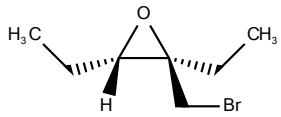
Organic Chemistry Practice Problems

Organic Chemistry I Practice Set #9 (Chapters 7 – Carey)

1) For each of the given compounds, provide a name. Use stereochemistry appropriately.

(a)



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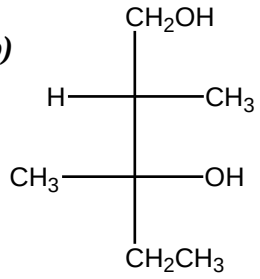
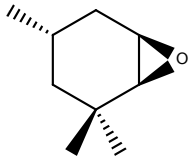


(c)



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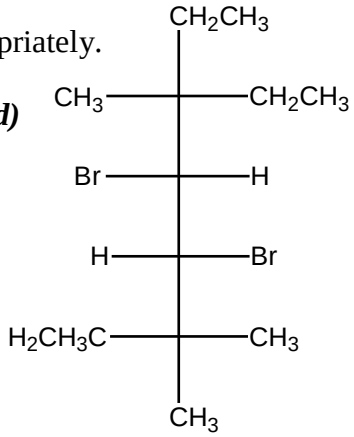
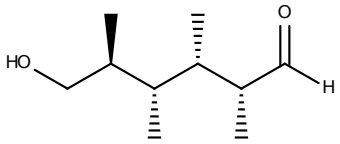


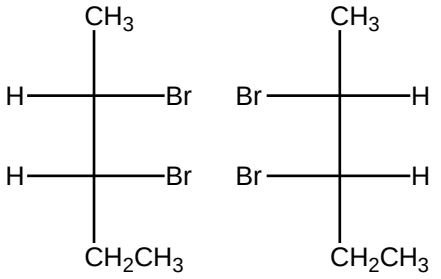
(e)



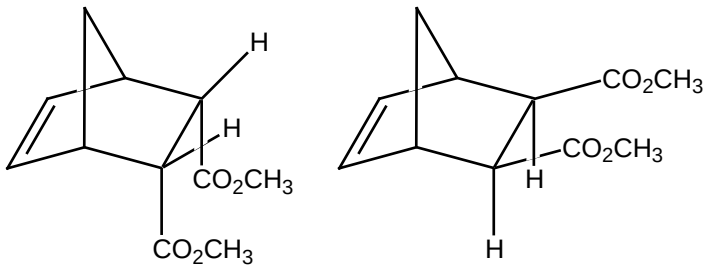
2) For this problem, consider the structural formula given in ***problem 1e***.
(a) Does it represent a D or L sugar?
(b) Represents: ***(i)*** aldopentose; ***(ii)*** aldohexose; ***(iii)*** ketopentose; ***(iv)*** ketohexose ?
(c) Give a Fischer projection of it in standard orientation for a sugar.
(d) Give a Fischer projection of a compound that is an ***epimer*** of compound ***1e and a D sugar***
(e) Give a Fischer projection of a compound that is an ***epimer*** of compound ***1e and a L sugar***
(f) Give a Fischer projection of a compound that is a ***diastereomer***, but ***not an epimer*** of compound ***1e and a D sugar***
(g) Same as above, ***make it a L sugar***
(h) Give a Fischer projection of the compound that is ***the enantiomer of compound 1e***.

