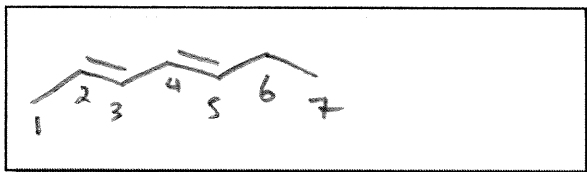


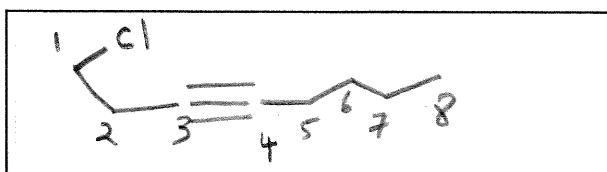
Key

1. (8 pts, 2 pts each) Draw the structure for the following.

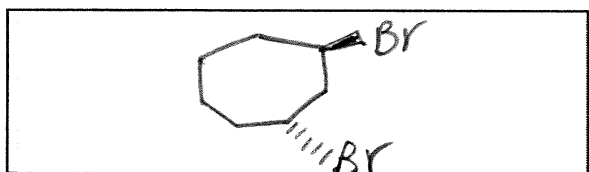
a) 2,4-heptadiene



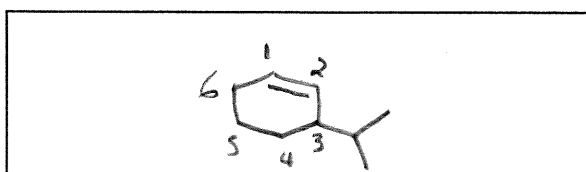
b) 1-Chloro-3-octyne



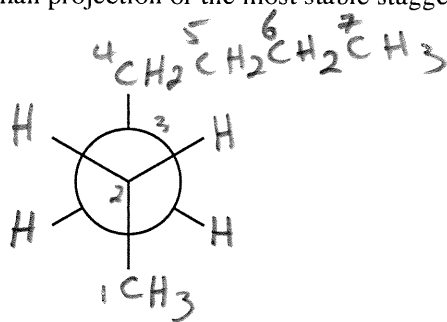
c) trans-1,3-dibromocycloheptane



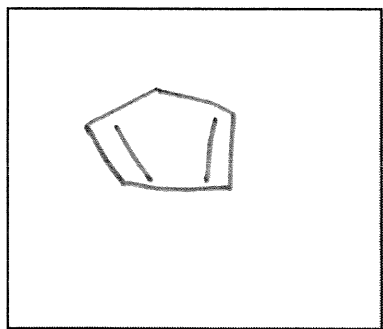
d) 3-isopropylcyclohexene



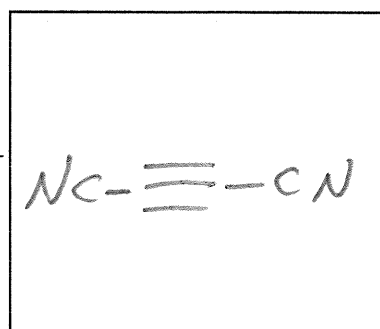
2. (4 pts) Draw the Newman projection of the most stable staggered conformer of heptane looking from C2 to C3.



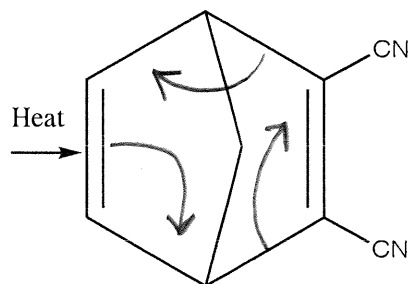
3. (4 pts, 2 pts. each) Complete the following Diels-Alder reaction.



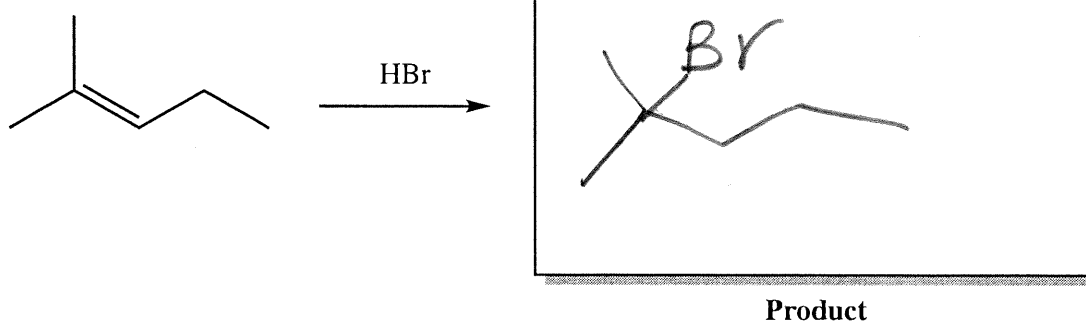
Diene



Dienophile

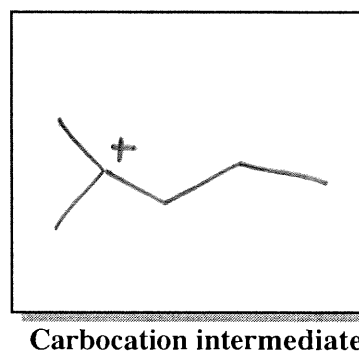


2. (9 pts) For the following reaction:



a) (2 pts.) Provide the product for the above reaction in the above box.

b) (2 pts.) Provide the structure of the intermediate carbocation in the box.



c) (5 Points) Draw an energy diagram for the above reaction, and clearly indicate the position of reactants, products, energy of activation, heat of reaction  $\Delta H$ , and transition states assuming an exothermic process.

