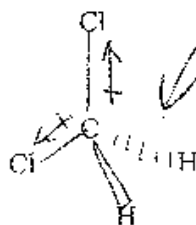


Sign Name Key Print Name \_\_\_\_\_

Please show work on all questions for partial credit even on questions which do not specify. (25 total pts)

1. a) Given the following molecule, draw in all non zero dipole moment arrows (assume C-H has a zero dipole moment) (8 pts, 2 pts each arrow)



wrong direction - 1 pt

no arrow or small arrow correct  $\leftarrow$  C-H

big - 1 arrow

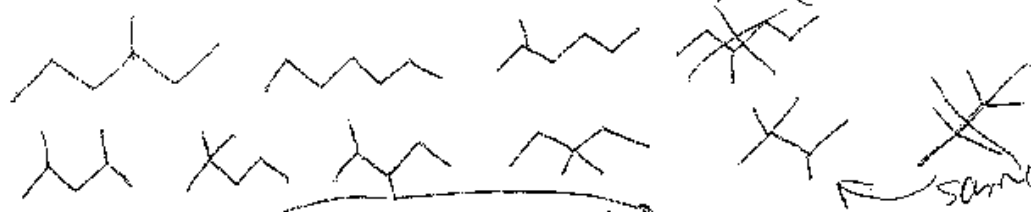
dipole moment  $\neq$  zero of molecule

→ should look like this

- b) what is the intermolecular force for the molecule? [(H bonding)(dipolar)(van der waals)] (circle one) (5 pts)

H not attached to F, O, N

2. Given the following skeletal drawing of an alkane, show at least 2 valid constitutional (structural) isomers. You may use a skeletal [condensed or line bond structure (structural formula)] to show the isomers. (both) (6 pts each, 12 pts total) (7C)

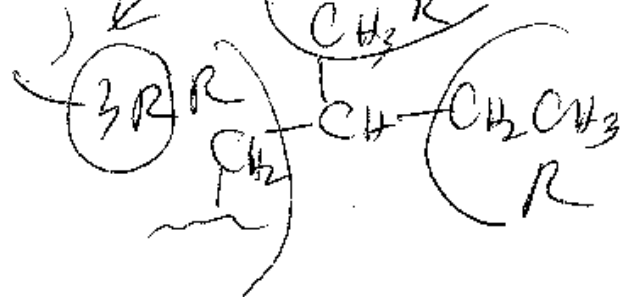
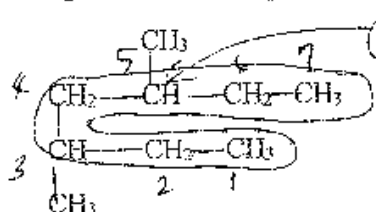


wrong #C - 6

same - 6

3,5-dimethylheptane

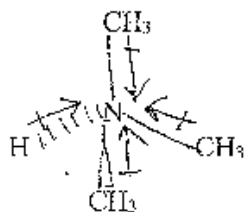
Extra Credit: given the following molecule, (a) circle the longest continuous chain which one would use for naming the molecule (1 pt) (b) For the carbon with the arrow and the parenthesis fill in with [1°, 2° or 3°] (1 pt)



Sign Name Key Print Name \_\_\_\_\_

Please show work on all questions for partial credit even on questions which do not specify. (25 total pts) green

1. a) Given the following molecule, draw in all non zero dipole moment arrows (assume C-H has a zero dipole moment) (8 pts, 2 pts each arrow)



dipole moment  $\neq$  zero

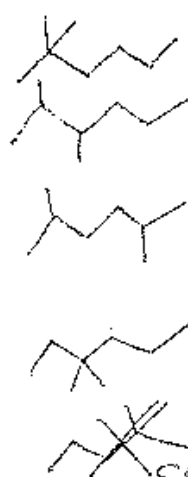
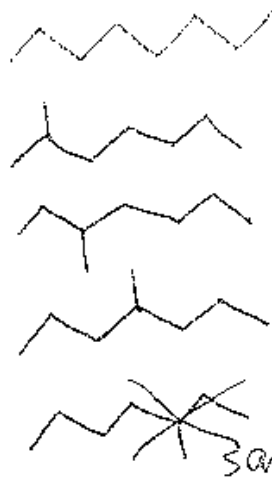
Wrong direction - lead arrow pt

arrow should look like  $\rightarrow$

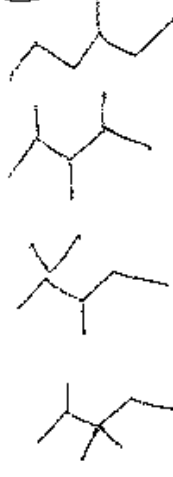
Not directly attached to N (F, O, N)

- b) what is the intermolecular force for the molecule? [(H bonding) (dipolar) (van der waals)] (circle one) (5 pts)

2. Given the following skeletal drawing of an alkane, show at least 2 valid constitutional (structural) isomers. You may use a skeletal [condensed or line bond structure (structural formula)] to show the isomers. (both) (6 pts each, 12 pts total)



8 C



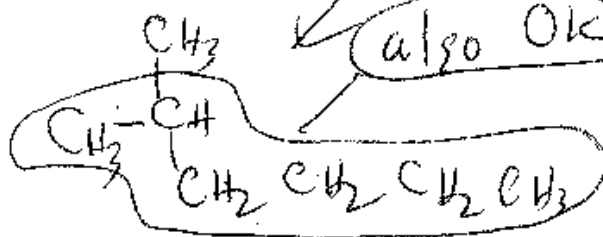
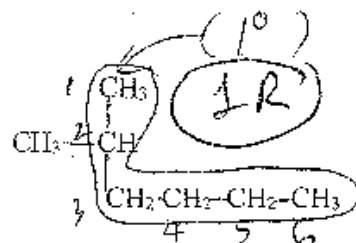
etc