3) Describe the relationship of each pair of molecules: ***(a)*** same molecule ***(b)*** constitutional isomers ***(c)*** diastereomers ***(d)*** enantiomers

(a)



(b)



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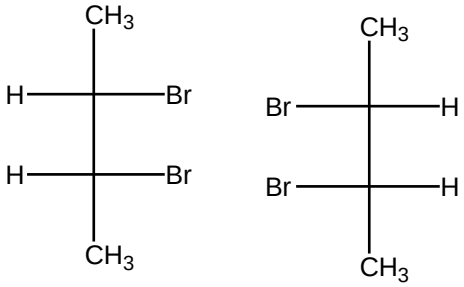
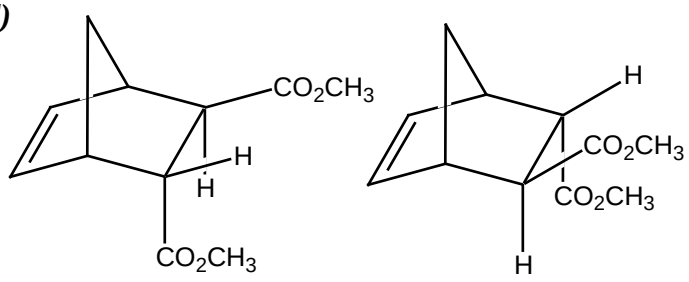


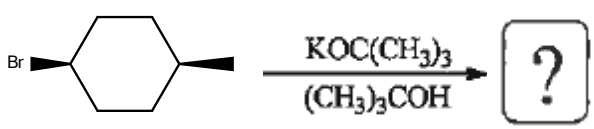
(d)

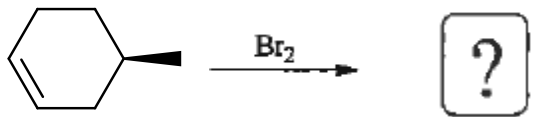


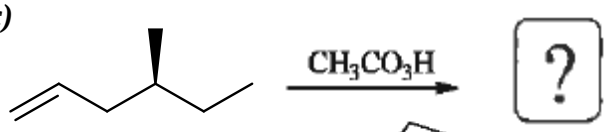
Adapted from practice handouts created by Dr. EF Hilinski of Florida State University

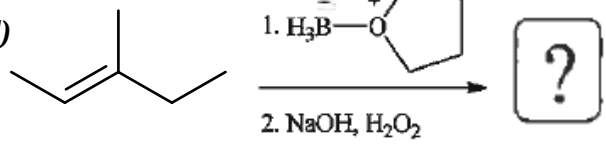
Organic Chemistry Practice Problems

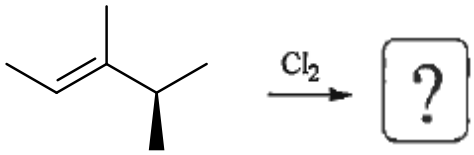
4) Fill in what is missing. Either give all of the missing reagents to complete the reaction or give a structural formula for the ***major organic product(s).*** Show stereoisomers properly if necessary. If no reaction occurs, write ***N.R. Each starting compound is the pure stereoisomer shown.***

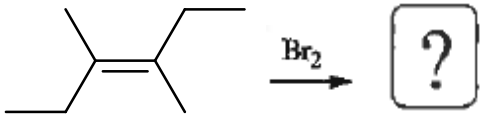
(a) 

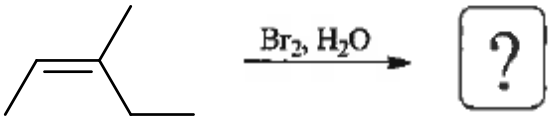
(b) 

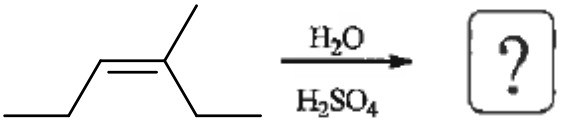
(c) 

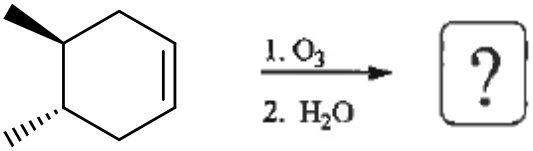
(d) 

