

Review Questions for Unit 2 - KEY
Chem 1010

1. Describe what is going on with water molecules in each state of matter.

	physical characteristics	spacing	movement	organization
solid	holds shape	close together	very little movement	highly organized
liquid	flows to take shape of container	farther apart	more movement	not organized
gas	expands to fill container	very far apart	lots of movement	not organized

2. What state of matter does a substance start in and end in during each of these changes? Give an example of each.

freezing **liquid** → **solid**; **ice cubes forming**

melting **solid** → **liquid**; **ice cubes melting**

evaporating or boiling **liquid** → **gas**; **water boiling or a puddle evaporating**

condensing **gas** → **liquid**; **water condensing on glass of ice water**

subliming **solid** → **gas**; **dry ice at room temperature**

deposition **gas** → **solid**; **frost forming**

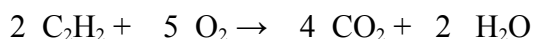
3. What state of matter will the following things be in at the temperature where water freezes and boils?

	melting point	boiling point	state of matter where water freezes	state of matter where water boils
water	0°C	100°C	x	x
propane	-187°C	-42°C	gas	gas
methyl salicylate	-9°C	220°C	liquid	liquid
ethanol	-114°C	78°C	liquid	gas
vanillin	80°C	285°C	solid	liquid

4. Describe the characteristics of chemical, physical, and nuclear changes, and give an example of each.

	what changes	what stays the same	example
physical changes	arrangement of molecules	compounds, atoms	sugar dissolving in water, ice melting
chemical reactions	bonds between atoms, new compounds formed	same elements	charcoal burning, iron rusting
nuclear reactions	number of protons and neutrons in nucleus, new elements formed	same total number of protons and neutrons	fusion of hydrogen in the sun, radioactive decay of uranium

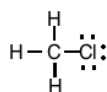
5. Balance the following equation, making a chart to show how you arrived at the answer.



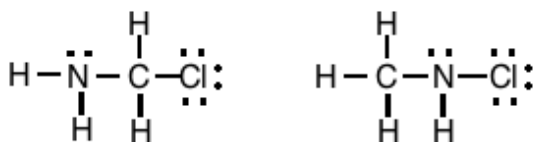
Reactants			Products		
C	H	O	C	H	O
2	2	2	1	2	3
4	4	10	2	4	4
			4		6
					10

6. Give Lewis structures for the following compounds, starting by drawing the Lewis structures for all of the atoms. For b) and c), also draw the Lewis structure of an isomer of that compound.

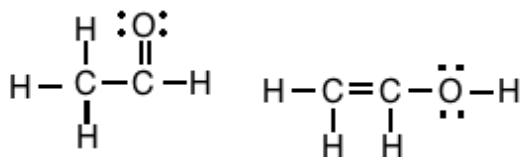
a) CH_3Cl



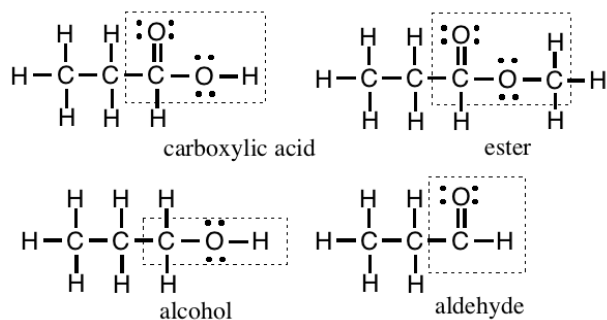
b) CH_4NCl



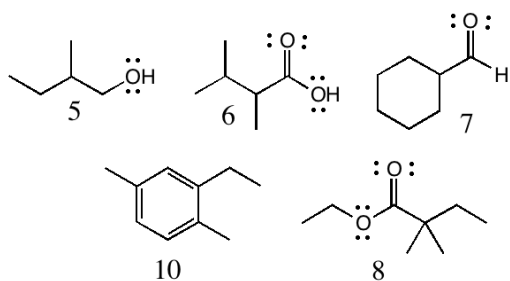
c) $\text{C}_2\text{H}_4\text{O}$



7. Identify the alcohol, carboxylic acid, ester, and aldehyde in the compounds below.



8. Give the number of carbon atoms in each of the line structures below.



9. Identify the following in the line structures below.

<p>a) hydrocarbon b) aromatic compound c) alcohol d) carboxylic acid e) ester f) aldehyde</p>	<p style="text-align: center;">alcohol carboxylic acid aldehyde</p> <p style="text-align: center;">aromatic hydrocarbon ester</p>
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10. Give the name and formula of a compound found in each of the following.

78% of earth's atmosphere	nitrogen gas (N_2)
alcoholic drinks	ethanol ($\text{C}_2\text{H}_6\text{O}$)
ant bites	formic acid (CH_2O)
antifreeze	ethylene glycol ($\text{C}_2\text{H}_6\text{O}$)
bananas	isopentyl acetate ($\text{C}_7\text{H}_{14}\text{O}_2$)
barbeque grills	propane (C_3H_8)
21% of earth's atmosphere	oxygen gas (O_2)
cinnamon	cinnamaldehyde ($\text{C}_9\text{H}_8\text{O}$)
cutting and welding torches	acetylene (C_2H_2)
dry ice	carbon dioxide (CO_2)
floor and window cleaners	ammonia (NH_3)
fruit hormone that causes ripening	ethylene (C_2H_4)
lemons	limonene ($\text{C}_{10}\text{H}_{16}$)
lighters	butane (C_4H_{10})
natural gas	methane (CH_4)
race car fuel	methanol (CH_4O)
rubbing alcohol	isopropyl alcohol ($\text{C}_3\text{H}_8\text{O}$)
stomach acid	hydrochloric acid HCl
used in embalming	formaldehyde (CH_2O)
vanilla	vanillin ($\text{C}_8\text{H}_8\text{O}_3$)
vinegar	acetic acid ($\text{C}_2\text{H}_4\text{O}_2$)
wintergreen	methyl salicylate ($\text{C}_8\text{H}_8\text{O}_3$)