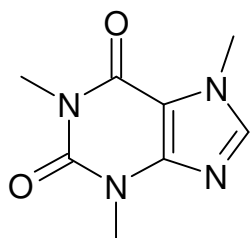


Name: _____

Organic Chemistry Test #1 - Structures and Nomenclature

1. For each of the following structures determine the degree of unsaturation and use this information to determine the complete chemical formula. Please note that the saturation formula is given in the next question.

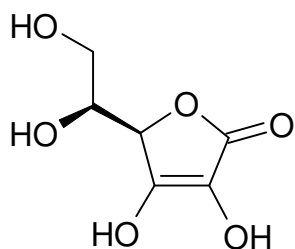


Caffeine

deg. unsat = 6

formula = $C_8H_{10}N_4O_2$

be careful, those are methyl groups attached to the nitrogen



Ascorbic Acid (Vitamin C)

deg. unsat = 3


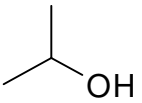
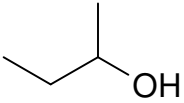
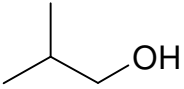
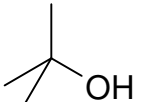
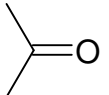
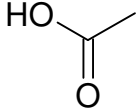
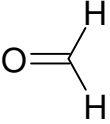

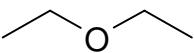
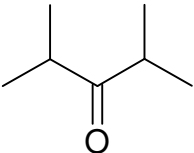
formula = $C_6H_8O_6$

2. $H = [2C + 2] - 2(\text{deg. unsat}) - X + N$

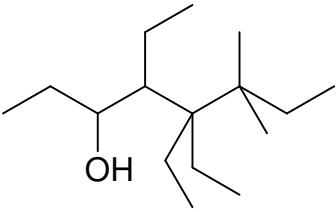
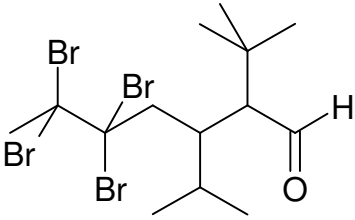
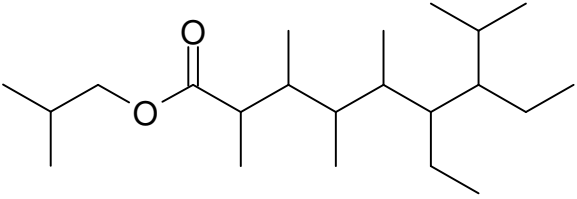
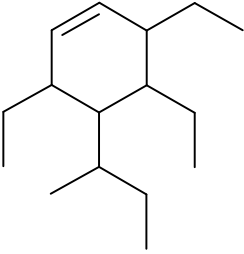
The above saturation formula can be used to determine the degree of unsaturation for any organic compound. This information can be useful when trying to determine the various combinations of functional groups and rings that make possible a given chemical formula. For each of the following, write the possible combinations of functional groups and rings that can result in the given formula.

C_2H_4O	alcohol + alkene aldehyde	$C_6H_{13}N$	amine + alkene amine ring
$C_{25}H_{50}O_2$	carboxylic acid ester aldehyde + alcohol aldehyde + ether ketone + alcohol ketone + ether		alcohol + alcohol + alkene alcohol + alcohol + ring alcohol + ether + alkene alcohol + ether + ring ether + ether + alkene ether + ether + ring

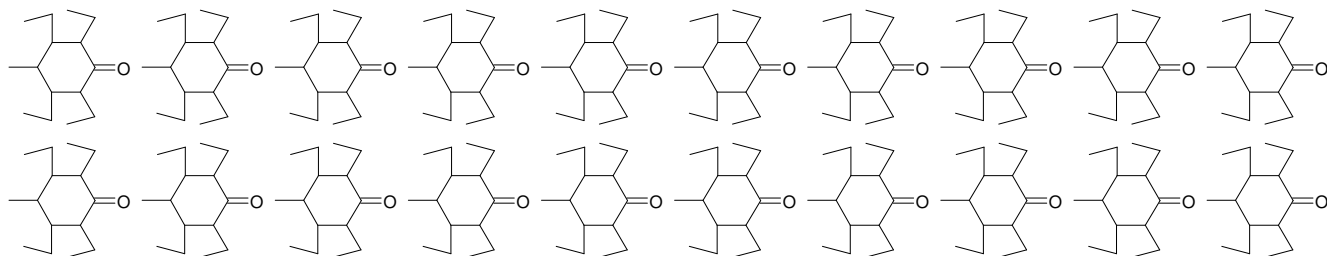
3. Provide common names and I.U.P.A.C. names for each of the following. If more than one common name exists, include both. Be sure to follow the rules when writing I.U.P.A.C. names. One mark per name