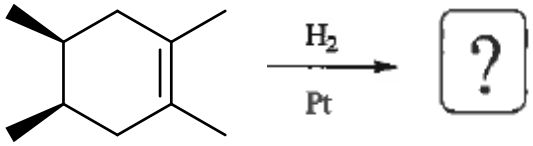
(e) 

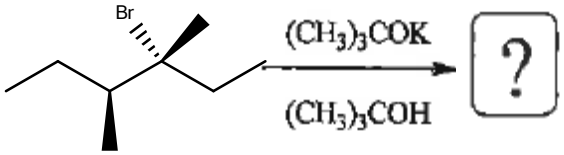
(f) 

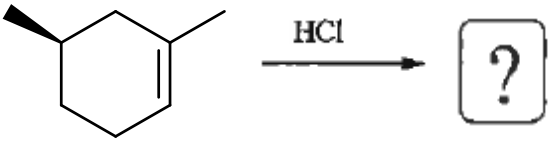
(g) 

(h) 

(i) 

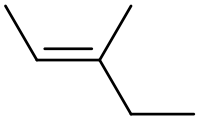
(j) 

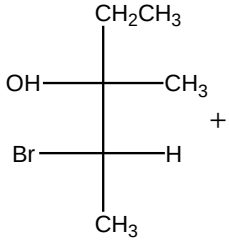
(k) 

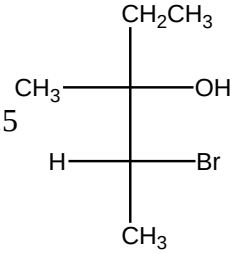
(l) 

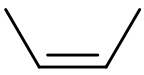
IMPORTANT NOTE for above problem! If there is a mixture of isomers for the major product, put both. Write "equal" if they are formed in equal amounts and "unequal" if they are formed in unequal amounts.

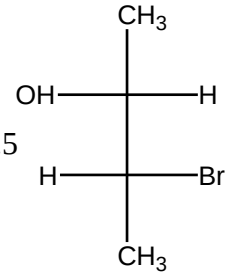
5) Using arrows to show the flow of electrons, write a stepwise mechanism for each of the following reactions. Show clearly how the final stereoisomeric products are formed.

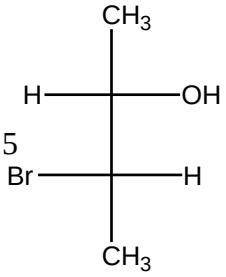
(a) 

+ Br_2 + H_2O → 0.5 

+ 0.5 

(b) 

