

Chemistry 333

Examination #2

October 27, 2005

Professor Charonnat

Name: _____

Be certain that your examination has six (6) pages including this one.

Put your name on **each** page of this examination booklet.

By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

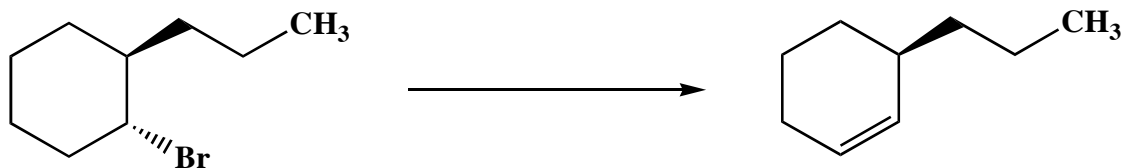
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: _____

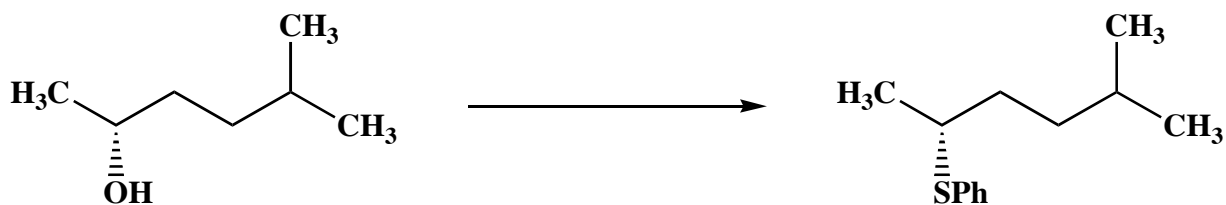
1. (25 points)

Draw the specific reagent(s) necessary to effect the transformation shown for each of the following four (4) questions. If more than one reaction is involved in an answer, be certain to distinguish the individual steps clearly. Specify the relative stoichiometry for each reagent.

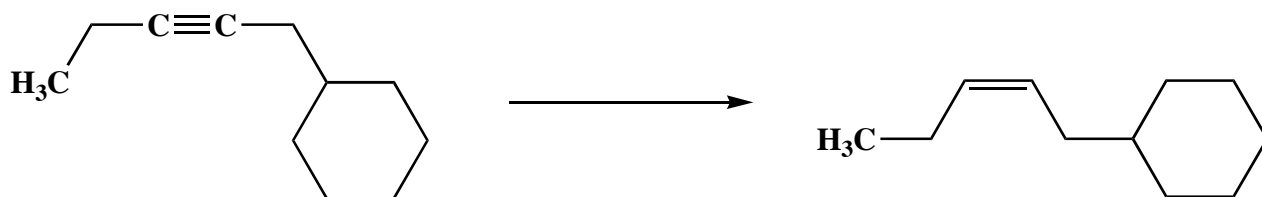
A.



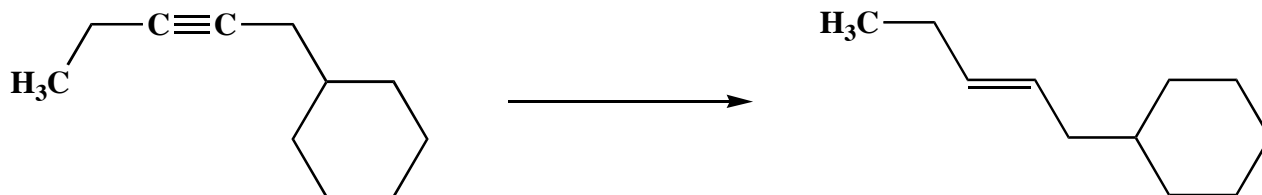
B.



C.



D.



Name: _____

2. (25 points)

Circle the number that corresponds to the correct answer for each of the following five (5) questions.