	Common Names	I.U.P.A.C.
	methyl alcohol	1-methanol
	isopropyl alcohol	2-propanol
	secbutyl alcohol	2-butanol
	isobutyl alcohol	2-methyl-1-propanol
	t-buty alcohol	2-methyl-2-propanol
	dimethyl ketone acetone	2-propanone
	acetic acid	ethanoic acid
	formaldehyde	methanal
	acetylene	1-ethyne
	diethyl ether ether	XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX
	diisopropyl ketone	2,4-dimethyl-3-pentanone

4. Write complete I.U.P.A.C. names for each of the following:

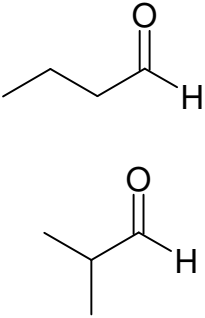
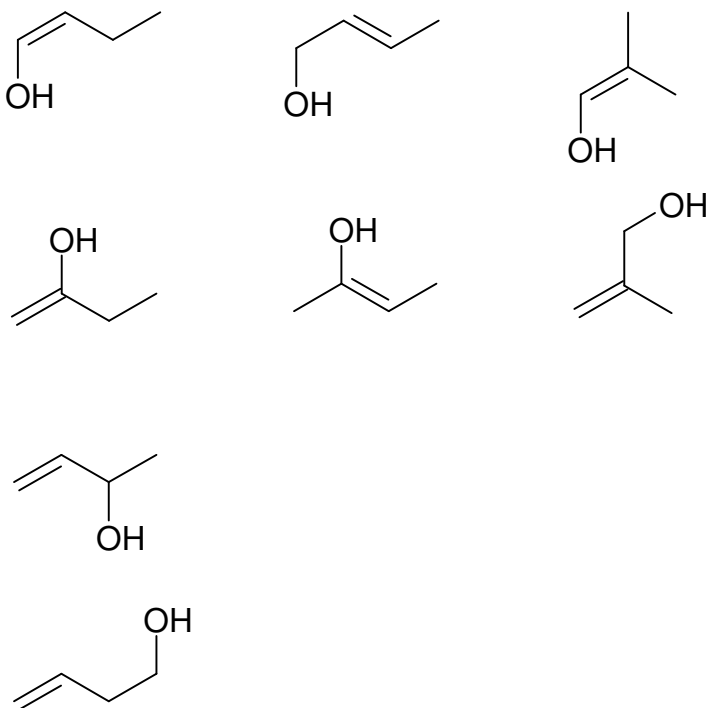
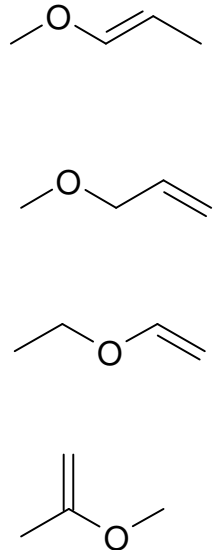
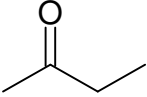
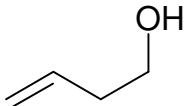
	<p>4,5,5-triethyl-6,6-dimethyl-3-octanol</p>
	<p>5,5,6,6-tetrabromo-2-t-butyl-3-isopropylheptanal</p>
	<p>isobutyl 6,7-diethyl-2,3,4,5,8-pentamethylnonanoate</p>
	<p>3,5,6-triethyl-4-secbutyl-1-cyclohexene</p>

Return of the Killer Ketones!!!



5. Provide all structural isomer for this formula. Be sure to consider and unsaturation considerations that should be considered. Present your work in an organized fashion. Marks will be deducted for disorder. Also, marks will be deducted for duplicate (or triplicate etc. structures). Use only five and six member rings. Organize your structures according to the combination of functional groups rings etc. that make possible this formula



<p>aldehydes</p> 	<p>alcohol alkenes</p> 	<p>ether alkenes</p> 
<p>ketone</p> 		<p>ether rings</p> 