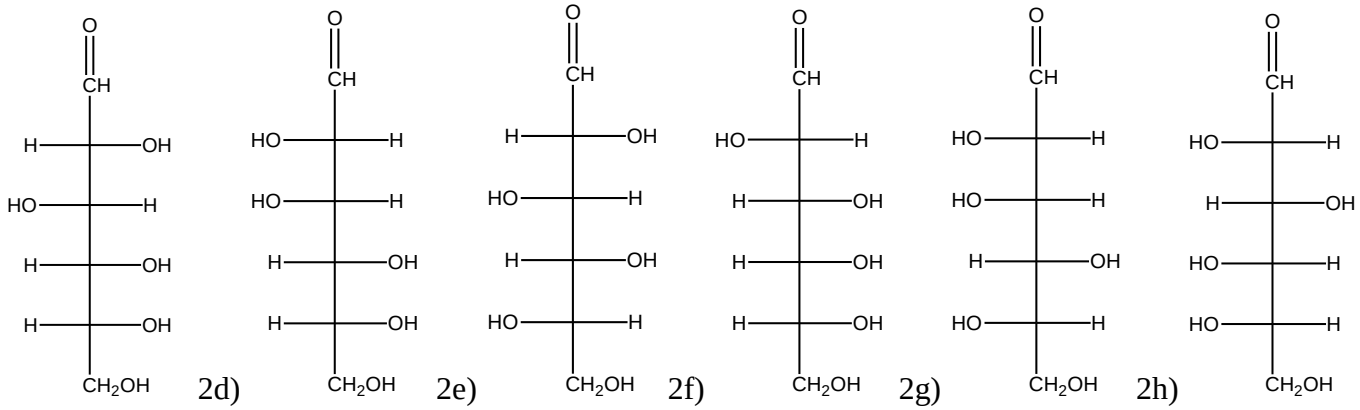
+ Br_2 + H_2O → 0.5 

+ 0.5 

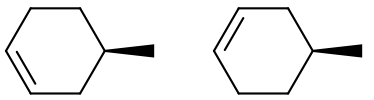
Organic Chemistry Practice Problems

Organic Chemistry I Answers to Practice Set #9 (Chapters 7 – Carey)

1a) (2R,3S)-2-(bromomethyl)-2,3-diethyloxirane 1b) (2S,3R)-2,3-dimethylpentane-1,3-diol
1c) (2S,3R,5S)-2,3-epoxy-1,1,5-trimethylcyclohexane 1d) (4R,5R)-4,5-dibromo-3-ethyl-3,6,6-trimethyloctane
1e) (2R,3S,4R,5R)-2,3,4,5,6-pentahydroxyhexanal 2a) D sugar 2b) ii 3a) iv 3b) iii 3c) i 3d) iv

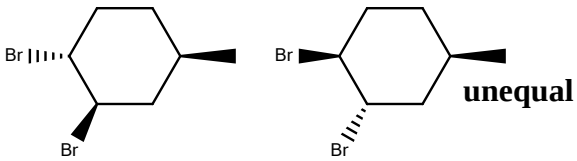


4a)



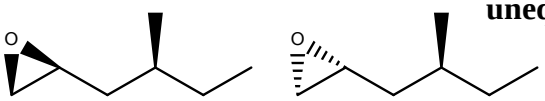
equal

4b)



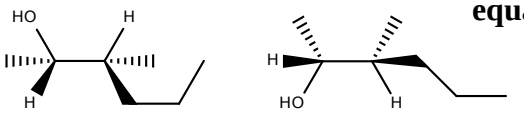
unequal

4c)



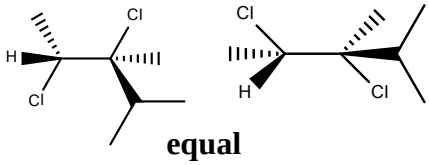
unequal

4d)



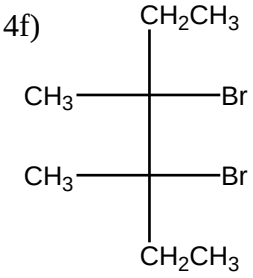
equal

4e)

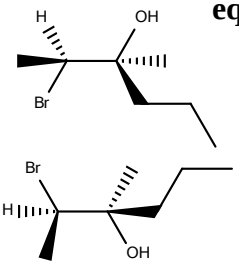


equal

4f)

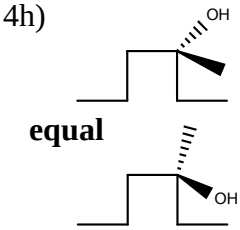


4g)



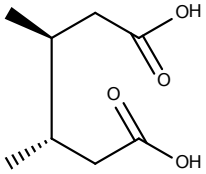
equal

4h)

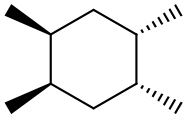


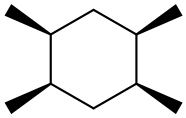
equal

4i)



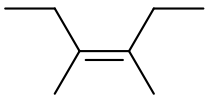
4j)



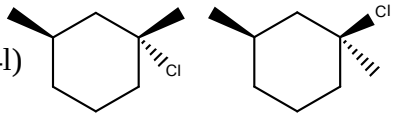


unequal

4k)



4l)

