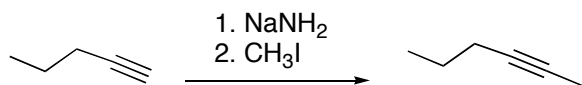


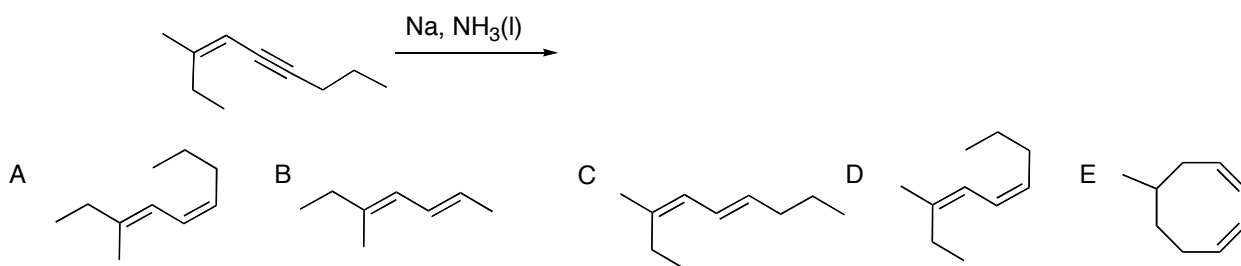
Q1-10 Multiple Choice, 4 points each

1. The **product** of the following reaction is correctly named:



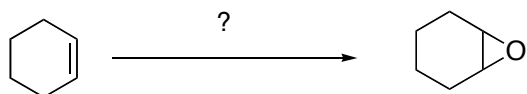
- A. 2-hexyne B. 1-hexyne C. propylmethylacetylene D. hexa-2,2-diene E. 1-butyne

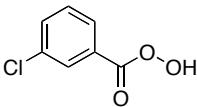
2. 3-*E*-5-*E*-3-methylnona-3,5-diene is the main product from the following reaction. The correct structure of this molecule is:



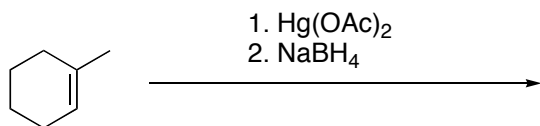
3.

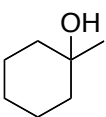
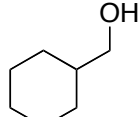
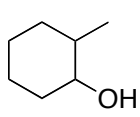
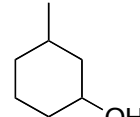
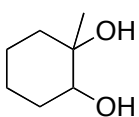
4. Which of the following reagents could accomplish the following transformation



