

Chemistry 325
Fall, 2008
Examination #3
VERSION A
Friday, December 5, 2008

The time limit for this examination is 50 minutes. The maximum score possible for this examination is 100 points. You may use molecular models. Where it is important, points are specifically allocated to stereochemistry.

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NAME:

SECTION I. Nomenclature [10 pts]

1. Draw the structure of Z-1-cyclopentyl-1-bromo-1,5-hexadiene [5 pts].

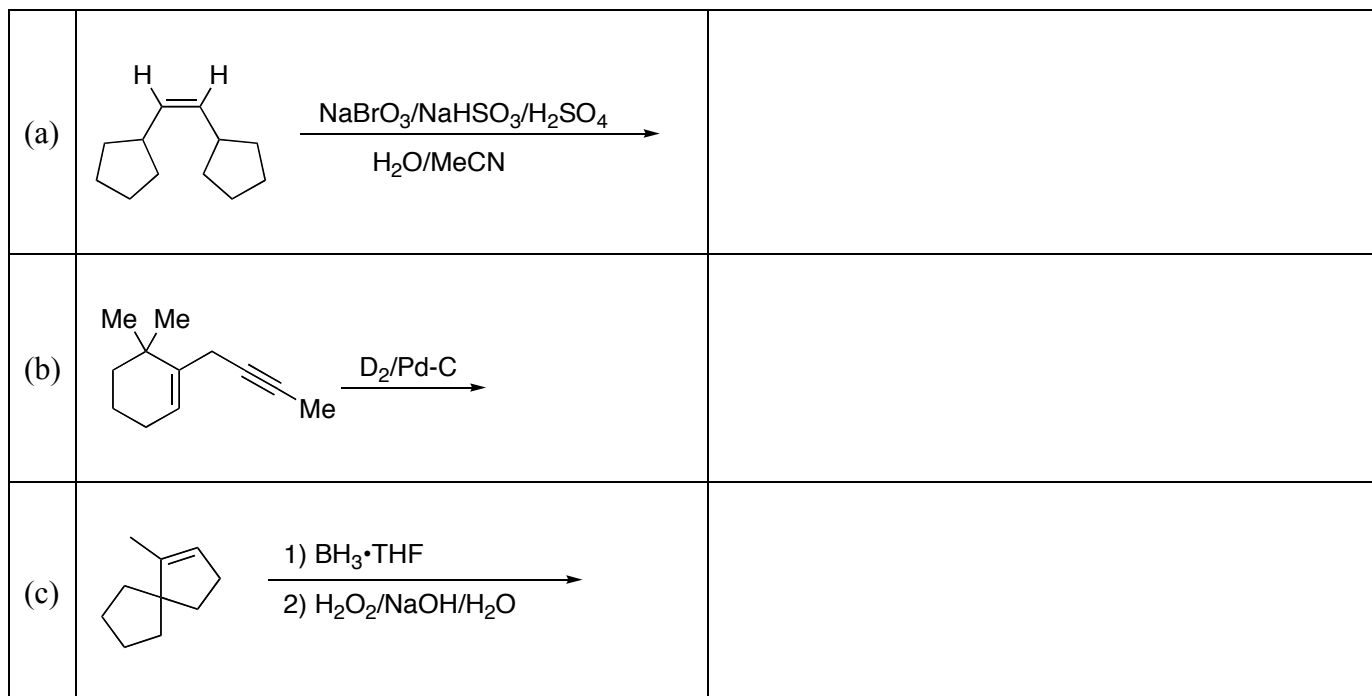


2. Write a correct name for the following compound [5 pts]:



SECTION II. Reactions and Theory [85 pts]

3. [5 pts each; 40 pts.] Complete the following reactions by drawing the structure of the major organic product. Where the product is a racemate, draw only one enantiomer of the product.



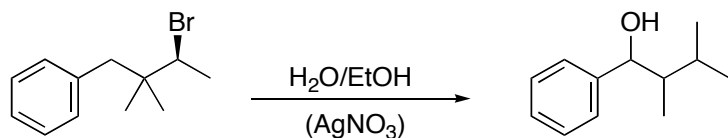
(d)	 <chem>CC1(Br)CC=C1</chem> $\xrightarrow[\text{H}_2\text{O/EtOH}]{\text{KOH } (10^{-5} \text{ M})}$	
(e)	 <chem>C1CCCCC1C#C</chem> $\xrightarrow[2) \text{ R-2-bromobutane}]{1) \text{ NaNH}_2/\text{THF}}$	
(f)	 <chem>C12CCC(CC1)C=C2</chem> $\xrightarrow{\text{OsO}_4/\text{Me}_3\text{C}-\text{O}-\text{OH}/\text{Me}_3\text{COH}}$	
(g)	 <chem>C#CC1=CC=CC=C1</chem> $\xrightarrow[\text{(HgSO}_4\text{)}]{\text{H}_2\text{SO}_4/\text{H}_2\text{O}}$	
(h)	 <chem>CC(C)=C[C@H](Br)CC</chem> $\xrightarrow{\text{NaSCH}_3/\text{DMF}/80^\circ\text{C}}$	

4. [5 pts each; 20 pts] Complete the following reactions by drawing the structure of the starting compound or providing the missing reagent. The molecular formula is given for some missing reactant alkenes. Note that stereochemistry may be important in some of these reactions.

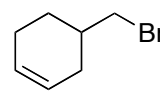
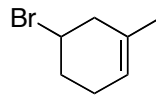
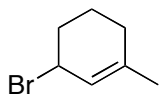
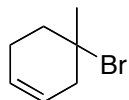
(a)	 <chem>CC(C)C1=CCCCC1</chem> \longrightarrow <chem>CC1(C)C(O)C(O)C2CCCC12</chem>	
(b)	 <chem>C#CC1=CC=CC=C1C2CCCC2</chem> \longrightarrow <chem>C=C(C1=CC=CC=C1)C2CCCC2</chem>	

(c)		
(d)		

5. [10 pts] Write a reasonable mechanism to account for the following transformation:



6. [5 pts.] Arrange the following alkyl halides in increasing order (slowest first, fastest last) of their reaction with sodium hydroxide in 50% EtOH-H₂O. **Draw the structures, don't just label them.**



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7. [15 pts] Design a reasonable synthesis of *Z*-2,7-dimethylocta-1,4,7-triene from hydrocarbons with 4 carbon atoms or less.