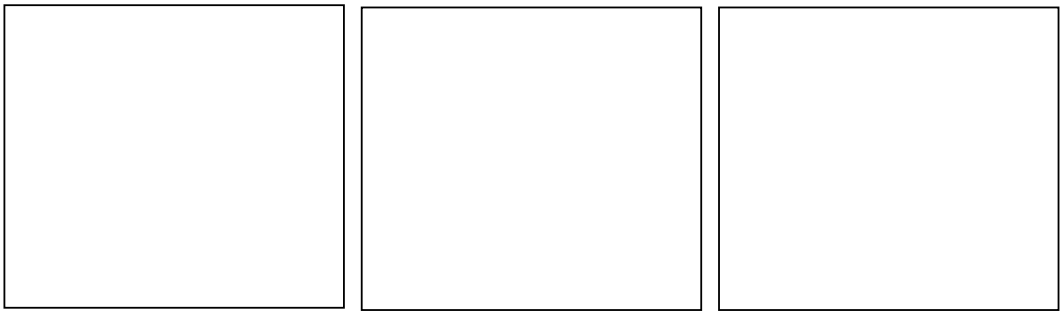




6) (<u>6 pts total</u>) Using the conditions shown, draw ALL the product(s) for the MOST LIKELY reaction mechanism below (E2 or S_N2 below) (<u>Include stereoisomerism, if necessary</u>). (5 pts)

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

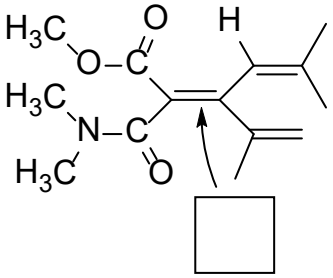




If fewer than 3 products place an X in the box(es) not used

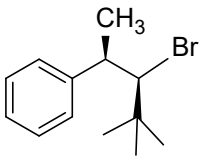
CIRCLE THE MORE FAVORABLE MECHANISM ABOVE

7) Assign *E* or *Z* configuration (1 pt each). CIRCLE the highest priority group attached to each sp^2 Carbon used to assign the configuration. (1 pt for each circle) (<u>3 pts total</u>)



REM: CIRCLE the highest priority *<u>groups</u>*

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)



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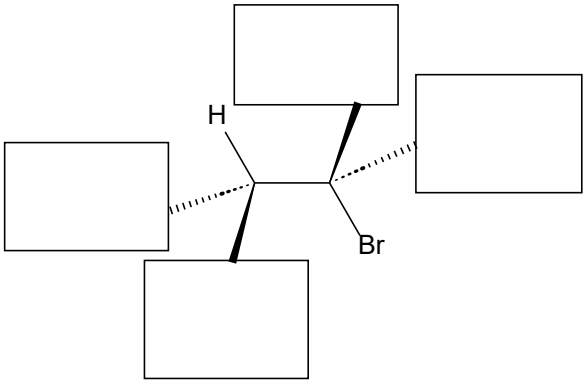
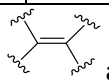
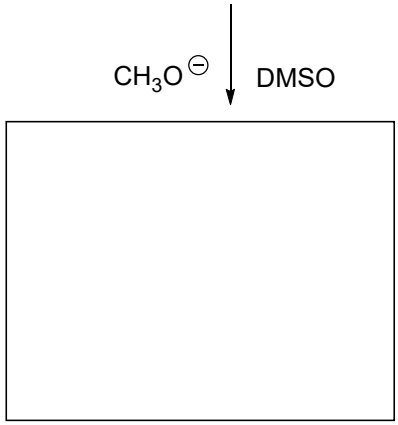


