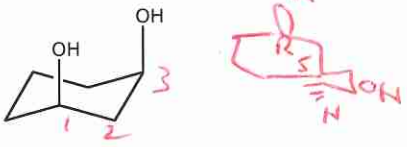
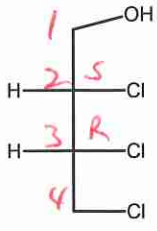
Organic 211 Test # 2 October 3, 2019

Name:_____

Directions: The test is worth 106 points but scored out of 100.

1) Give the name if given the structure or the structure if given the name for the following molecules. (3 pts. each)

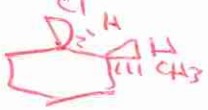
a) 

b) 

2S,3R-2,3,4-trichlorobutanal

Meso-1S,3R-cyclohexan-1,3-diol

c) 1R,2R-1-chloro-2-methylcyclohexane



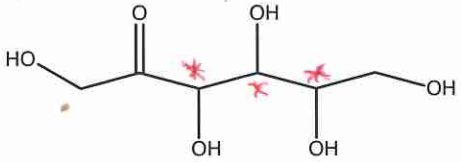
d) R-150

+90
R-240 ← fluorines
↑ hydrogens
two carbons

6 - 4 = 2 chlorines

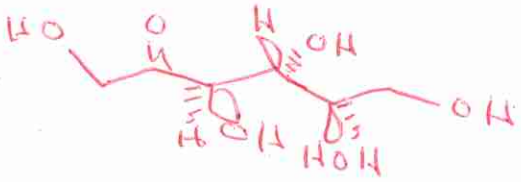
no letter means equal on each carbon

2) Given below is a 2-ketohexose. Answer the following questions using the ketohexose.



a) Identify the chiral centers in the molecule above with an asterisk. (3 pts.)

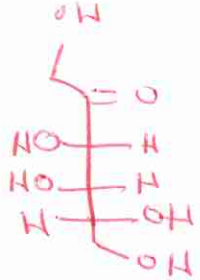
b) Give the all R configuration of the 2-ketohexose in a 3-D representation. (3 pts.)



c) Give a diasteromer of the stereoisomer in part b in a Fischer projection. (3 pts.)

6 different possibilities

SRR
RSR
RRS
SSR
RSS
~~RSR~~
SRS



3) Circle all [if any] of the true statements about melting points. (4 pts.)

a) (+)-tartaric and (-)-tartaric acid have the same melting point.
b) (+)-tartaric acid, (-)-tartaric acid and racemic tartaric acid have the same melting point.
c) (+)-tartaric acid, (-)-tartaric acid and meso tartaric acid have the same melting point.
d) meso-tartaric acid and racemic tartaric acid have the same melting point.

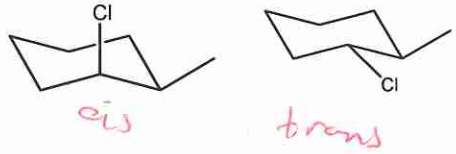
4) Indicate how the drawings for each letter are related. Your choices are meso/same, non-meso/same, enantiomers, diasteromers, constitutional isomers, conformational enantiomers. or no relation. (2 pts. each)

a) 

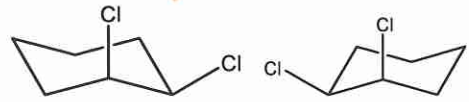
non-meso/same

b) 

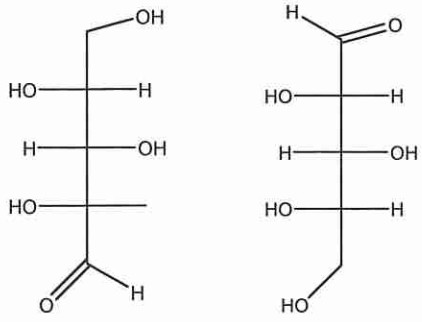
enantiomer

c) 

diasteromer

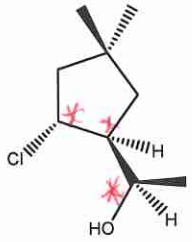
d) 

conformational enantiomer

e) 

