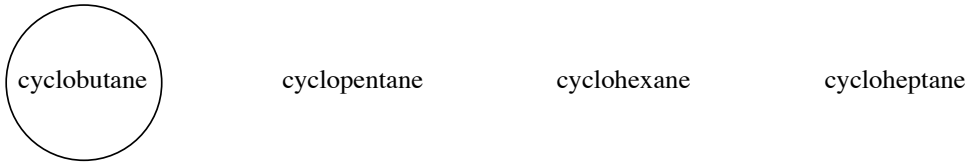
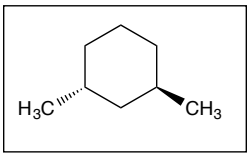
Practice Exam 1 – This is a 60 minute exam

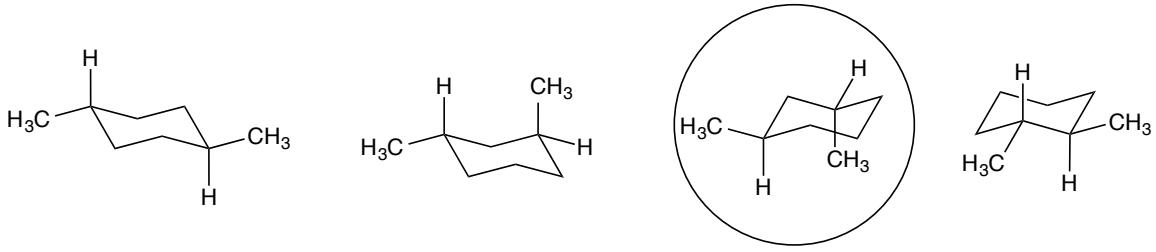
Question 1. Circle the <u>strongest base</u> from the list below

Question 2. Circle the compound with the <u>most angle strain</u> from the list below

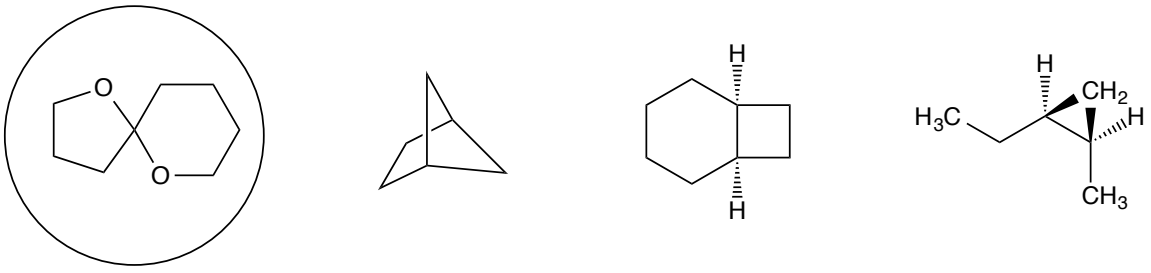


Question 3. Which of the following chair drawings is an accurate depiction of the compound shown in the box (circle your answer)?





Question 4. Circle the <u>spiro bicyclic compound</u> shown below.



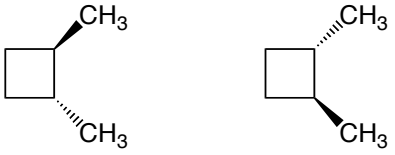
Question 5. Label each of the following pairs of molecules as **identical**, **structural isomers**, **conformational isomers, enantiomers** or **diastereomers** (***Note: if the 2 compounds can be interconverted via bond rotation, then you should pick "conformational isomer"***).

a) 2-chloropentane 3-chloropentane

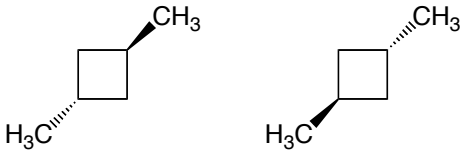
Answer: *structural isomers*

b) 

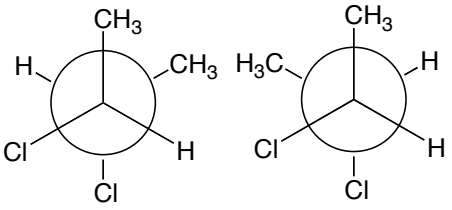
Answer: *identical*

c) 

