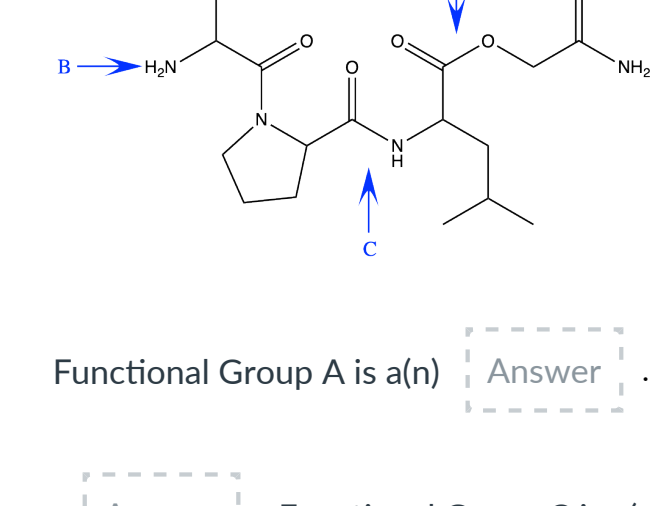


# HW05 - Organic Fundamentals

These questions will get you started on some organic chemistry.

1 5 points

Navigate the following big-ass molecule to best identify the functional groups labeled by the arrows A, B, C, and D.



Functional Group A is a(n)  . Functional Group B is a(n)

. Functional Group C is a(n)  .

Functional Group D is a(n)  . There are a total of

carbonyl groups on this molecule.

methyl group    alcohol    carboxylic acid    alkyl halide

nitrile    amine    thiol    ketone    amide

aldehyde    ester    ether

2 4 points

The inline formula for an ingredient in certain types of nail polish remover is  $\text{CH}_3\text{CO}_2\text{CH}_2\text{CH}_3$ . What type of compound (classification) is this?

- an ester  
 an aldehyde  
 an ether  
 a carboxylic acid  
 a ketone

3 4 points

What is the name of  $\text{C}_6\text{H}_{14}$ ?

- heptane  
 pentane  
 propane  
 hexene  
 hexane

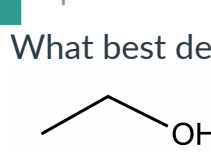
4 4 points

Which of the following has the greatest molar mass?

- methane  
 butane  
 propane  
 butene  
 pentane  
 pentene

5 5 points

What is the carbon chain product of the elimination reaction beginning with the reactant shown below?

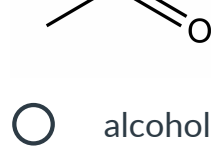


Hint: the eliminated product is HBr. What is left?

- $\text{HC}\equiv\text{CH}$   
  $\text{CH}_2\text{Br}-\text{CH}_2\text{Br}$   
  $\text{H}_2\text{C}=\text{CH}_2$   
  $\text{CHBr}=\text{CHBr}$

6 5 points

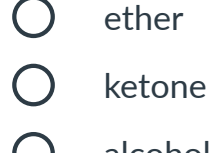
What best describes the functional group on this molecule?



- primary alcohol  
 secondary alcohol  
 ether  
 amine  
 carboxylic acid

7 5 points

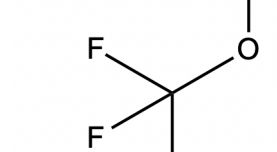
What is the functional group on this molecule?



- alcohol  
 aldehyde  
 amine  
 ketone

8 5 points

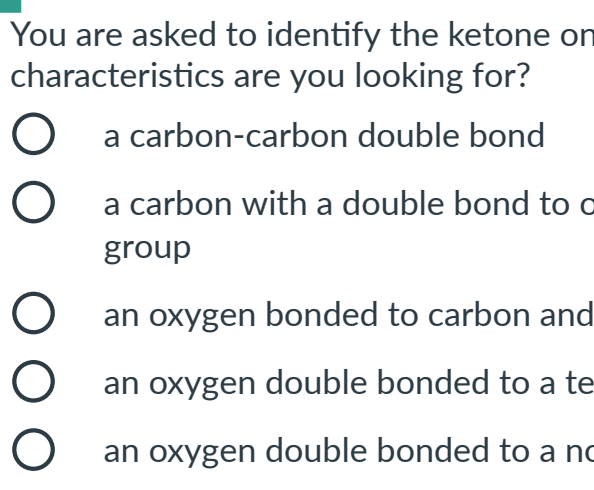
What is the functional group on this molecule?



- ether  
 ketone  
 alcohol  
 aldehyde

9 5 points

Look at this big molecule. What is the functional group on the top right?



- aldehyde  
 ketone  
 secondary amine  
 primary amine  
 carboxylic acid

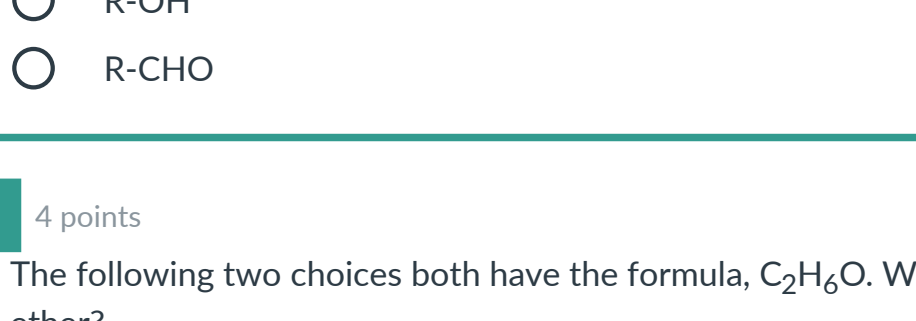
10 5 points

You are asked to identify the ketone on a large organic molecule. What characteristics are you looking for?

