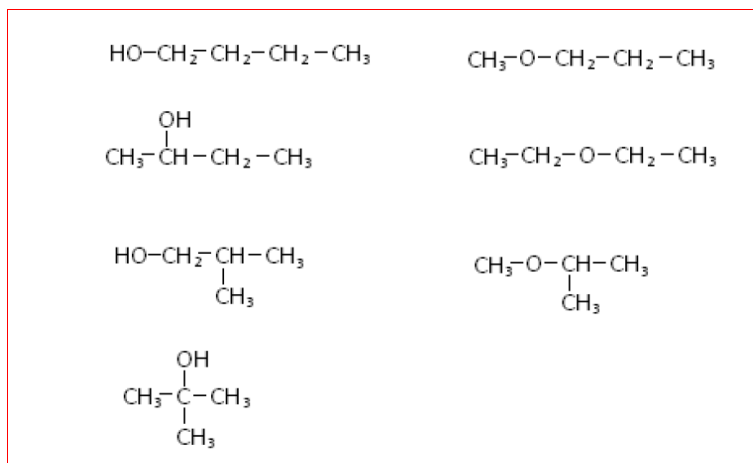


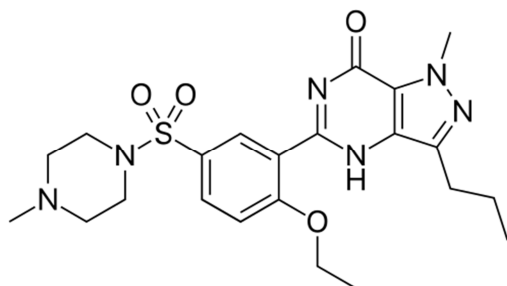
Name: _____

Functional Groups

1. Draw all possible isomers of $C_4H_{10}O$ (I believe there are 7 of them). You may use line-angle drawings if you wish.



2. What is the molecular formula and molar mass of 5-{2-Ethoxy-5-[(4-methyl-1-piperazinyl)sulfonyl]phenyl}-1-methyl-3-propyl-1,4-dihydro-7H-pyrazolo[4,3-d]pyrimidin-7-one or Sildenafil, which is marketed under the trade name Viagra, shown below?



Molecular formula: $C_{22}H_{30}N_6O_4S$, molar mass = 474.6 g/mol

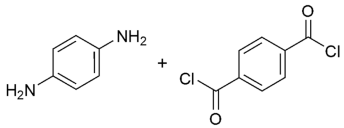
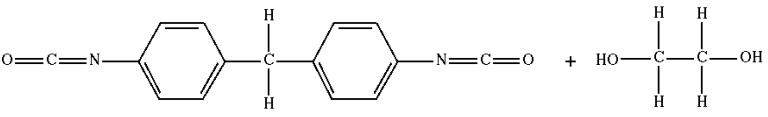
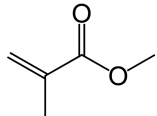
3. Given the name, identify the functional group present in each of the compounds below.

Compound Name	Functional Group Present
pentanal	aldehyde
decanoic acid	carboxylic acid
diethylpropylamine	amine
methyl propanoate	ester
3-hexanone	ketone
2-heptanal	aldehyde

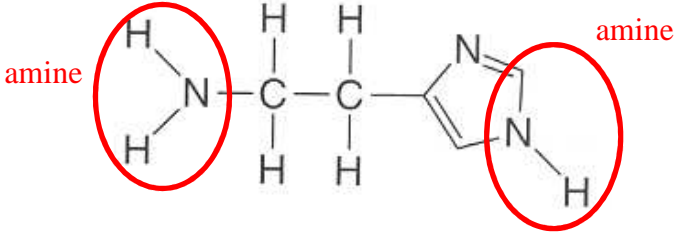
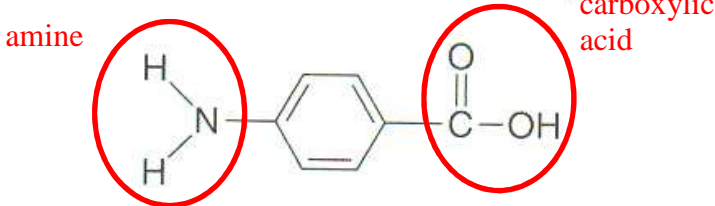
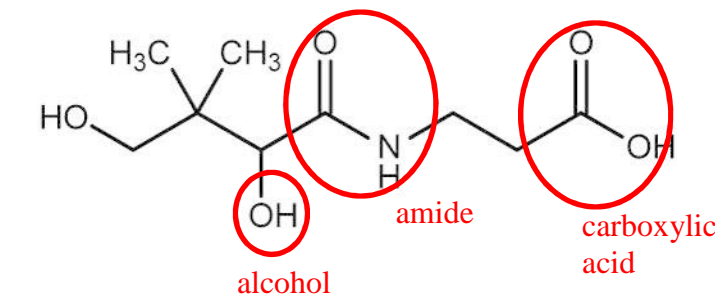
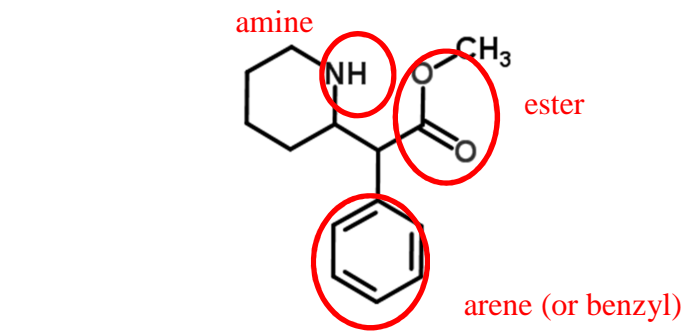
4. Many organic functional groups contain oxygen. Classify each of the atoms below by their oxygen-containing functional group. Circle the atoms present in the functional group.

Compound	Functional Group Classification
$\text{CH}_3\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$	ketone
$\text{CH}_3-\text{O}-\text{CH}_3$	ether
$\text{CH}_3\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$	amide
$\text{CH}_3\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$	carboxylic acid
$\text{CH}_3\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OCH}_3$	ester
$\text{CH}_3\text{CH}_2-\text{OH}$	alcohol
$\text{CH}_3\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OCH}_3$	ester

5. Draw the monomers that would be used to prepare the following polymers:

Poylmer	Monomer(s)
Kevlar	
Polyurethane	
Poly(methyl methacrylate)	

6. Circle and identify the names of the functional groups in each of these compounds and translate their structures into molecular formulas. Note that there are more than one functional group in each compound.

Compound	Structure	Molecular Formula
<p>Histamine, which causes runny noses, red eyes, and other symptoms in hay fever sufferers.</p>		<p>$C_5H_9N_3$</p>
<p>PABA (an ingredient in sunscreen)</p>		<p>$C_7H_7NO_2$</p>
<p>Vitamin B5, used in manufacturing red blood cells and maintaining digestive system.</p>		<p>$C_9H_{17}NO_5$</p>
<p>Ritalin, a stimulant used in treatment of ADHA and narcolepsy.</p>		<p>$C_{14}H_{19}NO_2$</p>