Answer: *enantiomers*

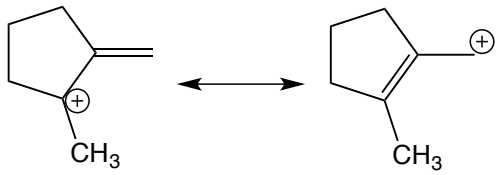
d) 

Answer: *identical*

e) 

Answer: *diastereomers*

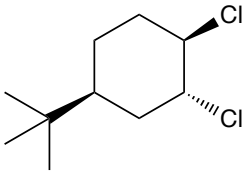
Question 6. A student made the assertion that carbocation **A** (below) is more stable than carbocation **B**. Is this correct? Why or why not? *Make sure to be clear and complete in your explanation, and pictures can be helpful.*



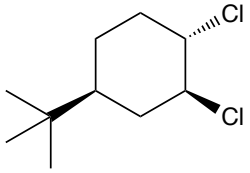
A **B**

*This is a single species, not two different species. **A** and **B** are two resonance forms of the same carbocation*

Question 7. Consider the two dichlorocyclohexanes below:

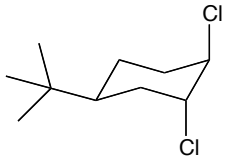


A

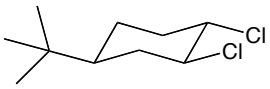


B

a) Draw compounds **A** and **B** in their most stable chair forms.



A



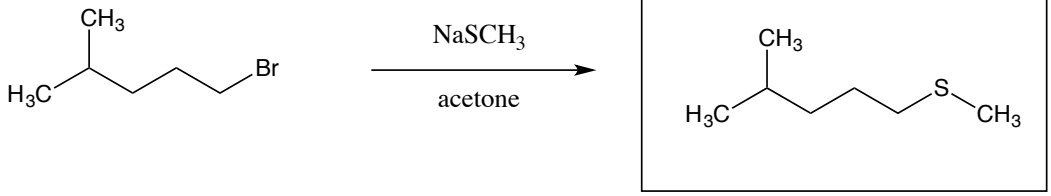
B

b) Which compound is more stable? Briefly explain your reasoning.

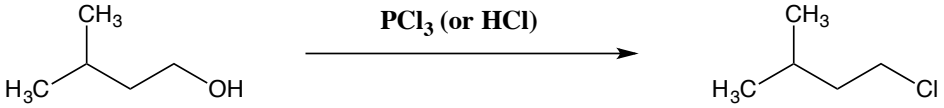
Compound B is more stable because all of the substituents are equatorial (fewer gauche/steric interactions).

Question 8. Supply the missing reagents or products to most efficiently complete the following substitution reactions. Multiple reagents/steps may be needed.

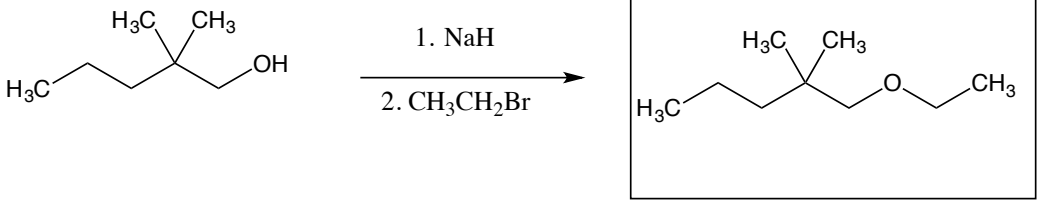
a)



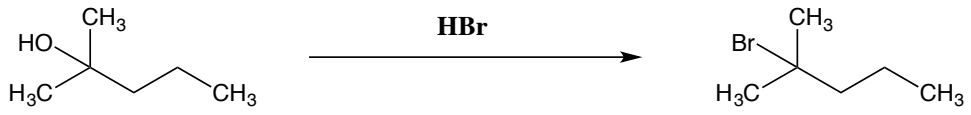
b)



c)



d)



Question 9. Provide a complete mechanism for the following transformation. *Don't skip any mechanistic steps, including H^+ transfers. Draw all intermediates and resonance structures.*