A. A sample containing a chiral compound

1. always rotates plane-polarized light
2. sometimes rotates plane-polarized light
3. never rotates plane-polarized light

B. E2 eliminations prefer

1. a syn, eclipsed conformation
2. an anti, eclipsed conformation
3. an anti, staggered conformation

C. Which of the following alkyl bromides is the least reactive in E2 eliminations?

1. 1-bromo-4-methylpentane
2. 3-bromopentane
3. 3-bromo-3-methylpentane

D. The rate of an S_N2 reaction is a function of

1. [substrate] only
2. [nucleophile] only
3. both

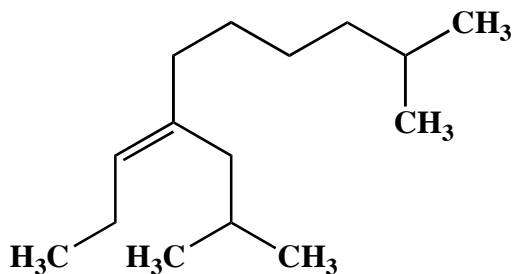
E. Stereocenters

1. always are asymmetric carbons
2. sometimes are asymmetric carbons
3. never are asymmetric carbons

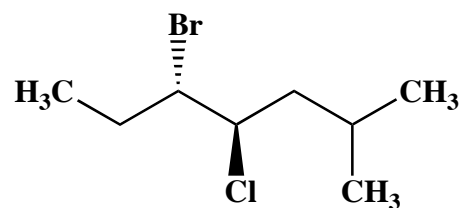
3. (20 points)

Use IUPAC nomenclature to write the systematic names for both of the following two (2) compounds.

A.



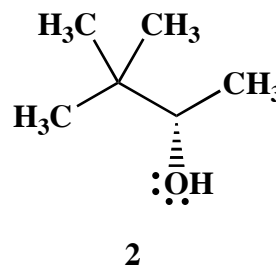
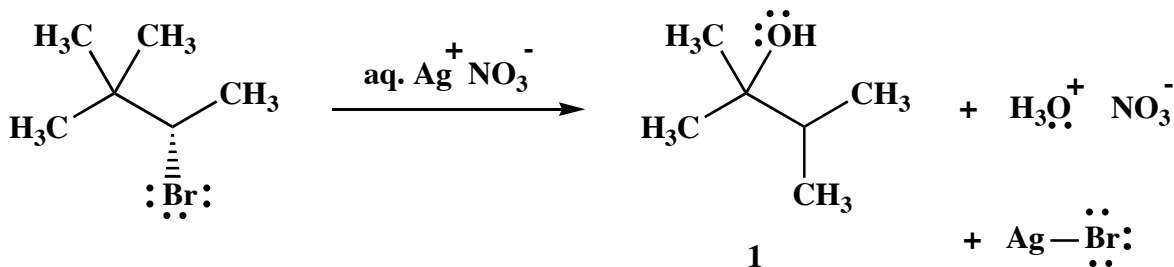
B.



Name: _____

4. (30 points)

Silver nitrate is known to facilitate nucleophilic substitutions of alkyl halides, due to the unusual strength of silver-halogen bonds. Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Denote **all** intermediates, lone pairs, nonzero formal charges, countercharges, and reversibility or nonreversibility. Explain clearly why the alcohol **1**, not the regioisomeric alcohol **2**, is formed.

