



THE UNIVERSITY OF
TOLEDO
1872

CHEM 2410 – Organic Chemistry I

CHEM 2410 Fall 2017 – Mid-Term Exam 2 10-25-17

Time: 5:30pm – 6:30pm

Student Name: _____

Student Number: _____

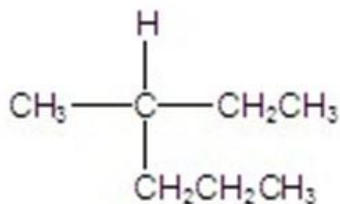
Instructor: Prof. Andreana
Room #: WO 1205

Exam #2 Chem 2410

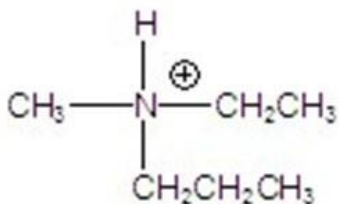
Multiple Choice

Identify the choice that best completes the statement or answers the question.

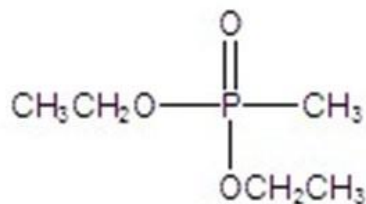
1) Which of the following compounds has an asymmetric center?



A



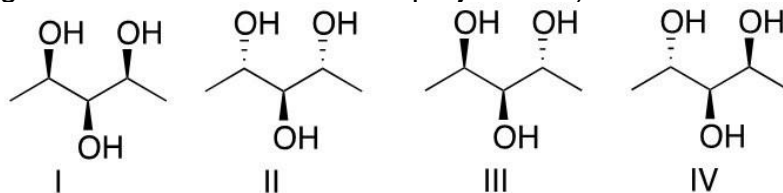
B



C

- A) A
- B) B
- C) C
- D) A and B
- E) A, B, and C

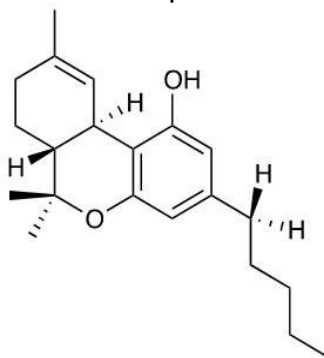
2) Which of the following compounds will not rotate the plane of polarization of plane-polarized light? (Hint: You might want to convert to Fisher projections.)



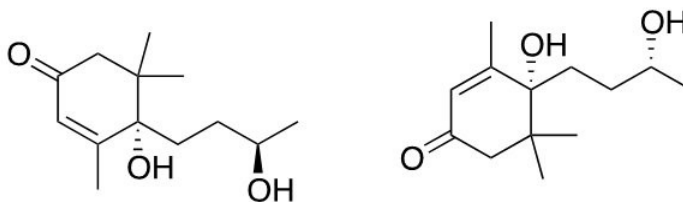
- A) I and II
- B) III and IV
- C) I and III
- D) I and IV
- E) all of the above

3) How many chiral stereocenters are in the compound shown below?

- A) 2
- B) 3
- C) 4
- D) 5
- E) 6

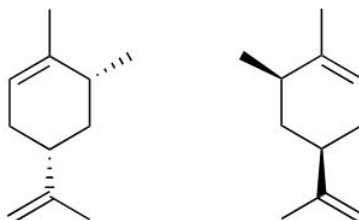


4) What is the relationship between the compounds shown below?



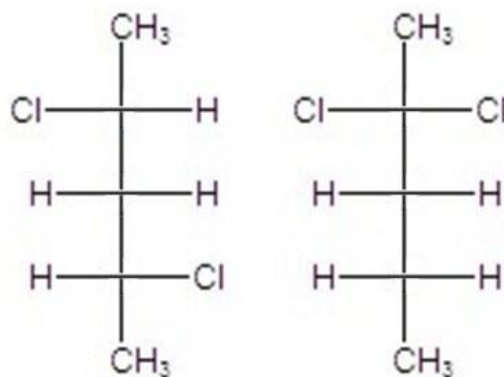
- A) constitutional isomers
- B) identical compounds
- C) enantiomers
- D) diastereomers
- E) meso compounds

5) What is the relationship between the compounds shown below?



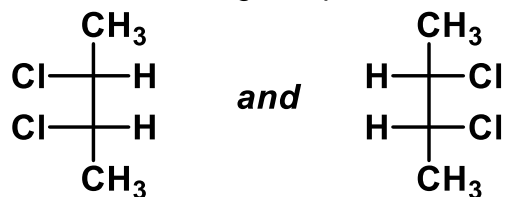
- A) constitutional isomers
- B) identical compounds
- C) enantiomers
- D) diastereomers
- E) meso compounds

6) What is the relationship between the following compounds?



