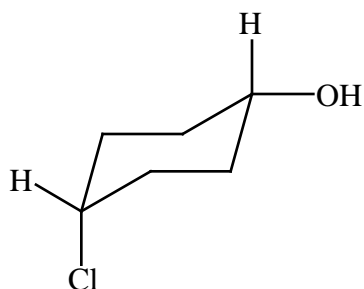
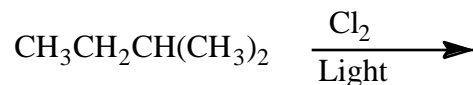


ORGANIC CHEMISTRY — CHEM 2210 — SECOND REVIEW EXAM — FALL 1999 - \*A\*

1. What is the IUPAC name of the compound shown?

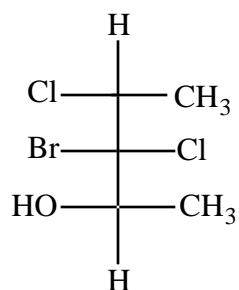


- A. *cis*-1-chloro-4-cyclohexanol  
 B. *cis*-4-chlorocyclohexanol  
 C. *trans*-1-chloro-4-cyclohexanol  
 D. *trans*-4-chlorocyclohexanol
2. Which of the following is NOT a product of the reaction shown?



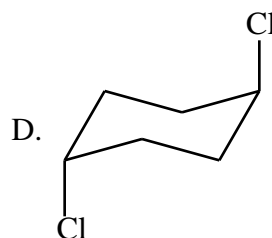
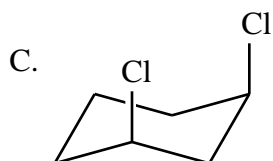
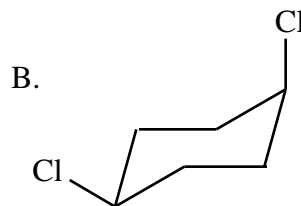
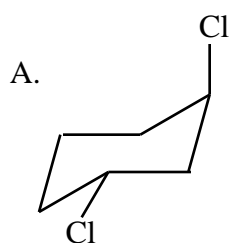
- A.  $\text{CH}_2\text{ClCH}_2\text{CH}(\text{CH}_3)_2$       C.  $\text{CH}_3\text{CHClCH}(\text{CH}_3)_2$   
 B.  $\text{CH}_3\text{CH}_2\text{CCl}(\text{CH}_3)_2$       D.  $\text{CH}_3\text{CH}_2\text{CCl}_2\text{CH}_3$

3. Give the IUPAC name of :



- A. (2R,3S,4S)-3-bromo-3,4-dichloro-2-pentanol  
 B. (1R,2R,3R)-2-bromo-2,3-dichloro-1,3-dimethyl-propanol  
 C. (1R,2S,3R)-2-bromo-1,2-dichloro-1,3-dimethyl-3-propanol  
 D. (2R,3S,4R)-3-bromo-3,4-dichloro-2-pentanol

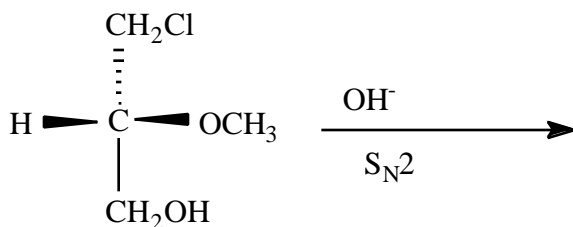
4. Which of the following compounds is chiral?