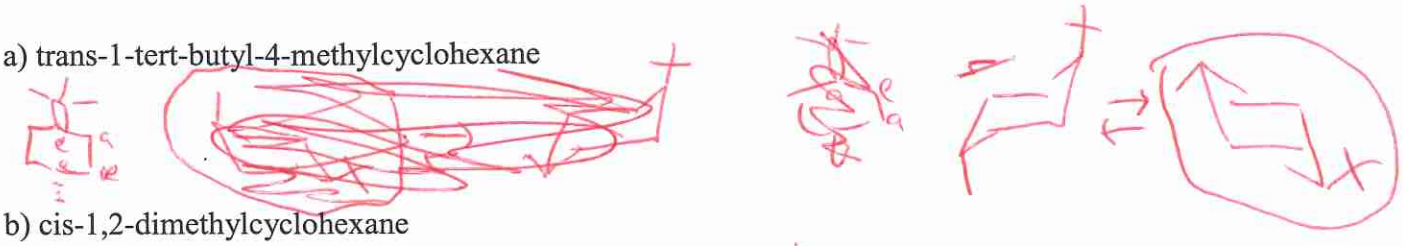
no relation

5) Indicate stereocenters (if any) with an asterisk in the following molecule. (4 pts.)



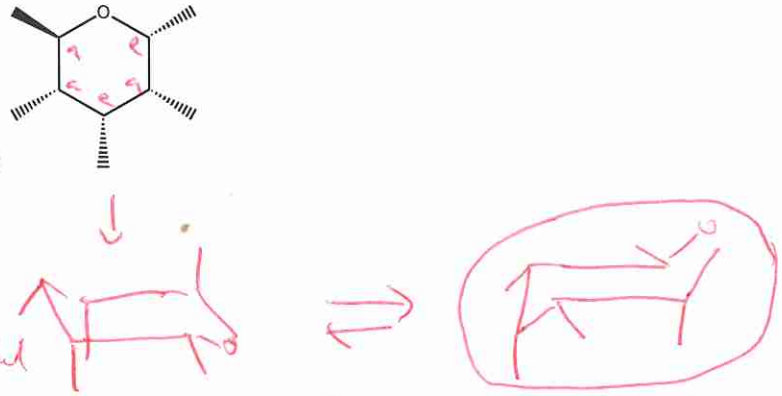
6) Draw both chair conformations of the following molecules circling the most stable conformation. If the conformations are equal, indicate this fact. (5 pts. each)

a) trans-1-tert-butyl-4-methylcyclohexane

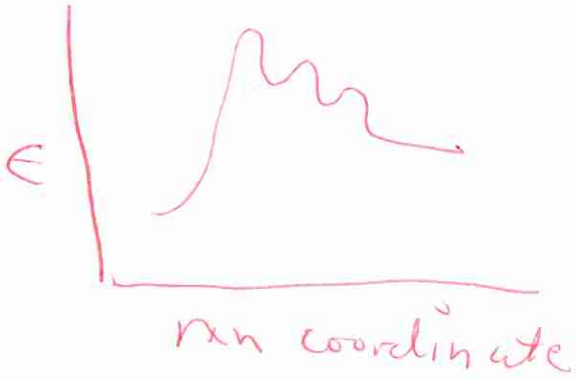


b) cis-1,2-dimethylcyclohexane

c)



7) Give a potential energy diagram that is a) endothermic overall, b) a three step reaction and c) has the first step as its rate-determining step. (4 pts.)



8) R-2-methylbutan-1-ol has a specific rotation of +5.8°.

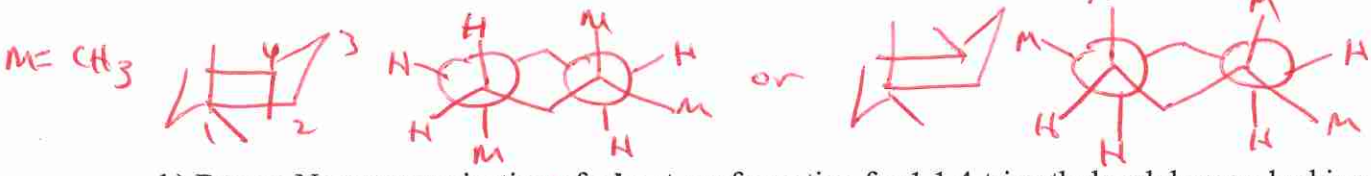
a) What is the percent enantiomeric excess for a mixture of R-2-methylbutan-1-ol and S-2-methylbutan-1-ol that gives a observed rotation of -.2.9°? (4 pts.)
SHOW YOUR WORK.

$\frac{2.9}{5.8} = 50\%$ e.e.

b) What is the percent composition of each enantiomer in this mixture? (4 pts.)

