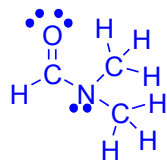
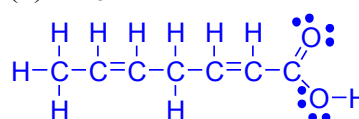
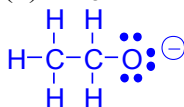
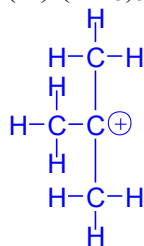
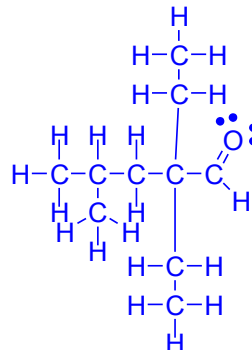
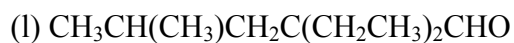
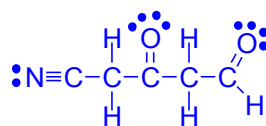
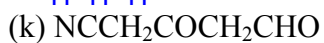
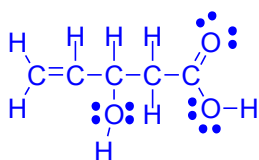
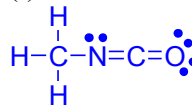
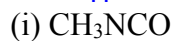
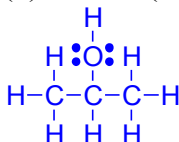
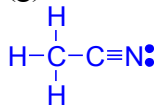
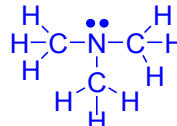
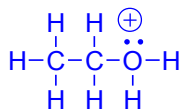
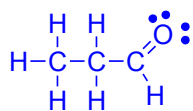
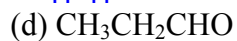
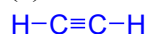
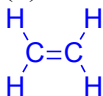
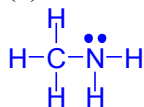


ANSWERS

1) Draw Lewis structures, showing all unshared electrons, for the following covalent molecules:



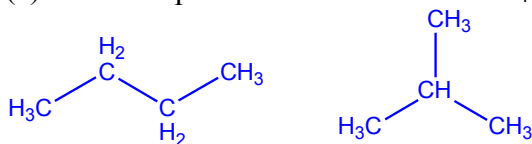
- 2) There is a small portion of the periodic table that you must know to do organic chemistry. Construct this from memory including the group numbers, numbers of valence electrons, and electronegativities.

I							
H ^{2.1}		III	IV	V	VI	VII	
		B ^{2.0}	C ^{2.5}	N ^{3.0}	O ^{3.5}	F ^{4.0}	
			Si ^{1.8}	P ^{2.1}	S ^{2.5}	Cl ^{3.0}	
						Br ^{2.8}	
						I ^{2.6}	

Note: depending on the source you use, small differences exist between electronegativity values. Nevertheless, the *relative* values for electronegativity are always the same.

- 3) Draw structures for

- (a) Two compounds with the formula C₄H₁₀

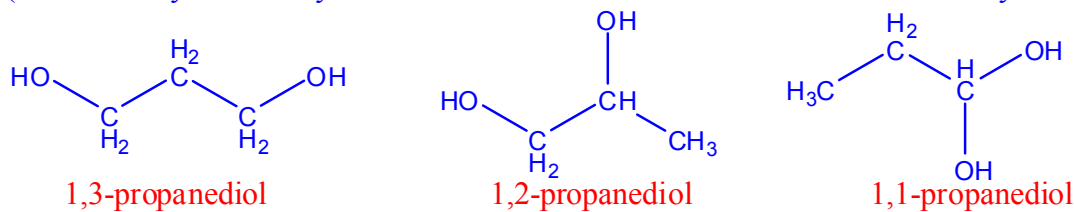


Butane

2-methylpropane

- (b) Three compounds with the formula C₃H₈O₂

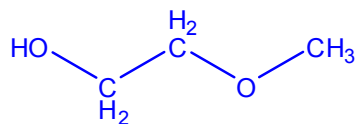
(Check with your TA if you have drawn other structures and aren't sure if they are correct)