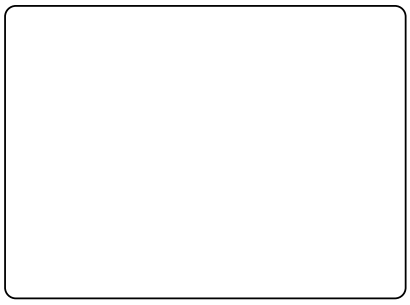
On the wedges and dashes of the template below, draw the remaining substituents to show the conformation needed for an E2 reaction.
REMEMBER: H are hidden in the LINE BOND structure. YOU WILL NEED TO SHOW THEM IN YOUR DRAWING

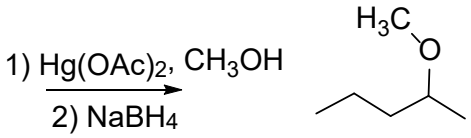
9) Now, draw the E2 product from the starting material (above) (like this  as shown in class) with substituents in appropriate positions. (2 pts)



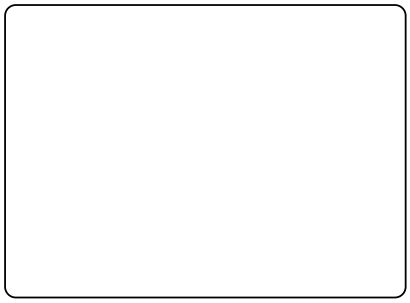
10) (<u>4 pts total</u>) Draw the *<u>alkene</u>*** reactant in BOX 1 that can give the product shown as one MAJOR. (2 pts) In BOX 2, what is the other alcohol obtained, as an equally MAJOR product, from the alkene you drew in BOX 1 (2 pts)?**

Box 1

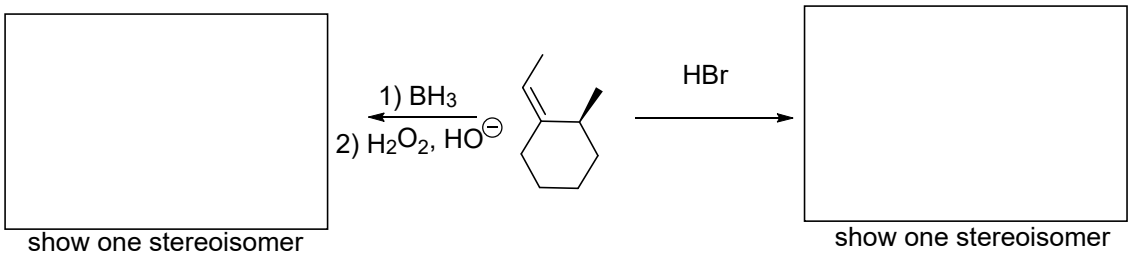




Box 2

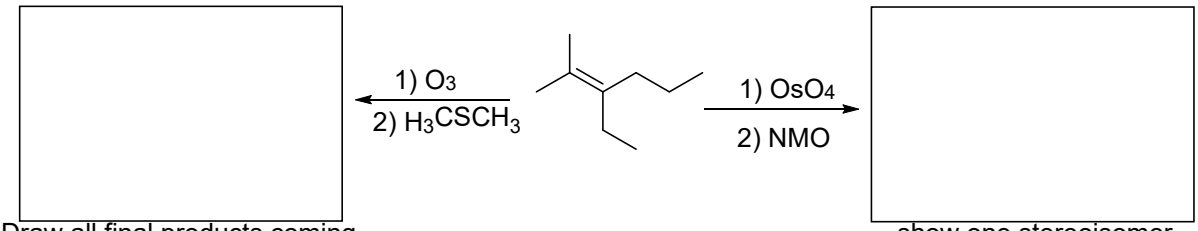


11) Draw the MAJOR (most abundant) product made in the reaction. USE WEDGED AND DASHED BONDS TO DEMONSTRATE SYN/ANTI ADDITION.
(16 pts)



