

ALL work must be shown to receive full credit. **PS3.1 - PS3.4 are due in lecture at 8:30 a.m. on Monday, February 4, 2002.**

PS3.1. Draw the Lewis structure for, and indicate all of the bond angles for each of the following hydrocarbons;

a) methane

b) hexane

c) 2-methylpropane

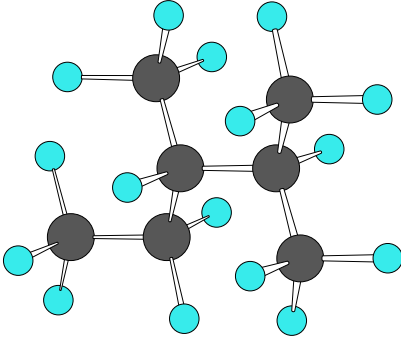
PS3.2. What are structural isomers? Draw and name all of the structural isomers for each of the following compounds;

a) C_7H_{16}

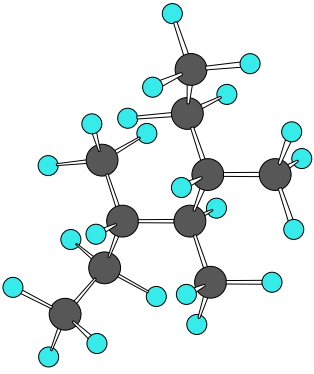
PS3.2. (Continued)

- b) $C_5H_{10}Cl_2$ (draw and name at least 7 different isomers, do a few chloropentanes, a few chlorobutanes and a few chloropropanes)

PS3.3. Name the following compounds;

a) 	Name:
b) $H_3CCH(CH_3)C(CH_3)_2CH_2CH_2CH_3$	Name: Draw the Lewis structure

PS3.3. (Continued)

c) 	Name:
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PS3.4. Draw the complete Lewis structure that corresponds to each of the following names.
(Complete mean all hydrogens must be shown.)

a) 3-ethylpentane

b) 2,2,3,4-tetramethyloctane

c) 1-bromo-2-chloro-3-fluoro-2-methylpropane

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PS3.5. Answer each of the following questions with a brief explanation.

- a) Is NH_3 polar or nonpolar?

- b) Is SO_3 polar or nonpolar?

- c) How do polar and nonpolar compounds differ?

PS3.6. Indicate the most important type of intermolecular attractive forces that operate in each of the following:

- a) $\text{HF}(l)$
- b) $\text{CH}_3\text{F}(l)$
- c) $\text{CO}(l)$
- d) $\text{CO}_2(l)$
- e) In the boxes below draw a picture showing two or three molecules of HF , CH_3F and CO and label the intermolecular attraction that occurs between adjacent molecules.

HF	CH_3F	CO

PS3.7. What are the required structural features for a substantial hydrogen-bonding contribution to be the primary intermolecular attractive forces between two identical or two different substances?

PS3.8. List all of the intermolecular attraction force, or bond, for each of the following substances. Indicate the strongest attractive force that must be overcome when each of the following substances is melted?

a) dinitrogen monoxide

b) carbon tetrachloride

c) hydrogen cyanide

d) magnesium chloride

e) butane

PS3.9. For each of the following pairs of substances predict which will have the higher boiling point and indicate why:

a) CO_2 and CS_2	b) $\text{CH}_3\text{CH}_2\text{OH}$ and $\text{HOCH}_2\text{CH}_2\text{OH}$
b) HBr and KBr	d) C_3H_8 and C_8H_{18}

PS3.10. The compound $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{OH}$ exhibits intermolecular hydrogen bonding and intramolecular hydrogen bonding. Use Lewis structure drawings to depict each type of hydrogen bonding.