- a carbon-carbon double bond  
 a carbon with a double bond to oxygen and a single bond to an alcohol group  
 an oxygen bonded to carbon and hydrogen  
 an oxygen double bonded to a terminal carbon  
 an oxygen double bonded to a non-terminal carbon

11 4 points

You'll notice that amine groups are prevalent on medications and biologically active molecules. However, the body also has enzymes that easily digest primary amines. This is important to know because you can make a medication that is theoretically active, but the body breaks it down before it can work. You can "protect" that medication from digestion by converting the primary amines to secondary or tertiary amines. The following drawings show four candidates for a migraine medication. Which of the following molecules will be most likely to withstand the digestive process and make its way to the brain?



- Molecule A  
 Molecule C  
 Molecule B  
 Molecule D

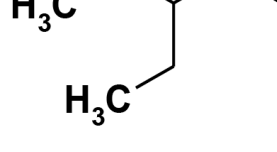
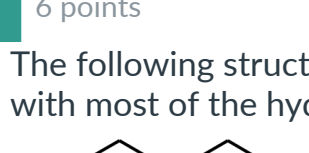
12 5 points

Which of the following is a carboxylic acid functional group?

- $\text{R}-\text{COOH}$   
  $\text{R}-\text{NH}_3$   
  $\text{R}-\text{CO}$   
  $\text{R}-\text{OH}$   
  $\text{R}-\text{CHO}$

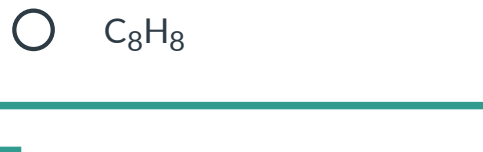
13 4 points

The following two choices both have the formula,  $\text{C}_2\text{H}_6\text{O}$ . Which is dimethyl ether?



14 6 points

This is the condensed structural formula for acetaminophen, the active ingredient in the over-the-counter medication Tylenol.



What is the molecular formula of acetaminophen?

- $\text{C}_8\text{H}_{11}\text{NO}_2$   
  $\text{C}_8\text{H}_8\text{NO}$   
  $\text{C}_8\text{H}_5\text{NO}_2$   
  $\text{C}_8\text{H}_9\text{NO}_2$

15 6 points

The following structure is the structural isomer of octane with most of the hydrogen and carbon atoms omitted.

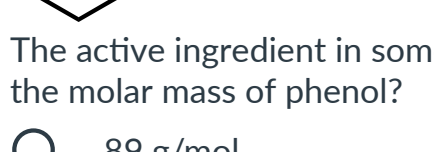


What is the molecular formula of this structure?

- $\text{C}_8\text{H}_{24}$   
  $\text{C}_8\text{H}_{16}$   
  $\text{C}_8\text{H}_{18}$   
  $\text{C}_8\text{H}_8$

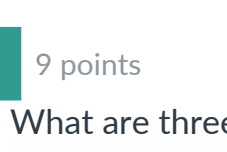
16 6 points

Consider the following structure:



How many single bonds and double bonds (respectively) are represented by this condensed formula?

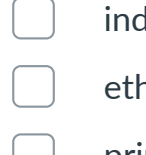
Note: the group on the far right can also be read as a phenyl group, similar to what you would see in benzene:



- 15, 14  
 12, 4  
 15, 4  
 12, 14  
 11, 7

17 6 points

Consider the structural formula of phenol.

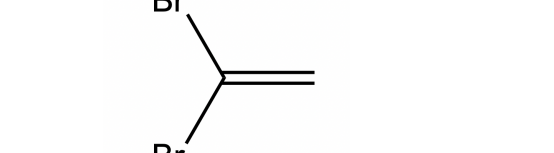


The active ingredient in some oral anesthetics used in sore throat sprays. What is the molar mass of phenol?

- 89 g/mol  
 50 g/mol  
 17 g/mol  
 94 g/mol

18 9 points

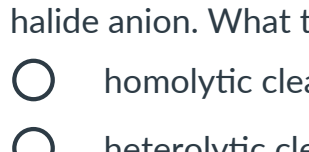
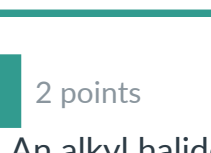
What are three functional groups in the following molecule?



- alcohol  
 carbonyl  
 indole  
 ether  
 primary amine  
 secondary amine  
 aldehyde

19 5 points

Consider the addition reaction between ethene (the simplest alkene) and bromine. Which one of the following structures is the correct one for the resulting product after the addition of bromine?



20 2 points

An alkyl halide is placed in solvent and breaks apart to form a carbocation and a halide anion. What type of process is this?

- homolytic cleavage  
 heterolytic cleavage