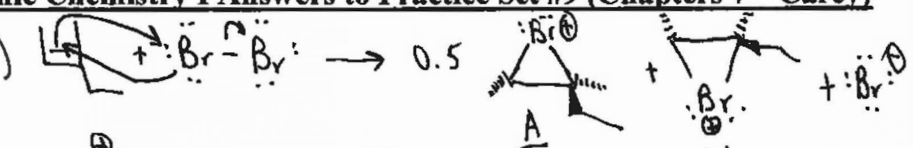


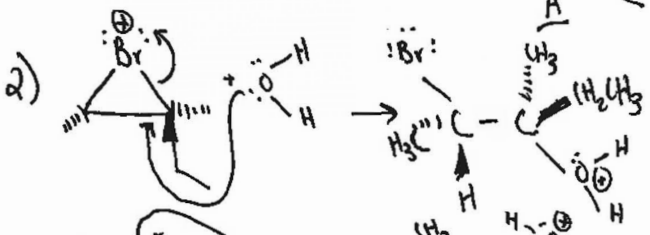
unequal

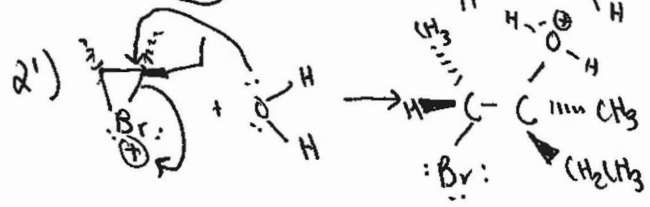
LE.ARNING
C0.M.!.vIONS

Organic Chemistry Practice Problems

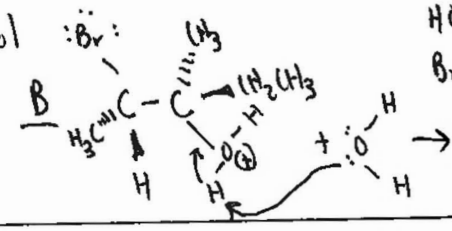
Organic Chemistry I Answers to Practice Set #9 (Chapters 7 – Carey)

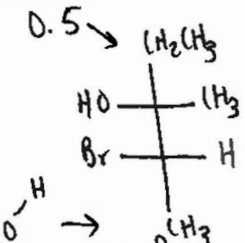
5a) 1) 

2) 

2') 

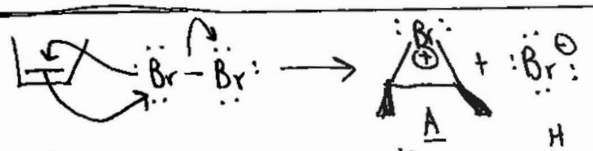
3) Proton-transfer to create alcohol
Both B and B' undergo
I will only show one



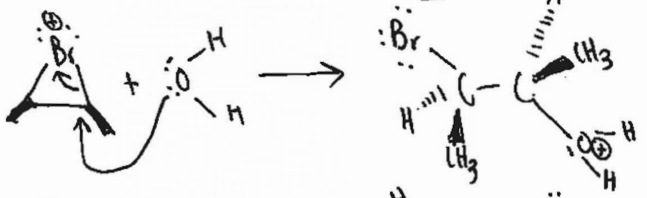


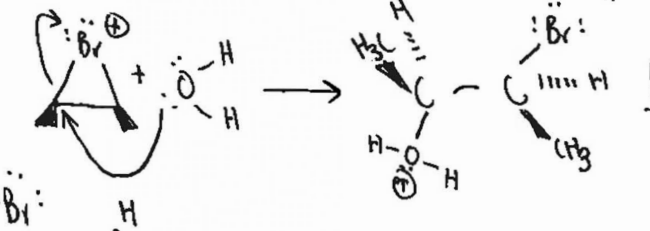
Final B'3

5b)

1) 

Water attacks each C in the ring of A with equal probability because both C's are identically substituted.

2) 

2') 

enantiomers

3)