Chemistry 2331H Tuesday, September 10

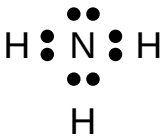
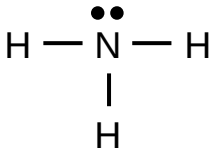
Workshop 1 Solutions
Drawing Organic Molecules

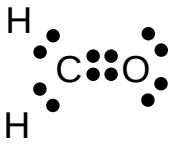
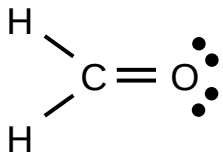
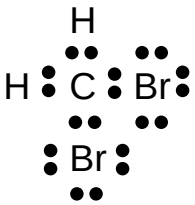
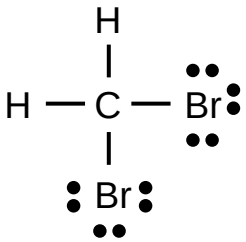
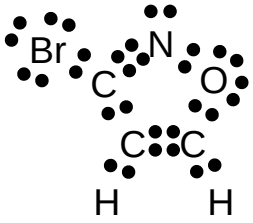
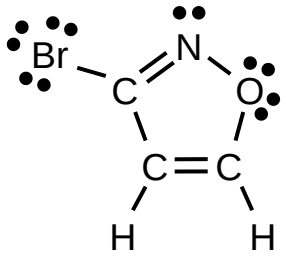
1.

atom	electronic configuration	# of valence electrons
H	$1s^1$	1
C	$1s^2 2s^2 2p^2$	4
N	$1s^2 2s^2 2p^3$	5
O	$1s^2 2s^2 2p^4$	6
S	$1s^2 2s^2 2p^6 3s^2 3p^4$	6
Br	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$	7

One easy mnemonic for the number of valence electrons: although it is technically equal to the total number of electrons in the highest orbital level [Br: (2 in 4*s*) + (5 in 4*p*) = 7], you can just look at the group number in the periodic table [Br is in Group 7].

2.

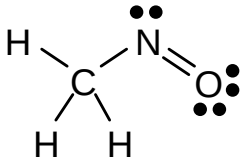
	Lewis *dot* structures	Lewis *dash-bond* structures
ammonia (NH_3)		

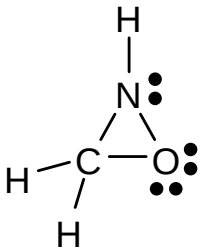
	Lewis *dot* structures	Lewis *dash-bond* structures
formaldehyde (H_2CO)		
dibromomethane (CH_2Br_2)		
3-*bromo-1,2-oxazole* (C_3H_2NOBr)		

Most importantly, each of the atoms heavier than H is the structures above has 8 electrons associated with it (either as lone pairs or shared in bonds). Each H has only 2 electrons (almost always shared in a bond).

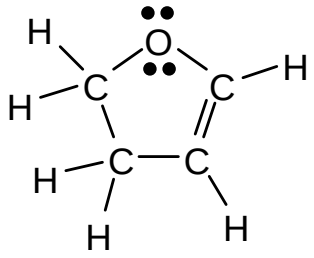
3.

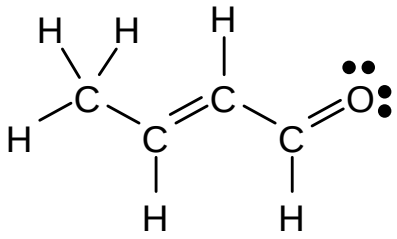
CH_3NO





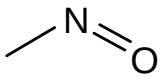
C_4H_6O

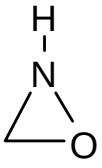


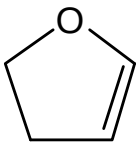


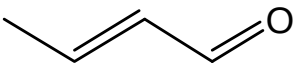
(+ many more possibilities)

Line-angle structures:

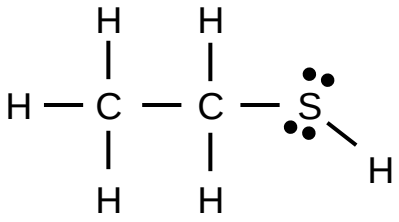




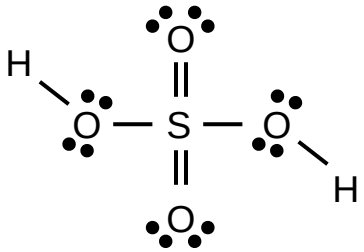




4.



ethanethiol
(added to natural gas so that it smells; obeys octet rule)



sulfuric acid
(disobeys octet rule; S has 12 electrons in valence shell)