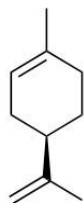
- A) identical
- B) conformers
- C) constitutional isomers
- D) configurational isomers
- E) none of the above

7) What is the relationship between the following compounds?

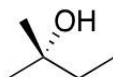


- A) enantiomers
- B) diastereomers
- C) constitutional isomers
- D) conformational isomers
- E) identical compounds

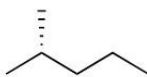
8) Which of the following molecules will rotate the plane of polarization of plane-polarized light?



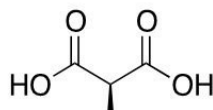
I



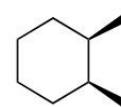
II



III



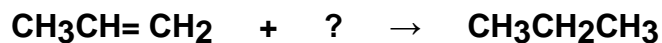
IV



V

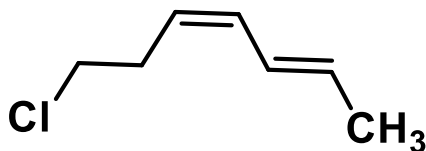
- A) I
- B) II
- C) III
- D) IV
- E) V

9) Which of the following reagents is required for the reaction shown below?



- A) H_2/HCl
- B) $\text{H}_2/\text{H}_2\text{SO}_4$
- C) $\text{H}_2, \text{Pd/C}$
- D) $\text{H}_2\text{O}/\text{Ni}$
- E) $\text{H}_2\text{O}/\text{H}_2\text{SO}_4$

10) Name the following compound:



- A) (2*E*,4*E*)-7-chloro-2,4-heptadiene
- B) (2*Z*,4*E*)-7-chloro-2,4-heptadiene
- C) (2*Z*,4*Z*)-7-chloro-2,4-heptadiene
- D) (2*E*,4*Z*)-7-chloro-2,4-heptadiene
- E) 7-chloro-2,4-heptadiene

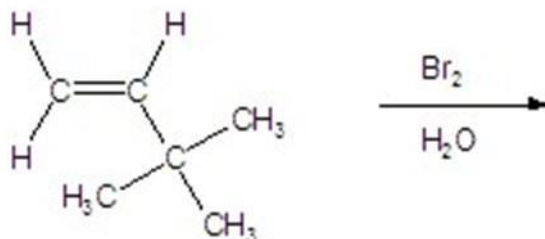
11) What is (are) the major organic product(s) obtained from the following reaction?



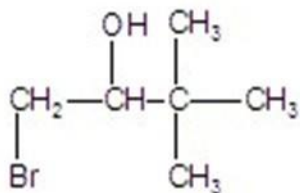
- 1. (2*R*,3*R*)-dibromobutane
- 2. (2*S*,3*S*)-dibromobutane
- 3. *meso*-2,3-dibromobutane

- a. only 1
- b. only 2
- c. only 3
- d. only 1 and 2

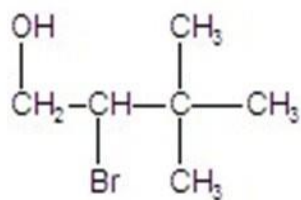
12) What is the **major** product of the following reaction?



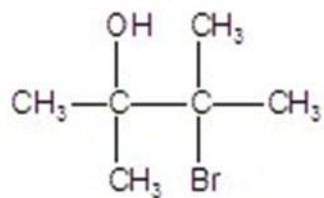
A)



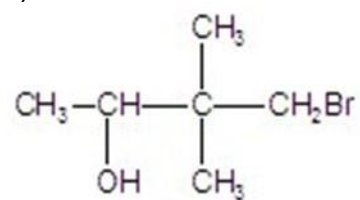
B)



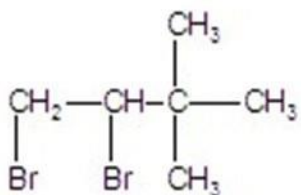
C)



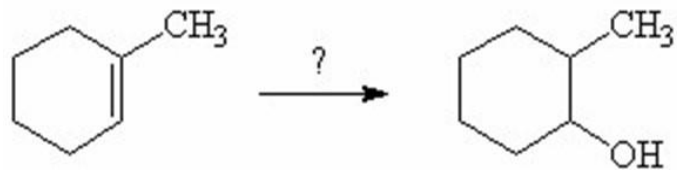
D)



E)



13) What reagents are needed to accomplish the following reaction?