5. Which of the following compounds reacts the FASTEST as a substrate in an  $S_N1$  reaction?

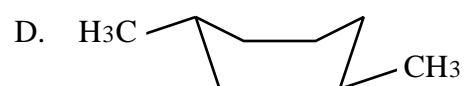
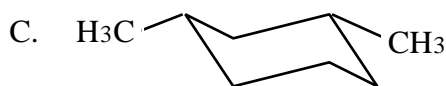
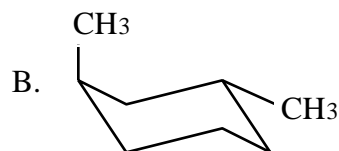
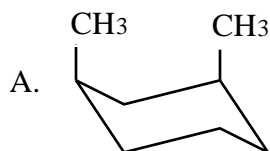
A.  $(C_6H_5)_3COH$     B.  $(C_6H_5)_3Cl$     C.  $(C_6H_5)_3CSH$     D.  $(C_6H_5)_3CCl$

6. Which of the following statements is true about the following reaction?

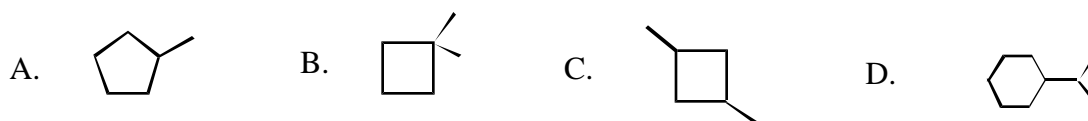


- A. The product will have R configuration.
- B. The product will not have a stereocenter.
- C. The product will have S configuration.
- D. The reaction will happen with racemization.

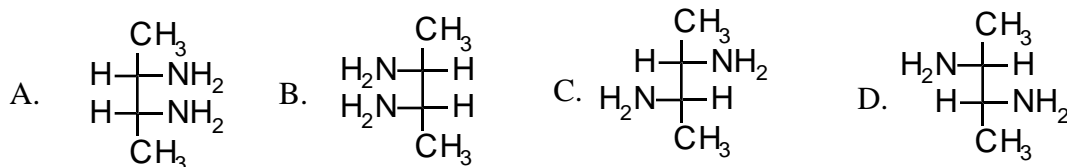
7. Which of the following is the most stable conformation of *cis*-1,3-dimethylcyclohexane?



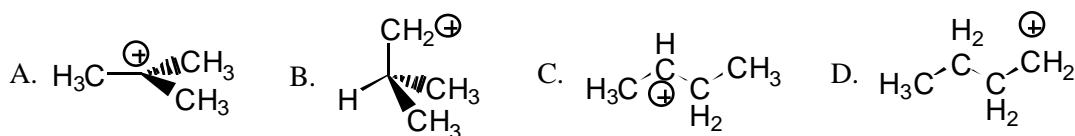
8. Which of these cycloalkanes shows *cis-trans* isomerism?



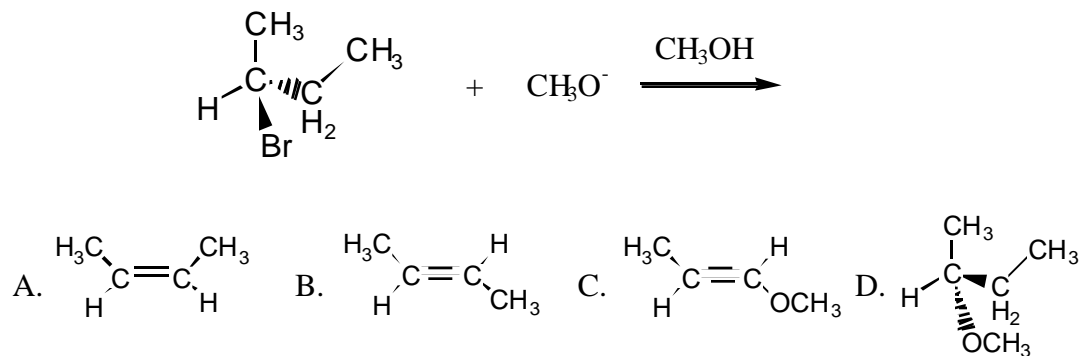
9. Which of the following is (2R,3R)-2,3-diaminobutane?