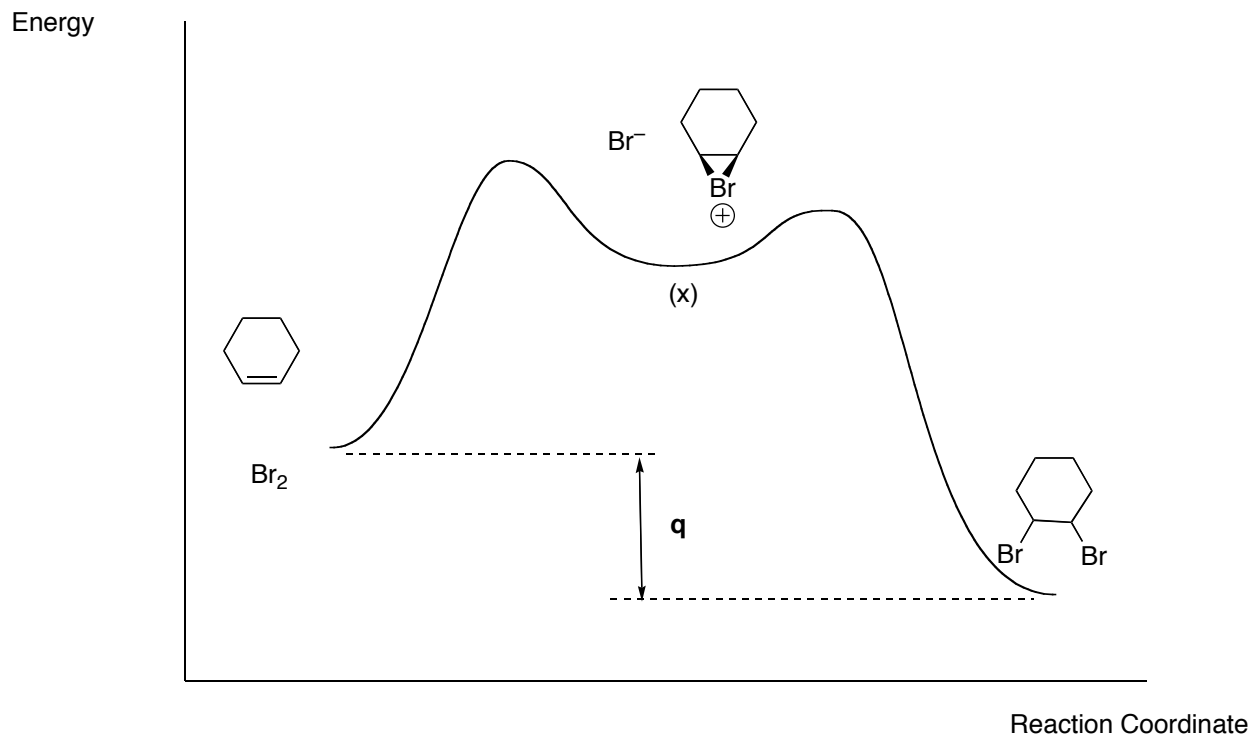
- A. CH_2Cl_2 B. O_2 C. NaOH D.  E. O_3

5. What is the most likely product of the following reaction



- A.  B.  C.  D.  E. 

The next three questions concern the following reaction profile for reaction of bromine with *trans*-2-butene:



6. The quantity labeled *q* is the

- A. Activation energy B. Free energy of reaction C. Equilibrium constant
D. Rate constant E. pK_a

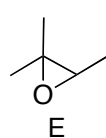
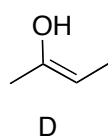
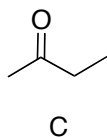
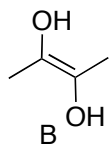
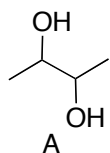
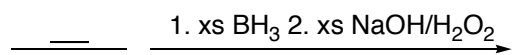
7. The feature labelled (x) in the diagram indicates that:

- A. (x) is a transition state
B. The reaction has an intermediate
C. The second step of the reaction is rate determining
D. The reaction is endothermic
E. The reaction is exothermic

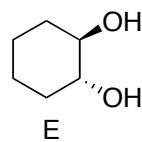
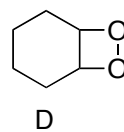
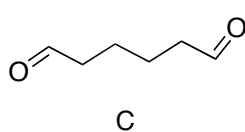
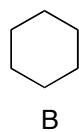
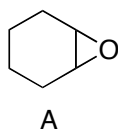
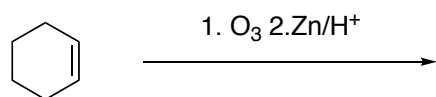
8. The relative configuration of the bromines in the product molecule are:

- A. cis B. trans C. mixture of cis and trans D. Cannot be determined

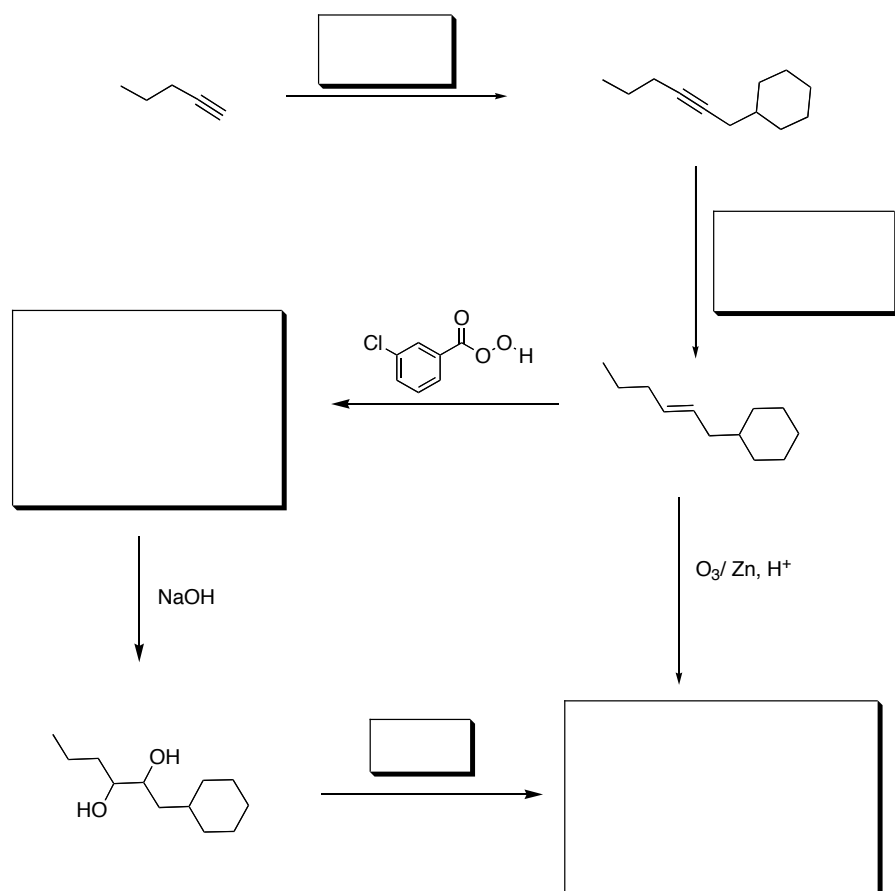
9. The product of the following reaction is:



10. The product of the following reaction is:

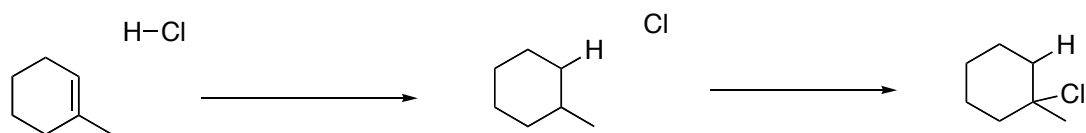


11. (20) Fill in the blanks in the following reaction scheme

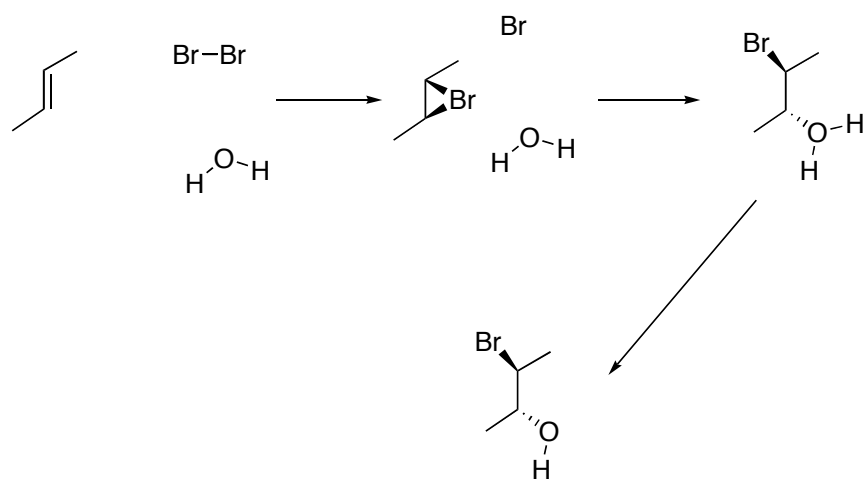


12. Complete the following reaction mechanisms by adding curly arrows and charges where necessary

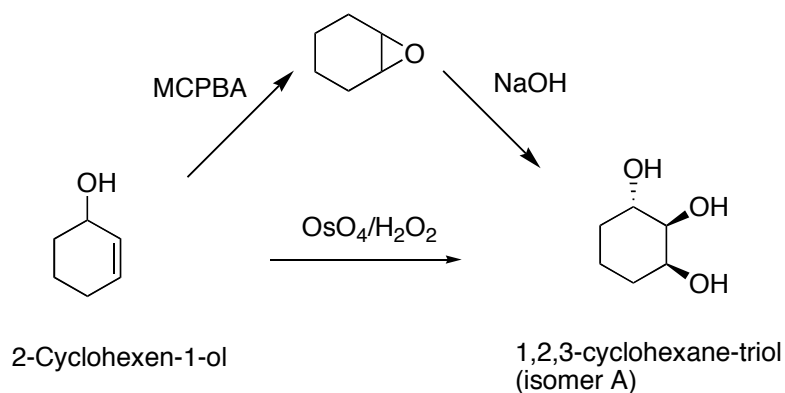
a) (10)



b) (10)



13. The product of the following reactions, 1,2,3-cyclohexane-triol can exist in several different isomers depending upon how the OH groups are arranged on the ring (*cis* vs *trans* etc.). One of these isomers is shown in the reaction scheme.



a) (4 points) Draw two other isomers of 1,2,3-cyclohexane-triol (do not worry about how to name them, just label them B and C)

b) (8 points) Isomer A is a possible product of both reactions. Which other isomers are possible products of the reaction with OsO_4 ? (there may be more than one) - explain your answer.

c) (8 points) Which other isomers are possible products of the reaction with MCPBA (m-chloroperbenzoic acid)/ NaOH (there may be more than one) - explain your answer.

14. Propose a method to complete the following transformations. More than one step will be required. (Hint: you may find useful reactions embedded in some of the other questions!)

a. (8)



b. (12) $\text{H}-\text{C}\equiv\text{C}-\text{H}$