A) $\text{H}_2\text{O}/\text{H}^+$

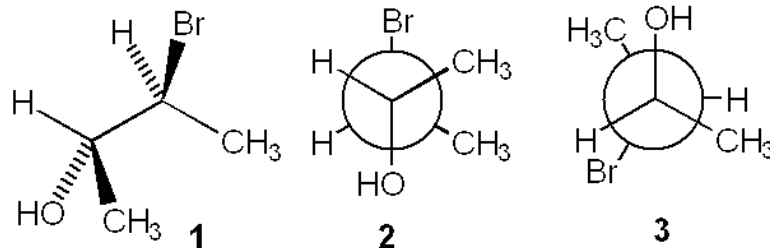
B) $\text{H}_2\text{O}/\text{Peroxide}$

C) OH^-

D) BH_3

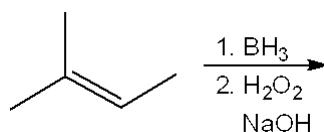
E) 1) BH_3 2) HO^- , H_2O_2 , H_2O

14) Which of the following structures represent the same stereoisomer?



- only 1 and 2
- only 1 and 3
- only 2 and 3
- 1, 2 and 3

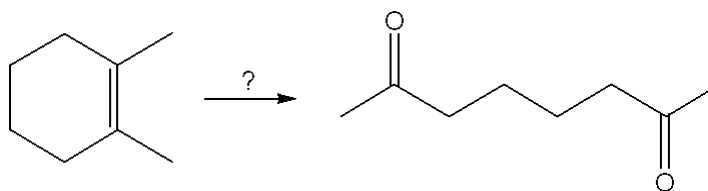
15) What is (are) the major organic product(s) obtained from the following reaction?



- (*R*)-3-methyl-2-butanol
- (*S*)-3-methyl-2-butanol
- 2-methyl-2-butanol

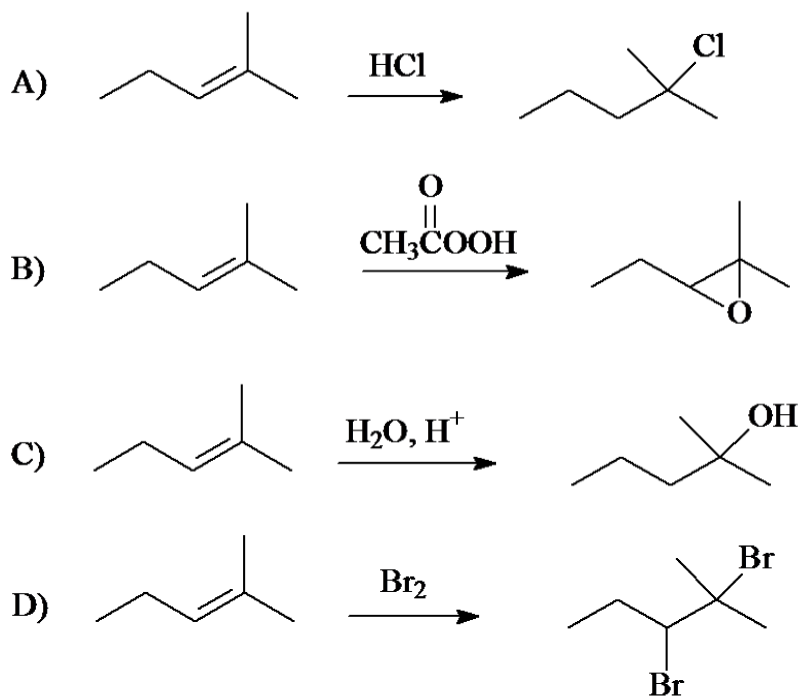
- only 1
- only 2
- only 3
- only 1 and 2

16) What is the best choice of reagent(s) to perform the following transformation?



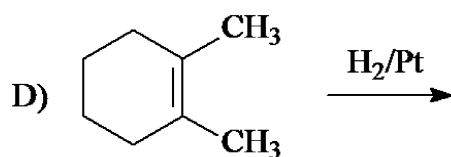
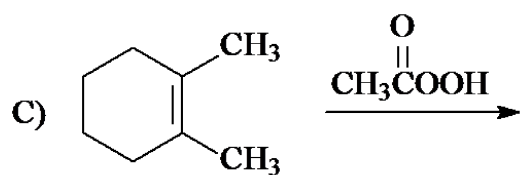
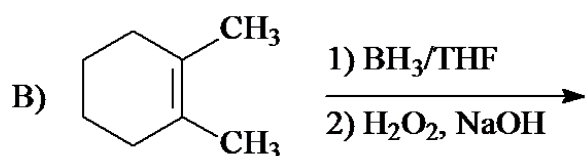
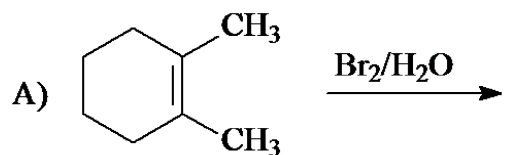
- O₃; followed by (CH₃)₂S
- Hg(OAc)₂ and H₂O; followed by NaBH₄
- BH₃; followed by H₂O₂, NaOH
- OsO₄; followed by NaHSO₃

17) Which of the following reactions occurs by a one-step mechanism as opposed to a two-step mechanism?



