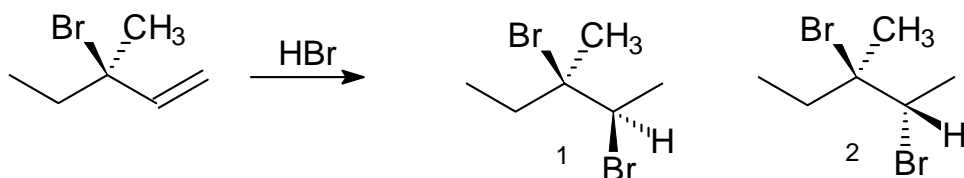


6. The addition of HBr to (R)-3-bromo-3-methyl-1-pentene was found to generate mostly compound 1, and less of compound 2. What does this outcome exemplify?



- A. chiral resolution B. chiral induction C. racemization D. optical rotation
E. levorotation

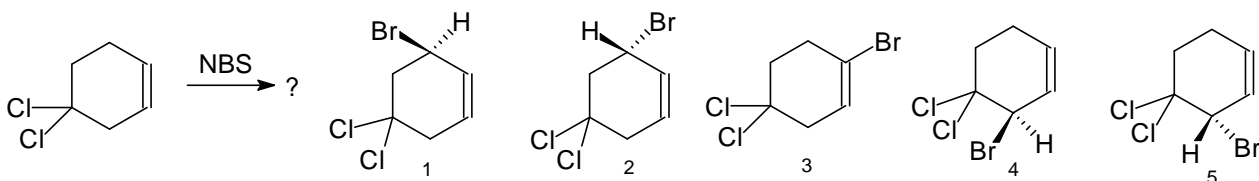
7. What does the reaction of (Z)-2-butene with bromine produce?

- A. (R,R)-2,3-dibromobutane B. racemic 2,3-dibromobutane C. meso-2,3-dibromobutane
D. 2,3-dibromobutane (compound lacks stereoisomers) E. (Z)-2,3-dibromobutene

8 A chemist places an order for “diphenylethene” and “diphenylethyne”, but his assistant doesn’t know which isomers of each are needed and orders all of them. How many compounds are on order?

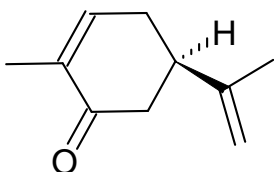
- A. 2 B. 3 C. 4 D. 5 E. 6

9. Which for the following 1-5 are plausible products of the allylic halogenation of 4,4-dichlorocyclopentene?



- A. only one B. two of them C. three of them D. four of them E. all of them

10. Shown below is the formula for (R)-carvone, which melts at 25.2° and gives spearmint its characteristic odor. Select the most appropriate statement.

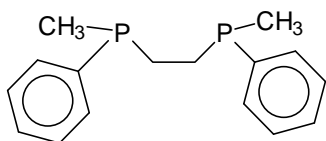


- A. As an R enantiomer, this compound has a positive chiral rotation
B. As an R enantiomer, this compound has a negative chiral rotation
C. (S)-carvone will also melt at 25.2 °
D. This compound is a *meso* form
E. (S)-carvone also will smell like spearmint

11. An angle of rotation α_1 has been measured for a solution of (R)-2-chlorooctane in hexane, by placing it in a 1 dm long tube and shining polarized light with a wavelength of 400 nm through it. The experiment was repeated by using light with a wavelength of 800 nm and leaving everything else the same, to produce a second angle α_2 . What can we say about this experiment?

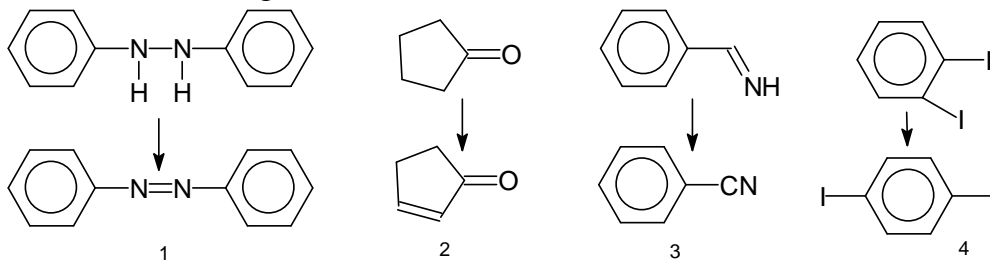
- A. We have all information needed to reproduce it and confirm the values reported for α_1 and α_2
 B. α_1 and α_2 will have the same value, but be opposite in sign
 C. α_2 will be twice the value of α_1 D. If α_1 is positive, then α_2 also must be positive
 E. Even if we know α_1 , there is no reliable way to predict α_2 and we need to measure it.

12. The organophosphorous compound below has been tested as a ligand for new types of catalysts. Which stereoisomers exist of this compound?



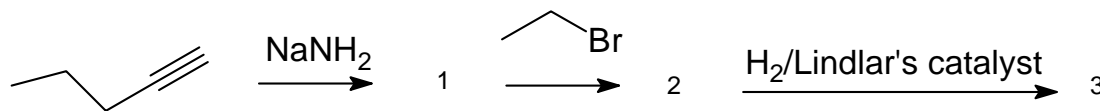
- A. none, this compound is achiral B. R,R; S,S and a meso form
 C. R,R; S,S; S,R and R,S D. R and S E. R, S and a meso form

13. Are the following reactions oxidations, reductions, or neither?



- A. 1 and 2 are oxidations, 3 and 4 reductions B. 1, 2 and 3 are oxidations, 4 is neither
 C. 2 and 3 are oxidations, 1 and 4 reductions D. 1 and 2 are oxidations, 3 and 4 neither
 E. All of them are oxidations

14. Complete the following reaction scheme, then decide what compound 3 is. Is it...



- A. *cis*-3-heptene B. 3-pentyne C. 3-ethyl-1-pentyne D. *trans*-3-heptene
 E. none of the previous

15. Complete the following reaction scheme, then decide what compound 3 is. Is it...



- A. Benzoic acid B. (R,R)-1,2-dibromo-1,2-diphenylethane C. *trans*-1,2-diphenylethene
 D. (S,S)-1,2-dibromo-1,2-diphenylethane E. *cis*-1,2-diphenylethene

Key:

1. C
2. C
3. E
4. C
5. E
6. B
7. B
8. C
9. D
10. C
11. E
12. B
13. B
14. A
15. A

Comments

qu. 2: possible isomers are 1,1; (R,S)-1,2; (R,R)-1,2; (S,S)-1,2; *cis*-1,3; *trans*-1,3

qu. 3: *trans*-cyclooctene can occur as two enantiomers (build a model!)

qu. 8: for diphenylethene, 1,1; *cis*-1,2; *trans*-1,2; There is only one diphenylethyne

qu. 11: We can't repeat the experiment until we know the concentration and the temperature of the solution

qu. 14: 1 is the sodium salt of 1-pentyne, 2 is 3-heptyne

qu. 15: 1 is (R)-1-bromo-1,2-diphenylethane, 2 is *trans*-1,2-diphenylethene