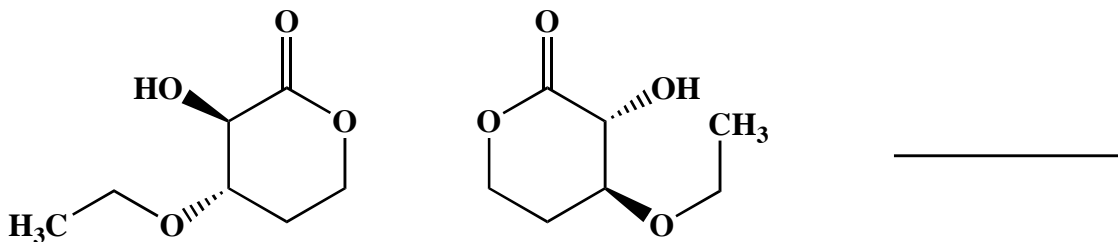


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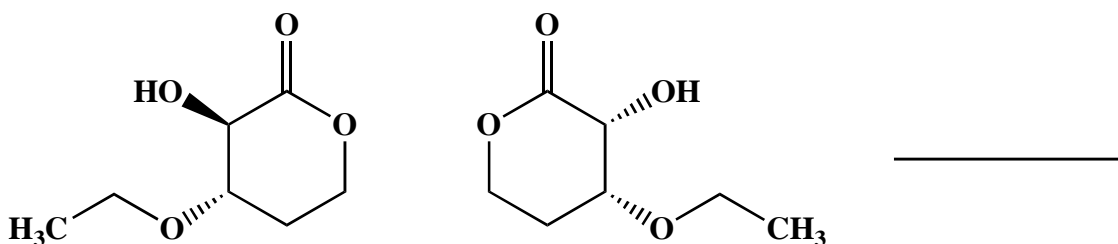
5. (30 points)

State the relationship between each of the following five (5) pairs of structures (identical, enantiomers, diastereomers, structural isomers, conformational isomers, different compounds that are not isomeric).

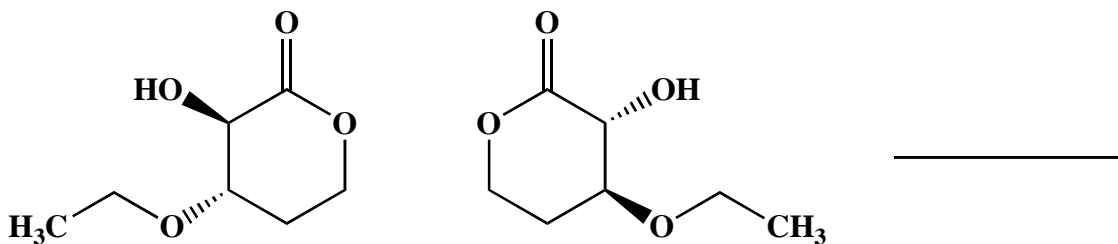
A.



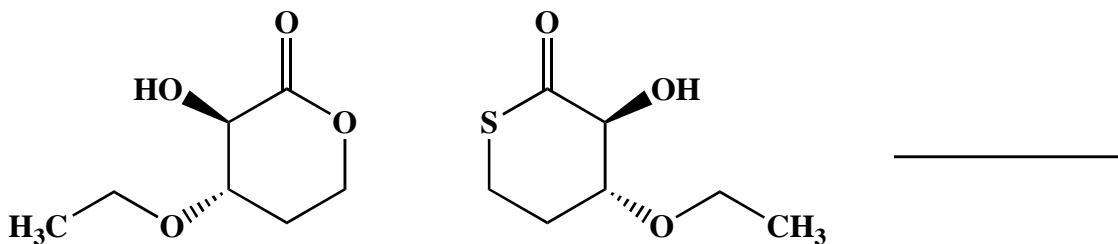
B.



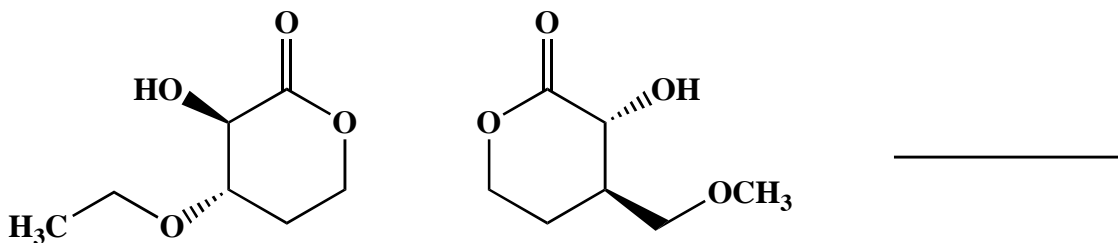
C.



D.



