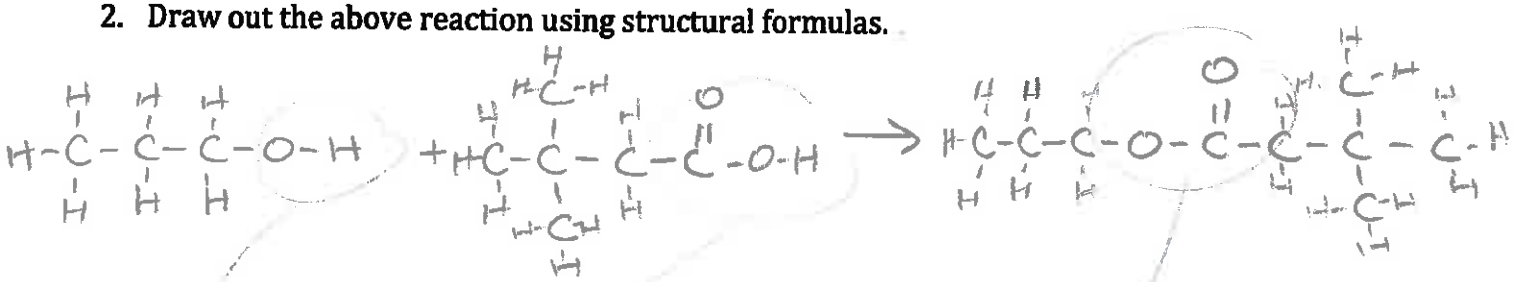
Chem 1 Review for Smells Unit Test

Name Key

1. Complete the following molecular reaction:

$C_3H_8O + C_6H_{12}O_2 \rightarrow H_2O + C_9H_{18}O_2$

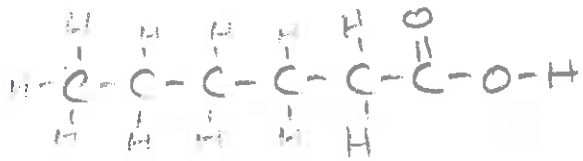
2. Draw out the above reaction using structural formulas.

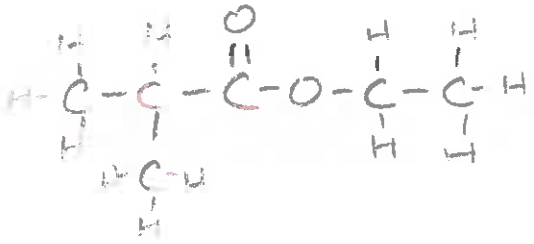


3. Circle and name each of the functional groups from #2.

alcohol carboxylic acid ester

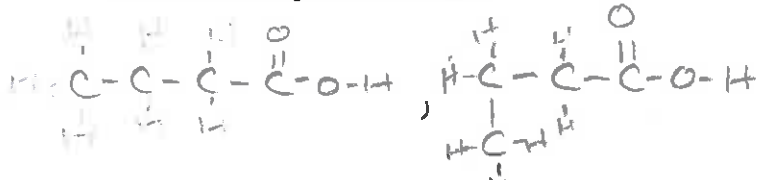
4. Draw two isomers for $C_6H_{12}O_2$



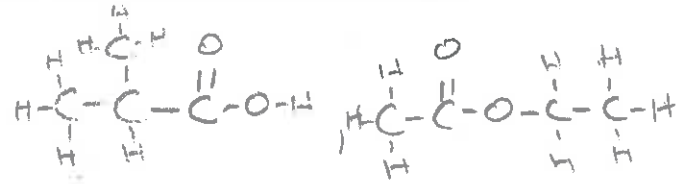


+ many more...

5. Give an example of two structures that are identical and two structures that are isomers using the compound $C_4H_8O_2$



IDENTICAL



isomers

6. How does receptor site theory relate to the shape of a molecule?

∴ the shape of a molecule can determine its smell.