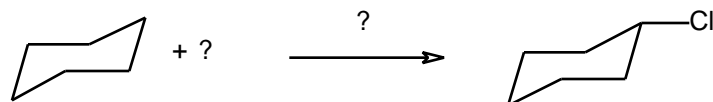
10. Which of the following is the most stable carbocation having the molecular formula  $C_4H_9^+$ ?



11. Which of these structures is NOT the product of the following reaction?

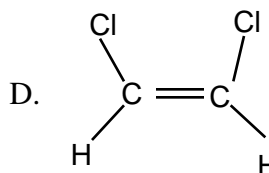
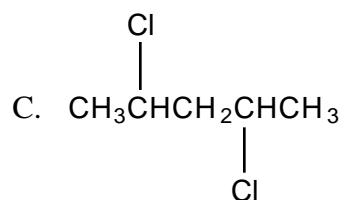
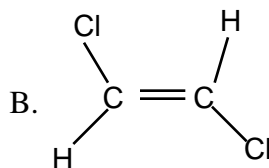
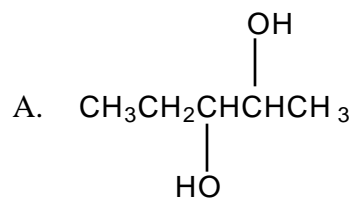


12. Which of the following sets of reagents and conditions will complete the following reaction?

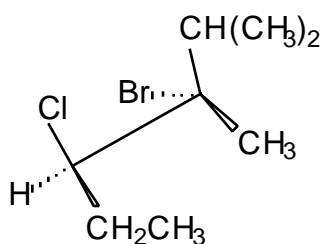


- A.  $Cl_2$ , Ni or Pt catalyst
- B. aqueous HCl, heat
- C.  $CH_3Cl$ , light
- D.  $Cl_2$ , light

13. Which of the following compounds has a *meso* stereoisomer?



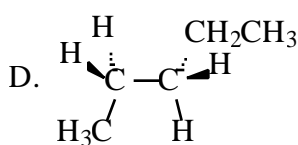
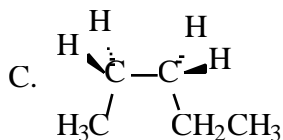
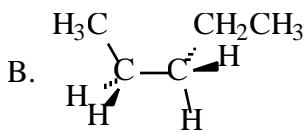
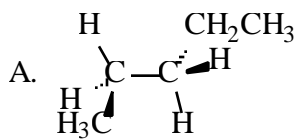
14. Consider the following molecule:



If Br and CH<sub>3</sub> group switch their places, what would the relationship between the new molecule and the one above be?

- A. Constitutional isomers
- B. Same compound
- C. Enantiomers
- D. Diastereomers

15. Which of the following structures is the LEAST stable?



16. Which of the following conditions are suitable for the synthesis of 2,2-dimethylbutane?

- I.  $\text{CH}_3\text{CH}_2\text{Br}$  with Li, then CuI, then  $(\text{CH}_3)_3\text{C-Br}$
- II.  $(\text{CH}_3)_3\text{CCH}_2\text{-Br}$  with Li, then CuI, then  $\text{CH}_3\text{Br}$
- III.  $(\text{CH}_3)_3\text{C-Br}$  with Li, then CuI, then  $\text{CH}_3\text{CH}_2\text{Br}$

A. I and II only    B. I and III only    C. II and III only    D. II only

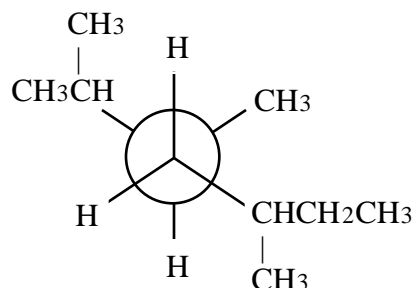
17. A particular sample of compound Z containing a mixture of the R and S enantiomers has a specific rotation of +15.0 degrees. The specific rotation of the pure S enantiomer of compound Z is -50.0 degrees. What is the % optical purity of this sample, and how much of the S enantiomer is present?