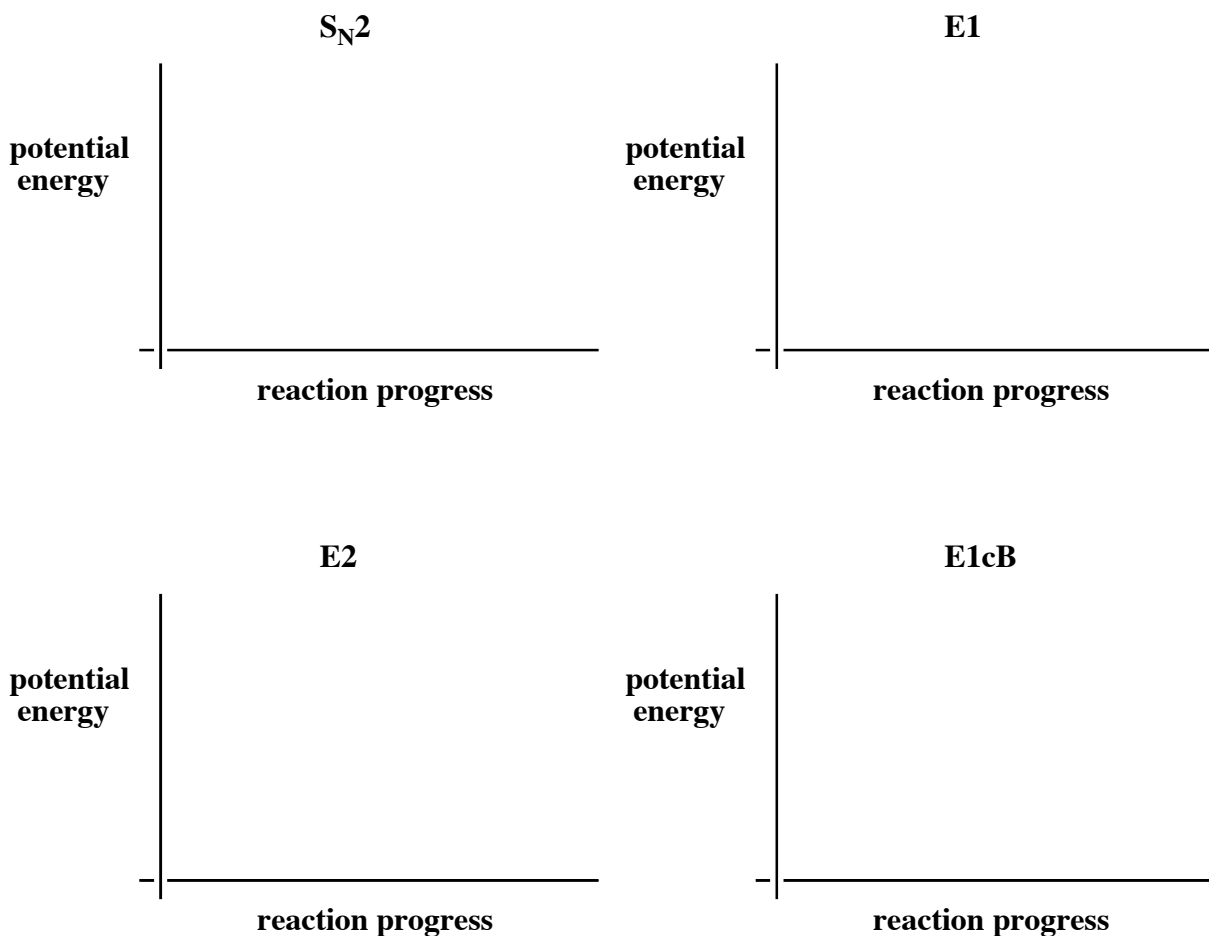
E.



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6. (20 points)

Draw a reaction-energy diagram (graph of potential energy versus reaction progress) for each of the following four (4) general reactions. Label each curve with the following: starting material (sm), transition states (ts_X), intermediates (int_X), product (p), activation energies (E_{aX}) and overall standard heat of reaction (ΔH°). Do not illustrate the possibility of rearrangements in your graphs.



Congratulations!

1	/25
2	/25
3	/20
4	/30
5	/30
6	/20
Total:	/150