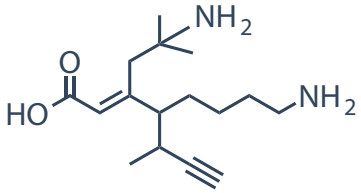
Organic Chemistry – Exercise 4

Distribution: October 16, 2025

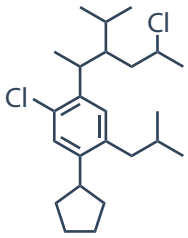
Help: October 30, 2025

Return until: November 1, 2025

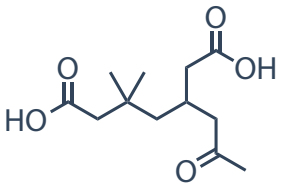
1. Draw the structural formulae for the following compounds:
   a. (*E*)-8-amino-3-(2-amino-2-methylpropyl)-4-(but-3-yn-2-yl)oct-2-enoic acid



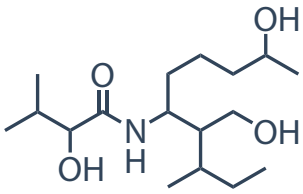
   b. 1-chloro-2-(5-chloro-3-(propan-2-yl)hexan-2-yl)-5-cyclopentyl4-(2-methylpropyl)benzene



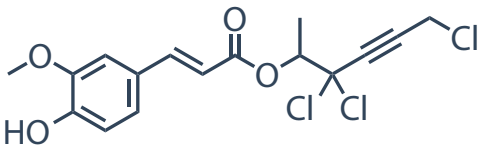
   c. 3,3-dimethyl-5-(2-oxopropyl)heptanedioic acid



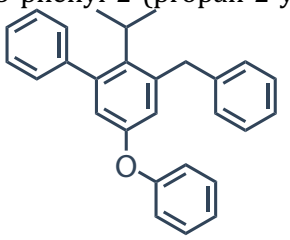
   d. (2-(butan-2-yl)-1,7-dihydroxyoctan-3-yl) 2-hydroxy-3-methylbutanamide



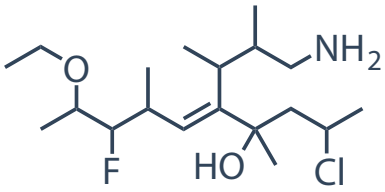
   e. (3,3,6-trichlorohex-4-yn-2-yl) (*E*)-3-(4-hydroxy-3-methoxyphenyl)prop-2-enoate



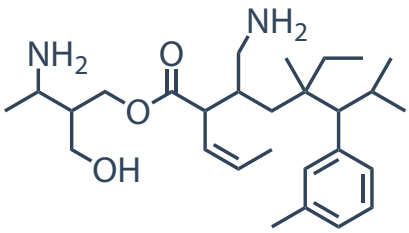
f. 1-benzyl-5-phenoxy-3-phenyl-2-(propan-2-yl)benzene



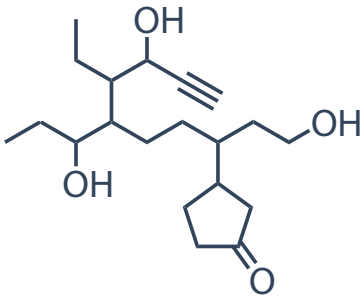
2. Give the IUPAC names for the following compounds. Include the isomerism of the double bond where necessary.

a. 

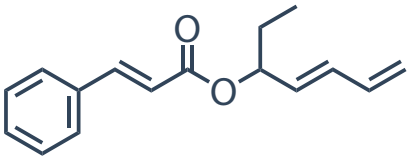
(*E*)-5-(4-amino-3-methylbutan-2-yl)-2-chloro-9-ethoxy-8-fluoro-4,7-dimethyldec-5-en-4-ol

b. 

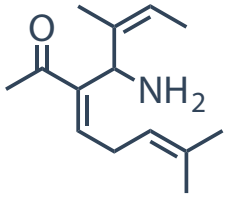
(2-(1-aminoethyl)-3-hydroxypropyl) 3-aminomethyl-5-ethyl-5,7-dimethyl-6-(3-methylphenyl)-2-((*Z*)-prop-1-enyl)octanoate

c. 