← smells like roses

ox receptor for rose smell

because the shape of the molecule "fits" in the "rose" receptor.

7. Write the functional group that corresponds to the following smells:

a. Minty ketone

b. sweet ester

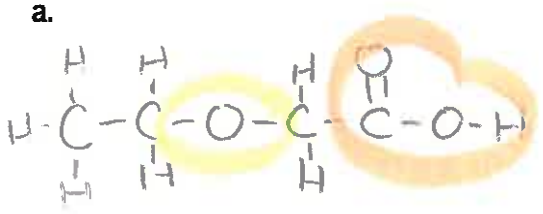
c. putrid carboxylic acid

d. medicinal alcohol

e. fishy amine

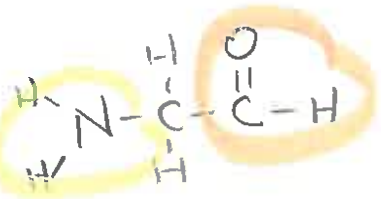
8. For the following molecules, identify all of the functional groups:

a.



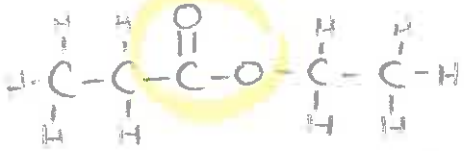
ether carboxylic acid

b.



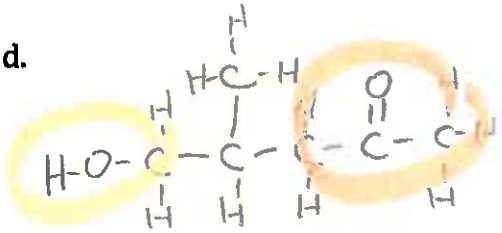
amine aldehyde

c.



ester

d.



alcohol ketone

9. What determines the shape of a molecule?

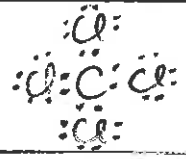
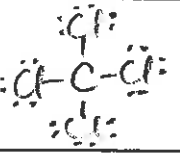
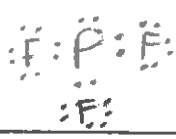
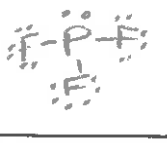
# of e⁻ domains & lone pairs of e⁻ around the central atom.

9. **How and why do atoms form covalent bonds?**

how: by sharing valence e^- w/ another atom

why: so they can fill their outer shell (full octet) & lowers their energy so they are more stable.

11. **Complete the table for the following molecules**

Molecular formula	Lewis dot structure	Structural formula with loan pairs	Number of electron domains (around the central atom)	Number of loan pairs of electrons	Shape of molecule
CCl_4			4	0	tetrahedral
CS_2			2	0	linear
H_2O			4	2	bent
PF_3			4	1	trigonal pyramidal

12. **What are intermolecular forces?**

attractions between individual molecules.

13. **Explain why water is attracted to a wand charged with electrons?**

water is a polar molecule so its negative end would be attracted to a positively charged wand.

14. **Hexane C_6H_{14}, is not attracted to a charged wand. What can you infer about the structure of Hexane?**

Hexane is not polar.

15. In your own words, define electronegativity.

an atoms ability to attract the electrons in a bond to itself.

16. What does electronegativity have to do with bonding type?

the difference in electronegativity values between atoms in a bond determins the type of bond.

big difference = ionic little/no difference = non-polar covalent mid difference = polar covalent.

17. For the following bonds, indicate what type of bond it is: non-polar covalent, polar covalent or ionic

O_2	non polar covalent	HF	polar covalent
SF	polar covalent	PO	polar covalent
NH	polar covalent	SBr	non polar covalent
NCl	ionic	OH	polar covalent.

18. Write a short paragraph explaining how the differences in electronegativity relate to bond type (ionic, polar covalent, and nonpolar covalent)

19. Draw H_2S, and label its dipole for each bond.