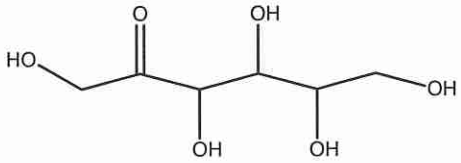
$50 + \frac{50}{2} = 75$ S
25 R

9) a) a) Draw a Newman projection of a **chair** conformation for 1,1,4-trimethylcyclohexane looking down the 1, 2 and 5,4 bonds. (4 pts.)



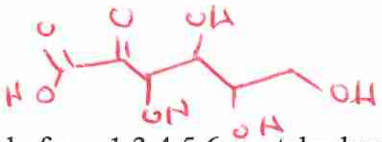
b) Draw a Newman projection of a **boat** conformation for 1,1,4-trimethylcyclohexane looking down the 1, 2 and 5,4 bonds. (4 pts.)

10) Given below is 1,3,4,5,6-pentahydroxyhexane-2-one. (3 pts. each)



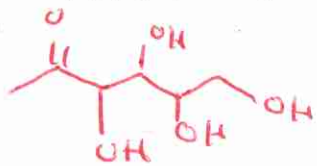
a) Give a molecule from 1,3,4,5,6-pentahydroxyhexane-2-one that has been oxidized.

lots of Choices

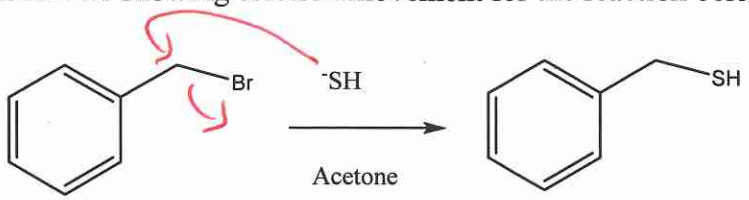


b) Give a molecule from 1,3,4,5,6-pentahydroxyhexane-2-one that has been reduced.

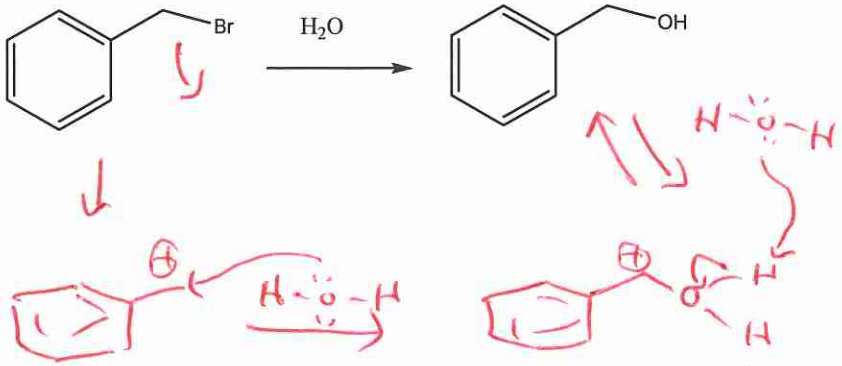
lots of Choices



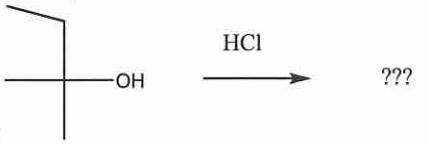
11) a) Give all of the arrows showing electron movement for the reaction below. No carbocation allowed. (5 pts)



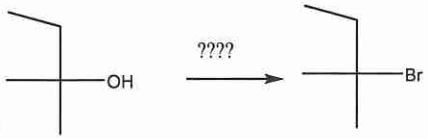
b) Give all of the arrows showing electron movement for the reaction below. Carbocation REQUIRED. (5 pts.)



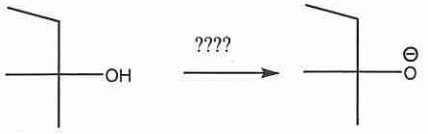
12) Reactions: Give the missing product or reagent for the following reactions. Indicate if no reaction is possible. Show stereochemistry if important. (3 pts each)

a) 

+ Cl

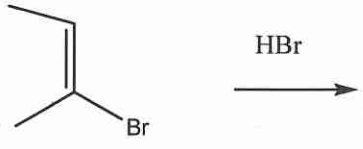
b) 

HBr

c) 

any base stronger than $OH^{\ominus}$

$\therefore NH_2^{\ominus}$, $H^{\ominus}$, $^{\ominus}{\equiv}-$, etc.

d) 

bad question

Next test