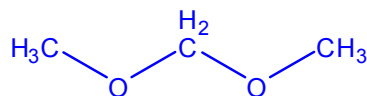
1,3-propanediol

1,2-propanediol

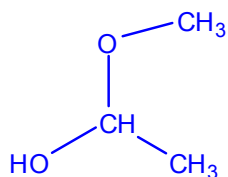
1,1-propanediol



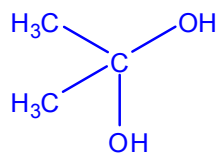
2-Methoxyethanol



1,1-dimethoxymethane

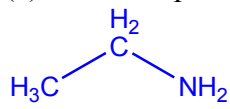


1-Methoxyethanol

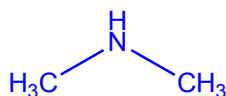


2,2-propanediol

(c) Two compounds with the formula C₂H₇N

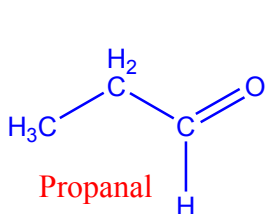


ethylamine

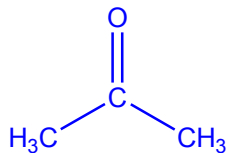


N,N-dimethylamine

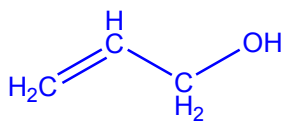
(d) Five compounds of formula C₃H₆O



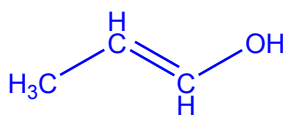
Propanal



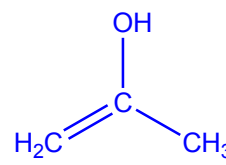
Propan-2-one



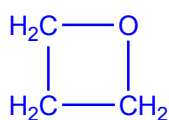
Prop-2-en-1-ol



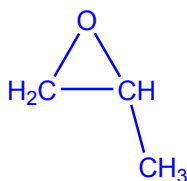
(*E*)-prop-1-en-1-ol



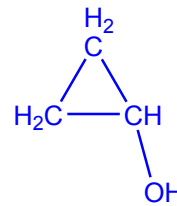
prop-1-en-2-ol



Oxacyclobutane



2-methyloxirane

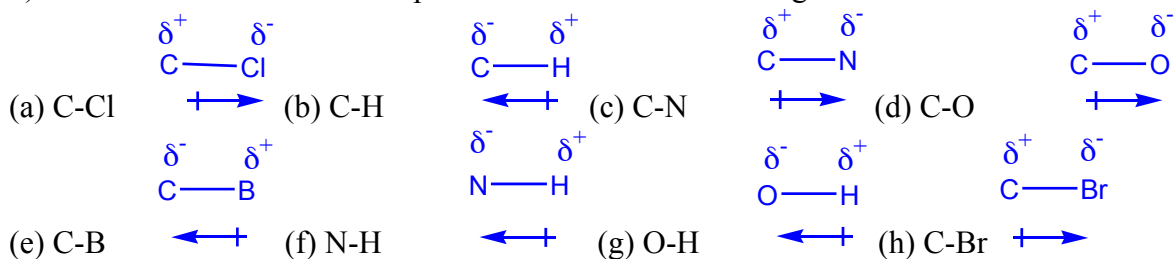


Cyclopropanol

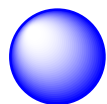
4) Name all the compounds in Question 3.

Answers in Red.

5) Show the direction of the dipole moments of the following bonds. Use two methods.



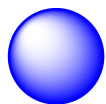
6) Draw the shape of s and p orbitals including phasing. Show the resulting shapes following sp, sp² and sp³ hybridization.



s



p



s

+

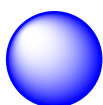


p



sp

(2 sp-hybridized orbitals at 180° to each other)



s



p

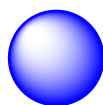


p



sp²

(3 sp²-hybridized orbitals at 120° to each other)



s



p



p



p



sp³

(4 sp³-hybridized orbitals at 109° to each other)

7) For each molecule below:

- i. Draw complete molecular orbital structures using the LCAO method.
- ii. Label the atomic orbitals used to make the bonds (p, sp, sp², sp³)
- iii. Label the bonds (σ, π).
- iv. Indicate the geometry of each atom (linear, trigonal planar, tetrahedral).

