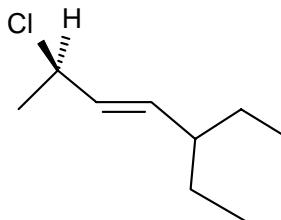
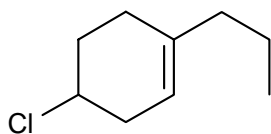


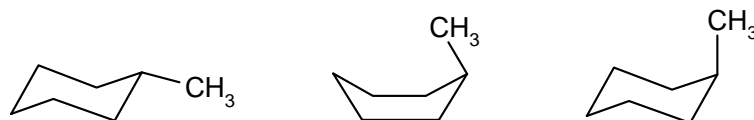
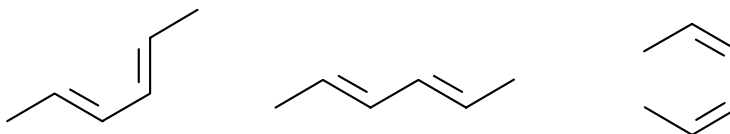
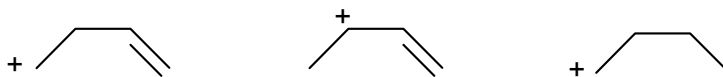
YOUR NAME _____

3 hours duration, 360 points total. [NOTE: YOUR FINAL WILL ONLY BE TWO HOURS LONG, AND SO IT WILL BE SHORTER THAN THIS ONE].

1. Give a systematic name for each of the following compounds, including stereochemistry:

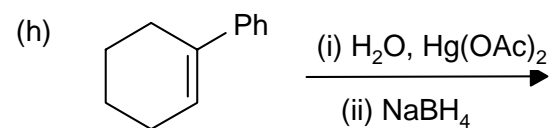
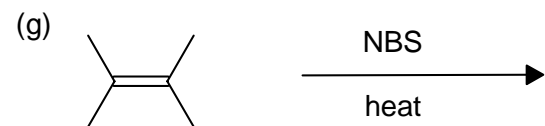
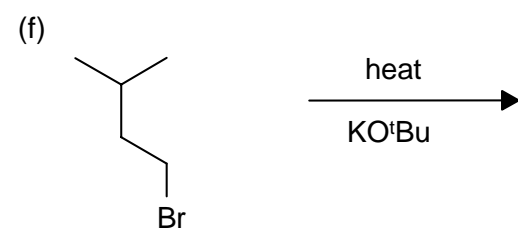
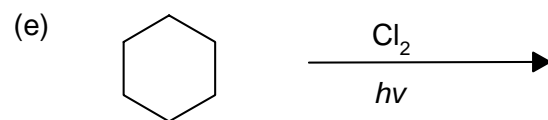
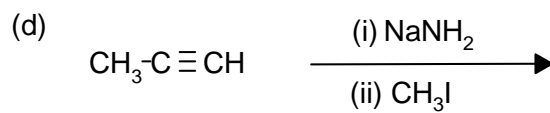
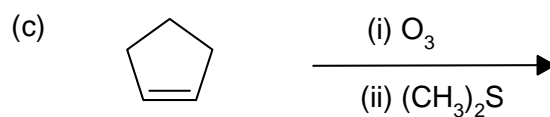
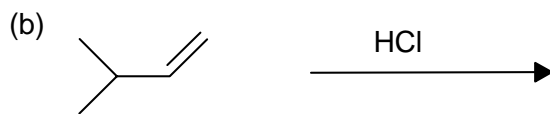
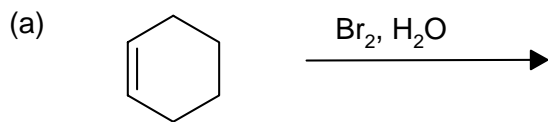