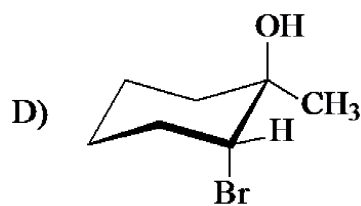
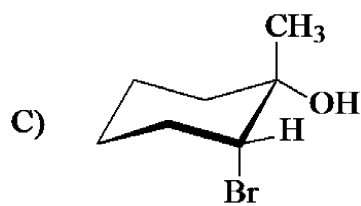
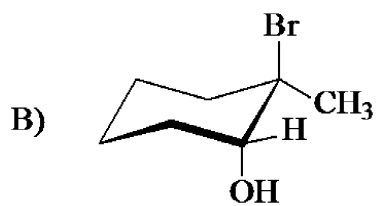
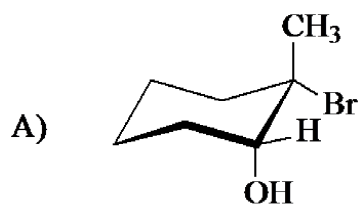
- A
- B
- C
- D

18) Which reaction proceeds by an overall net *anti* addition?



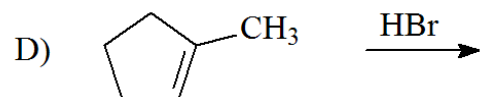
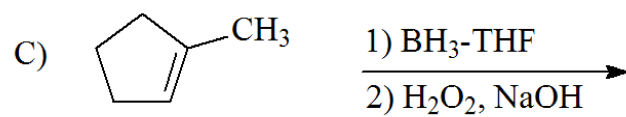
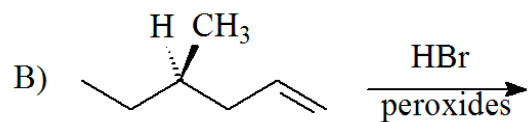
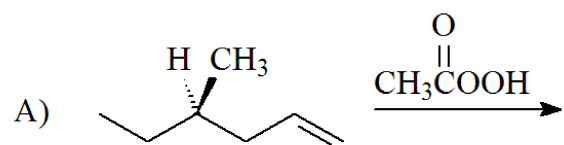
A
B
C
D

19) Addition of Br₂ and H₂O to 1-methylcyclohexene gives:



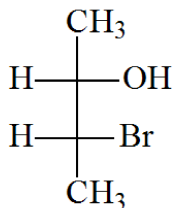
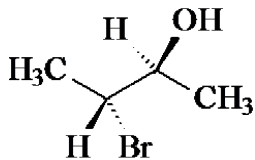
A
B
C
D

20) Which reaction below gives only enantiomers of a chiral product?

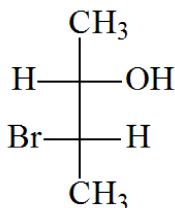


- A
- B
- C
- D

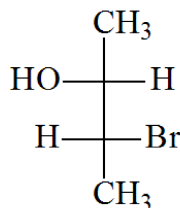
21) Which of the following Fischer projections corresponds to the compound shown below?



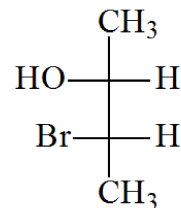
A)



B)



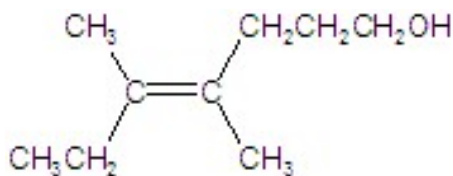
C)



D)

- A
- B
- C
- D

22) Name the structure. NB - The alcohol takes priority over the olefin.



- A) Z-4,5-dimethyl-4-hepten-1-ol
- B) E-3,4-dimethyl-3-hepten-7-ol
- C) Z-3,4-dimethyl-3-hepten-7-ol
- D) E-4,5-dimethyl-4-hepten-1-ol
- E) (1S)-E-4,5-dimethyl-4-heptenol

23) What configurations are found in the product(s) of the reaction below?



- A) 1R,2R only
- B) 1S,2S only
- C) 1R,2S only
- D) an equal mixture of 1R,2R and 1S,2S
- E) an equal mixture of 1R,2R and 1R,2S