1. The halogenation of alkanes is a reaction used to create alkyl halides.



The process proceeds through the steps shown below:



(a) What type(s) of intermediates are present?

(b) Using the table provided on the last page, calculate ∆H (in kcal/mol) for the overall reaction.

(c) On the image above, draw curved arrows showing the movement of electrons for Step 2 only. (Hint: You might need to draw in an atom that is part of a structure but not shown!)

(d) **Omitting Step 1**, how many transition states would be present on a reaction coordinate diagram for the bromination of cyclohexane shown above?

(e) If Step 1 is the rate determining step, write a rate law for the complete halogenation reaction.

2. Label all of the stereocenters (A, B, C, etc.) on the molecule shown below and assign them as R or S in the box to the right.



|  |  |
| --- | --- |
| A |  |
| B |  |
| C |  |
| D |  |

3. Use the following compounds to answer the questions below. If no compounds fit the description, write NA. (There could be more than one correct answer for each question...you do not need to provide them all.)

    

a) A pair of diastereomers \_\_\_\_\_\_\_\_\_\_

b) A pair of enantionmers: \_\_\_\_\_\_\_\_\_\_

c) A meso compound: \_\_\_\_\_\_\_\_\_\_

d) A pair of identical structures: \_\_\_\_\_\_\_\_\_\_