2. Which is the most stable from each set of three related structures?

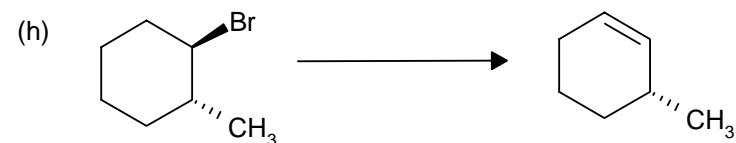
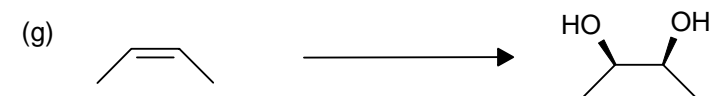
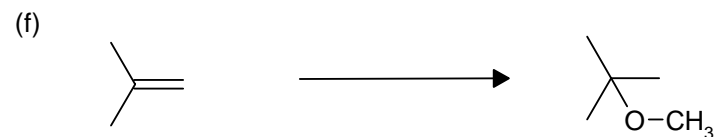
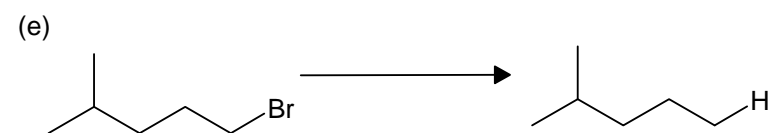
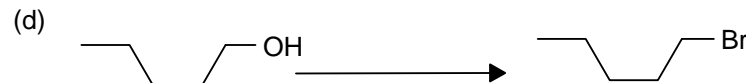
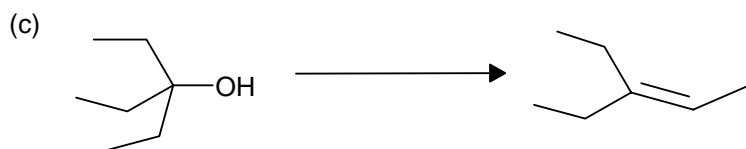
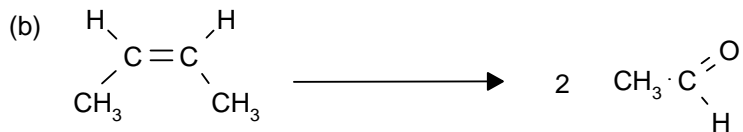
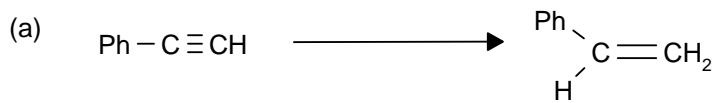


3. Draw a meso form and two enantiomers of 3,4-dimethylhexane:

4. Predict the major product(s) of the following reactions (indicate stereochemistry):



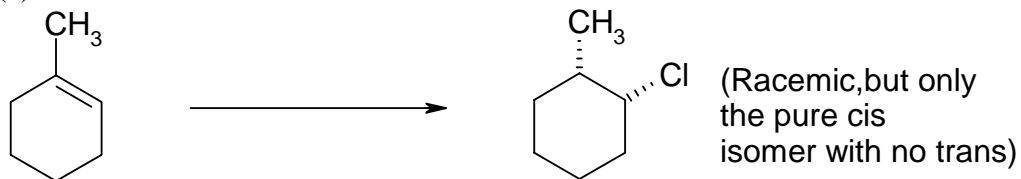
5. What reagent(s) might you use in order to effect the following transformations in a practicable manner? Indicate solvents and/or conditions (e.g. temp.) where appropriate.



6. Show how you might perform **either one** of the syntheses shown below. You must use the starting material given as your sole source for all carbons in the product (you need **not** synthesize reagents which are not incorporated, however)

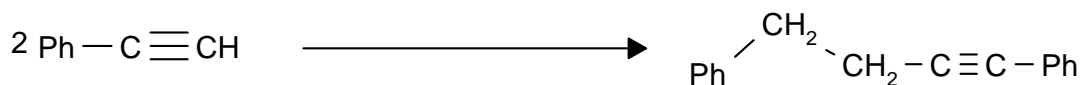
EITHER

(a)



OR

(b)

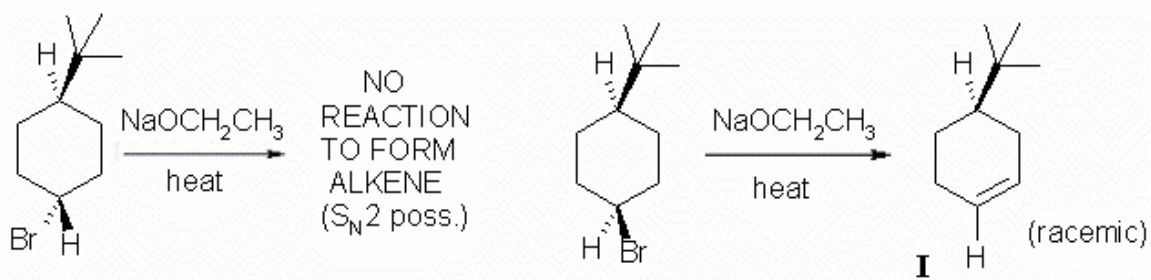


7. 1-Chlorohexane reacts with $^-\text{OCH}_3$ ion as shown:



- (a) Draw an energy curve for the reaction, and indicate which points on the curve correspond to any intermediates or transition states.
- (b) Write a rate equation for the reaction.
- (c) Which would you expect to be more reactive as a substrate in this reaction, 1-chlorohexane or 1-bromohexane?
- (d) What functional group has been formed in this reaction?

8. Explain why *trans*-1-bromo-4-*tert*-butylcyclohexane fails to react when heated with sodium ethoxide, whereas *cis*-1-bromo-4-*tert*-butylcyclohexane forms mainly alkene **I**.



9. In the reaction sequence shown below, indicate whether each structure would be expected to be optically active or not. Also, if the structure is a pure enantiomer, a racemic pair of enantiomers, or a mixture of diastereomers, indicate this. You will have to fill in the final structure (major one only) for yourself!