A. 70%, 30% S    B. 30%, 35% S    C. 30%, 65% S    D. 35%, 70% S

18. Which of the following is a feature of an E2 reaction?

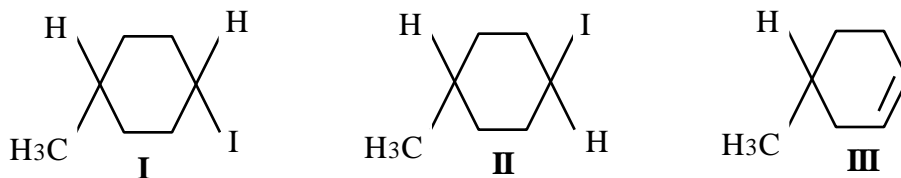
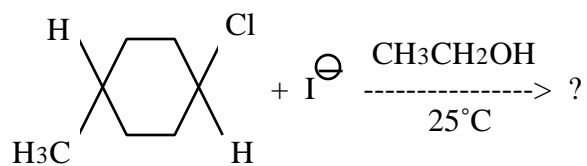
- A. The rate of reaction depends on the concentration of base.
- B. It is a two step process.
- C. It goes via a reactive intermediate.
- D. It is faster in more polar solvents.

19. What is the name of the compound shown?



- A. 2-ethyl-4,5-dimethylhexane
- B. 5-ethyl-2,3-dimethylhexane
- C. 3,5,6-trimethylheptane
- D. 2,3,5-trimethylheptane

20. What will be the major product(s) of the following reaction?

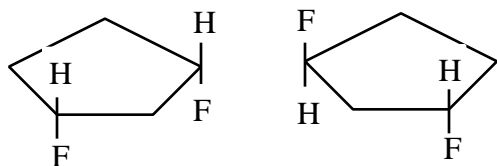


A. I only    B. II only    C. III only    D. Equal amounts of I and II

21. The reaction of 2-methylbutane with chlorine in the presence of UV light will yield \_\_\_ compounds (including stereoisomers) of molecular formula  $\text{C}_5\text{H}_{11}\text{Cl}$ , of which \_\_\_ are optically active. The total number of fractions that can be isolated by distillation is \_\_\_.

A. 4, 2, 4    B. 6, 4, 4    C. 6, 4, 2    D. 4, 4, 4

22. What is the relationship between the structures shown?

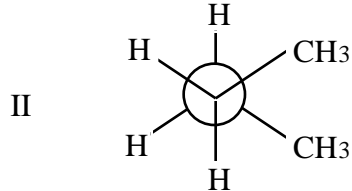
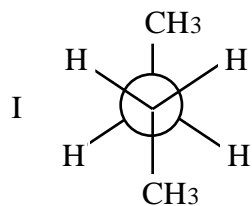


A. Enantiomers  
 B. Diastereomers  
 C. Same compound  
 D. Structural isomers

23. Molecule A is the enantiomer of molecule B. Molecule B is a stereoisomer of molecule C but NOT its mirror image. What is the relationship between A and C?

A. Same compound    B. Enantiomers    C. Diastereomers    D. Constitutional isomers

24. Which of the following statements about the relative stabilities of the structures shown is TRUE?



- A. II has more steric strain.  
 B. II has more torsional strain.  
 C. I has more steric strain.  
 D. I has more torsional strain.
25. While studying the reaction
- |                                    | [RBr] | [CH <sub>3</sub> ONa] | Relative Rate |
|------------------------------------|-------|-----------------------|---------------|
| below, a chemist obtained the      | 0.01  | 0.01                  | 1             |
| rate data shown at right. What     | 0.01  | 0.02                  | 2             |
| is the mechanism of this reaction? | 0.02  | 0.01                  | 2             |
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{CH}_3\text{ONa} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_3 + \text{NaBr}$
- A. SN1    B. SN2    C. E1    D. E2