Wrong # C - 6

Same - 6

2-methyl hexane

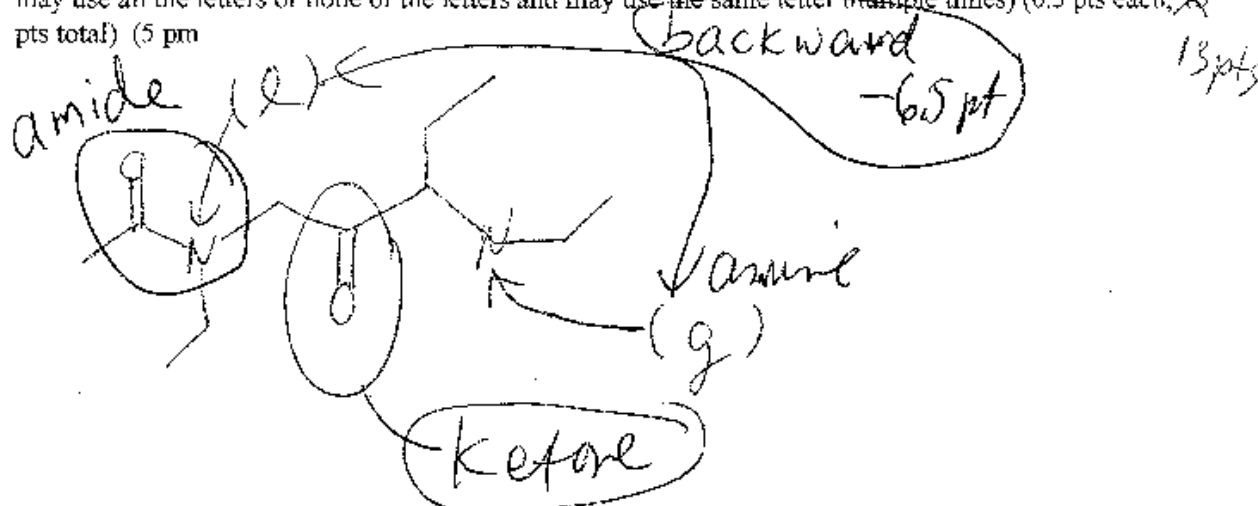
Extra Credit: given the following molecule, (a) circle the longest continuous chain which one would use for naming the molecule (1 pt) (b) For the carbon with the arrow and the parenthesis fill in with [1°, 2° or 3°] (1 pt)



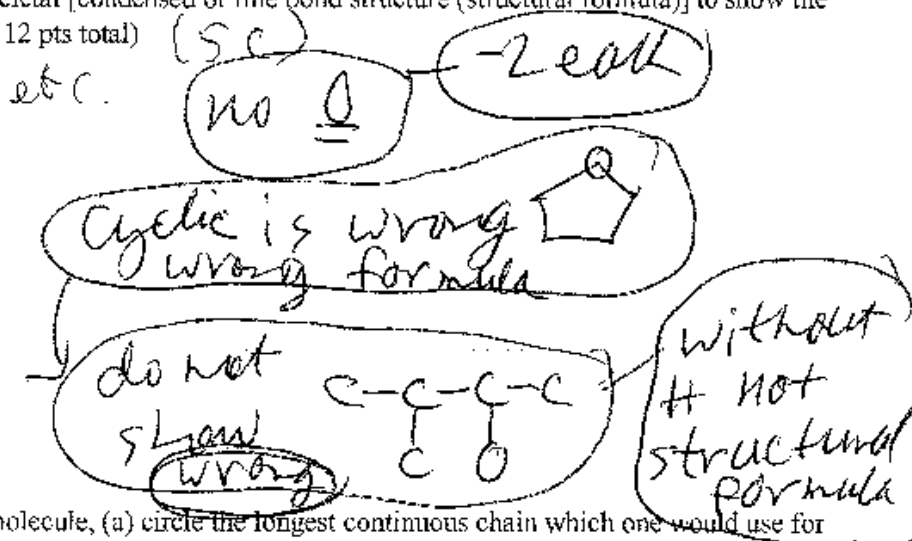
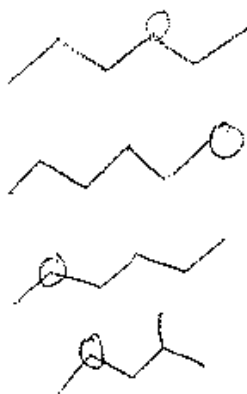
Sign Name Key Print Name \_\_\_\_\_

Please show work on all questions for partial credit even on questions which do not specify. (25 total pts)

1. Given the following molecule, fill in the parenthesis with the letter of the functional group. (a) alkene (b) alkyne (c) arene (d) alkyl halide (e) alcohol (f) ether (g) amine (h) aldehyde (i) ketone (j) carboxylic acid (k) ester (l) amide (m) acid halide (n) acid anhydride (You may use all the letters or none of the letters and may use the same letter multiple times) (6.5 pts each, 13 pts total) (5 pm)



2. Given the following skeletal drawing of an alkane, show at least 2 valid constitutional (structural) isomers. You may use a skeletal [condensed or line bond structure (structural formula)] to show the isomers. (both) (6 pts each, 12 pts total) (5 c)



Extra Credit: given the following molecule, (a) circle the longest continuous chain which one would use for naming the molecule (1 pt) (b) For the carbon with the arrow and the parenthesis fill in with [1°, 2° or 3°] (1 pt)

