

1.) Draw the **most stable** conformation of *cis*-1-ethyl-2-methylcyclohexane in chair conformation. You do not need to draw in the H's. Be very clear about your positioning! (12 pts)

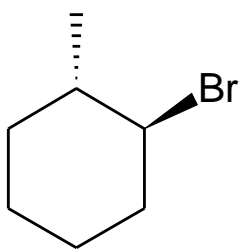
2.) Draw the Newman projection for the **lowest energy, most stable** conformation of pentane, looking down the C₂-C₃ bond. Is it eclipsed or staggered? Anti or gauche? (12 pts)

3.) Consider the following three molecules: trimethylamine, ethylmethanamine, and isopropanol. (20 pts)

a.) Arrange the above by **increasing** boiling point, starting with the **lowest**. (Hint: draw out the structures!)

b.) Explain your reasoning in (a), including reference to the intermolecular forces present in each.

4.) Consider the following molecule. (28 pts)

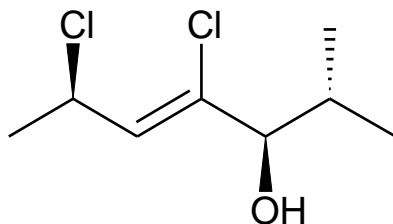


a.) Name the molecule appropriately.

b.) Circle the asymmetric center(s).

c.) Assign correct stereochemistry to each asymmetric center.

5.) Consider the following molecule. (28 pts)



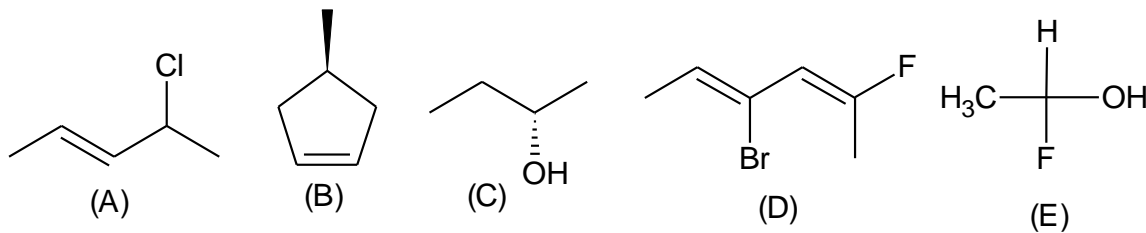
a.) Is it chiral or achiral? _____

b.) What is its maximum number of stereoisomers?

c.) Draw all possible unique stereoisomers for this compound.

6.) Why is cis-trans isomerization seen in **alkenes**, but not in **alkanes**? (8 pts)

7.) Give the appropriate IUPAC names for the following compounds, including stereochemistry where applicable. (35 pts, 7 pts ea)



(A) _____

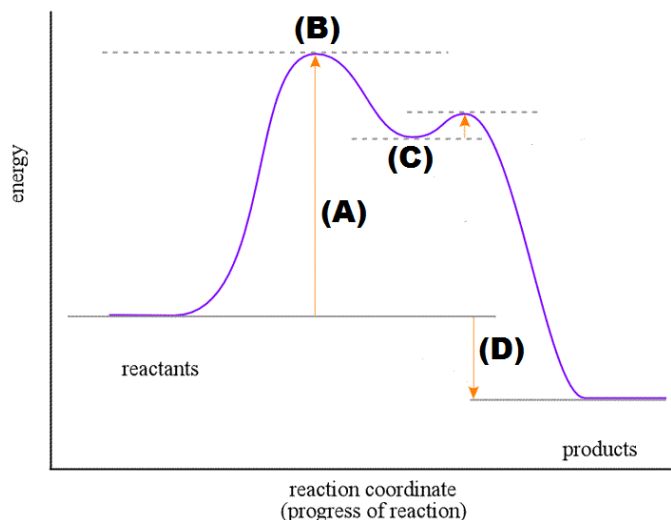
(B) _____

(C) _____

(D) _____

(E) _____

8.) Consider the following reaction coordinate diagram for a hypothetical reaction. Identify each of the following features on the graph correctly. (22 pts)



(A) _____

(B) _____

(C) _____

(D) _____

- a.) Is the reaction **exergonic** or **endergonic**? _____
- b.) Is it **spontaneous**? _____
- c.) How many steps are in this reaction? _____
- d.) The addition of a **catalyst** will change which value (A-D) on the graph? _____
- e.) If ΔS is **negative**, is the reaction **endothermic** or **exothermic**? _____