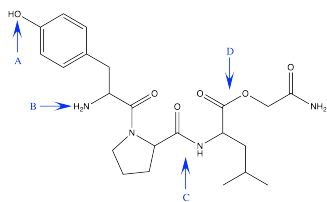


HW05 - Organic Fundamentals

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 C_6H_{14} ?

- heptane
- pentane
- propane
- hexene
- hexane

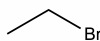
4 4 points

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

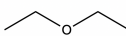
What is the functional group on this molecule?



- alcohol
- aldehyde
- amine
- ketone

8 5 points

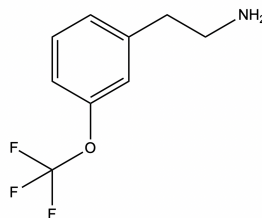
What is the functional group on this molecule?



- 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

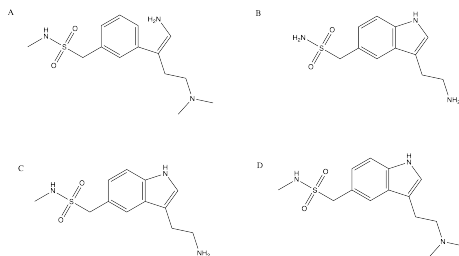
10 5 points

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

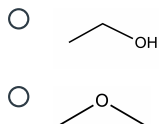
12 5 points

Which of the following is a carboxylic acid functional group?

- R-COOH
- R-NH₃
- R-CO
- R-OH
- R-CHO

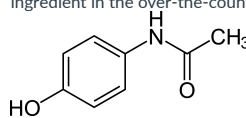
13 4 points

The following two choices both have the formula, C₂H₆O. 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.

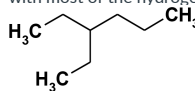


What is the molecular formula of acetaminophen?

- C₈H₁₁NO₂
- C₈H₈NO
- C₈H₅NO₂
- C₈H₉NO₂

15 6 points

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

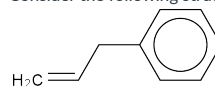


What is the molecular formula of this structure?

- C₈H₂₄
- C₈H₁₆
- C₈H₁₈
- C₈H₈

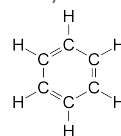
16 6 points

Consider the following structure:



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

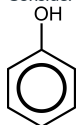
Note: the group on the far right can also be read as a phenyl group, similar to what you would see in benzene:



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

17 6 points

Consider the structural formula of phenol.

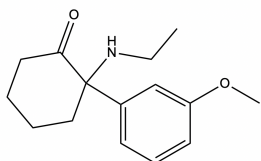


The active ingredient in some oral anesthetics used in sore throat sprays. What is the molar mass of phenol?

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

18 9 points

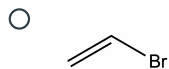
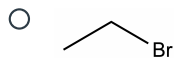
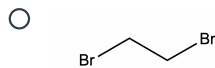
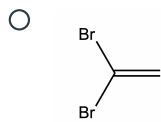
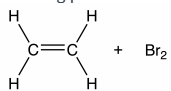
What are three functional groups in the following molecule?



- 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