show one stereoisomer

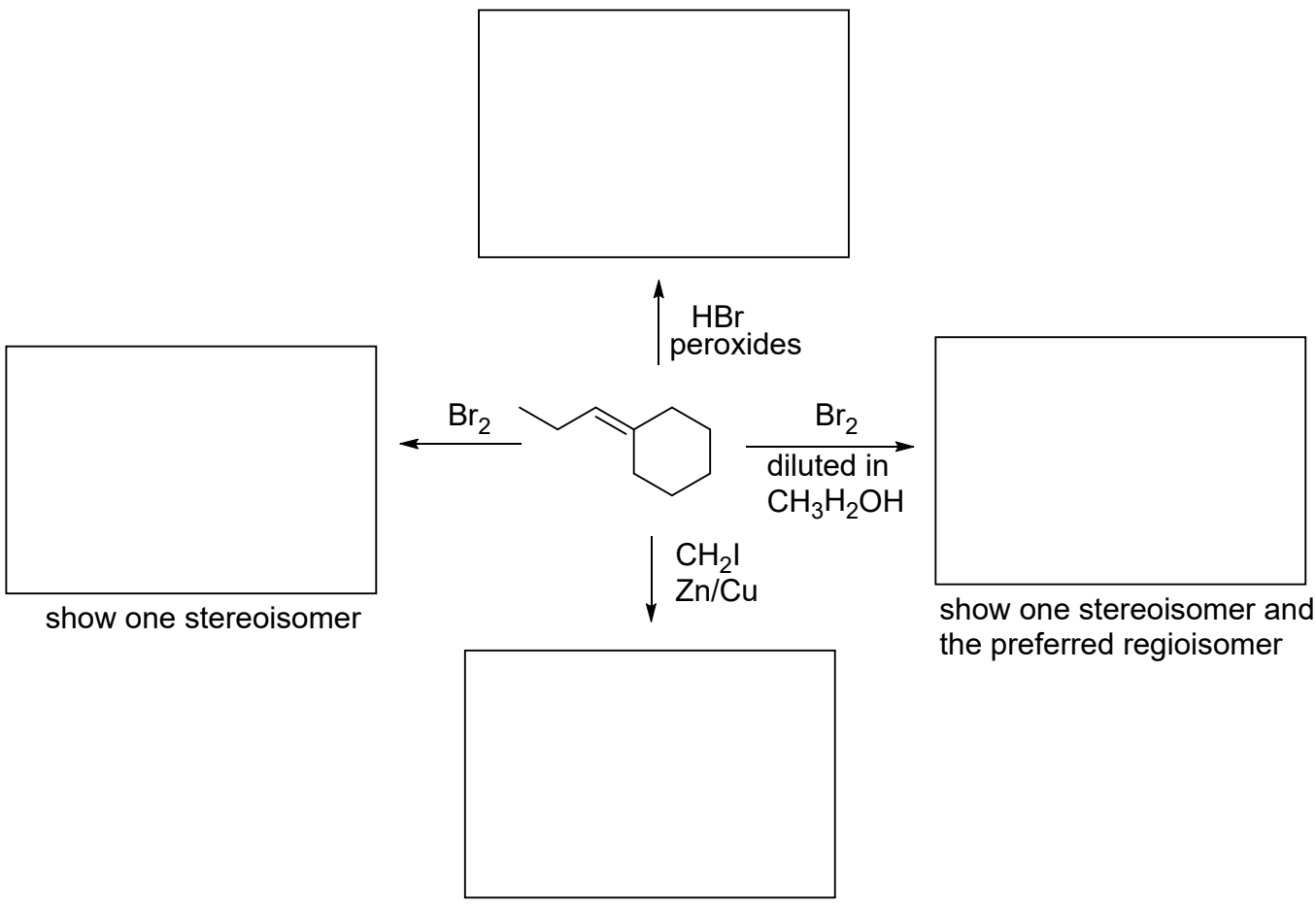
show one stereoisomer



Draw all final products coming from alkene skeleton

show one stereoisomer

Show More Abundant Product



show one stereoisomer

show one stereoisomer and the preferred regioisomer

show one stereoisomer