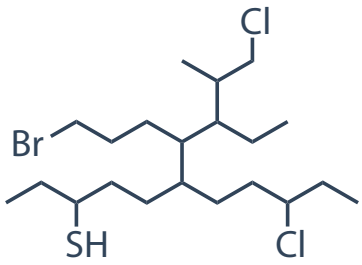
3-(7-ethyl-1,8-dihydroxy-6-(1-hydroxypropyl)dec-9-yn-3-yl)cyclopentane-1-one

d. 

((*E*)-hepta-4,6-dien-3-yl) (*E*)-3-phenylprop-2-enoate

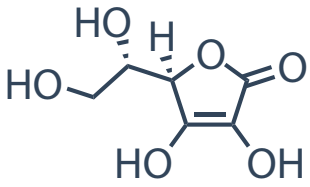
e. 

(*E*)-3-((*Z*)-1-amino-2-methylbut-2-enyl)-7-methylocta-3,6-dien-2-one

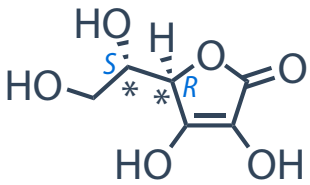
f. 

6-(7-bromo-1-chloro-3-ehtyl-2-methylheptan-4-yl)-9-chloroundecane-3-thiol

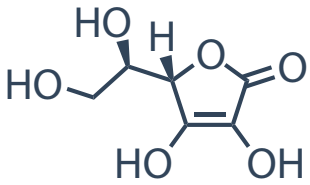
3. This question is about L-ascorbic acid, known as vitamin C (structure shown below).



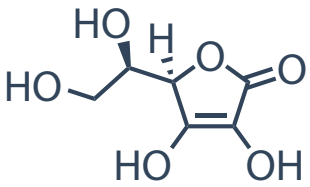
a. Mark all chiral atoms with an asterisk and determine their absolute configurations.

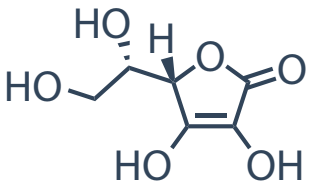


b. Draw the enantiomer of ascorbic acid.



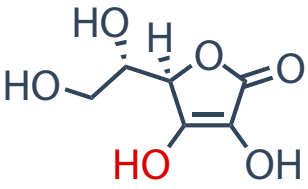
c. Draw all diastereomers of ascorbic acid.

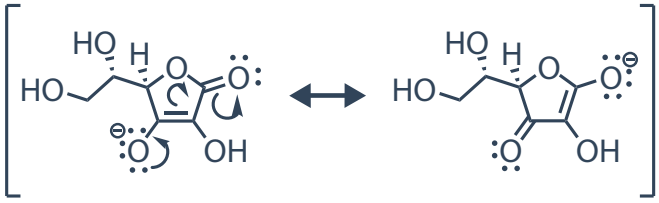




d. Even though ascorbic acid does not contain carboxylic functional groups, it is an acidic compound. The proton of the hydroxylic group labeled in red is the most

acidic proton in this structure. Using the resonance structures of the anion obtained by deprotonation of ascorbic acid explain why this proton is acidic.





Since there is a conjugation with the double bond and the carbonyl group, the electrons are delocalized and the formed anion is particularly stable.

4. Give the exact structural relationship (same compounds, different compounds, isomers – specify which type of isomerism) between the compounds in the following pairs:

a) 

same compounds

b) 

different compounds

c) 

enantiomers

d) 

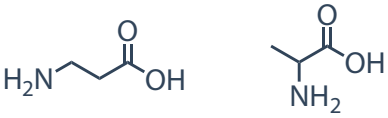
enantiomers

e) 

geometric isomers

f) 

same compounds

g) 

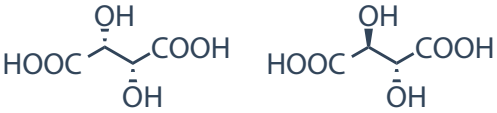
position isomers

h) 

same compounds

i) 

same compounds

j) 

diastereomers

Reading Suggestions:

Clayden, Greeves, Warren, *Oxford University Press*, **2012**.

Organic Chemistry, John McMurry, *Thomson Brooks/Cole*, **2008**.

Chimie Organique, Les Grands Principes, John McMurry, *Dunod Editeur*, **2009**.

Chimie Organique, Paul Arnaud, *Dunod Editeur*, **2009**.