GROUP HOMEWORK #2

CHEM 121, section 1,
Background and Chp. 12
Homework Due

Printed Name: key

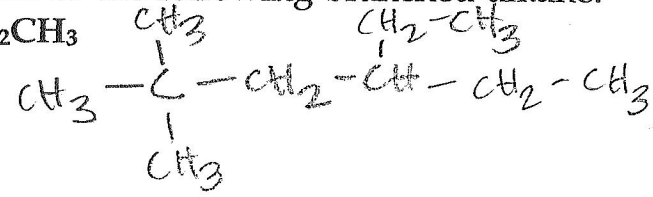
Group Name:

1. (2 pts. total) Give the number of constitutional isomers possible in following alkanes.

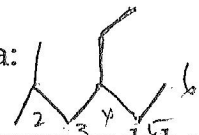
a) CH_4	1	d) C_4H_{10}	2	g) C_7H_{16}	9
b) C_2H_6	1	e) C_5H_{12}	3	h) C_8H_{18}	18
c) C_3H_8	1	f) C_6H_{14}	5	i) C_9H_{20}	35

2. (1 pts. total) Give the IUPAC name of the following branched alkane:
$CH_3C(CH_3)_2CH_2CH(CH_2CH_3)CH_2CH_3$

a) Expanded condensed formula:



b) Line-angle formula:



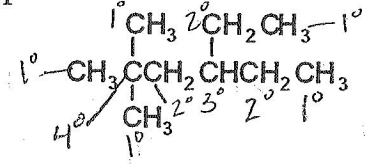
c) Branched Alkyl groups and their names:

methyl, ethyl

d) IUPAC name of the compound:

4-ethyl-2-dimethyl hexane

3. (3 pts) Identify the type of carbon atoms in the following structure



1° primary
2° secondary

4. (3 pts) Complete combustion reaction of following alkanes.

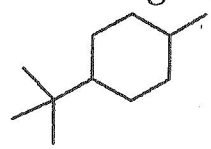
a) $CH_4 + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(g)}$

b) $C_4H_{10} + 13/2\ O_2 \rightarrow 4CO_2 + 5H_2O$

c) $C_5H_{12} + 8\ O_2 \rightarrow 5CO_2 + 6H_2O$

5. (3 pts) IUPAC name of the following substituted cycloakane

1-tert-butyl-4-methyl cyclohexane



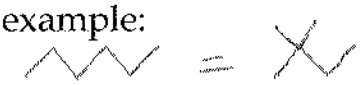
6. (3 pts) Give the common/IUPAC names of following substituted alkanes:

	Common	IUPAC

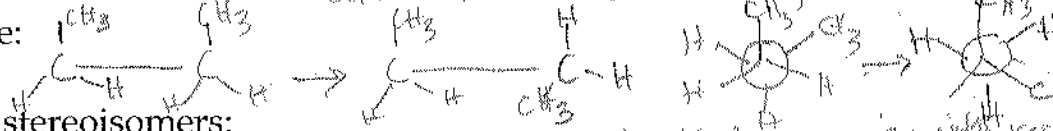
a) CH_2Cl_2 Methylene Chloride dichloromethane
b) $CHCl_3$ Chloroform Trichloromethane
d) CCl_3F Freon-11 Trichlorofluoromethane
e) CCl_2F_2 Freon-12 dichlorodifluoromethane

7. (3 pts) Define following types of terms used in describing isomerism:
a) Isomers: Compounds with the same molecular formula but arranged d
different
An example:

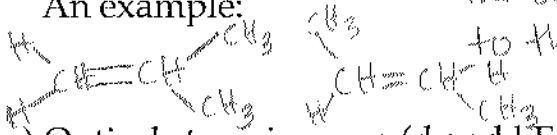
b) Constitutional isomers: differ in the connectivity of atoms
An example:



c) Conformational stereoisomers: differ in the 3D arrangment of ator
An example:

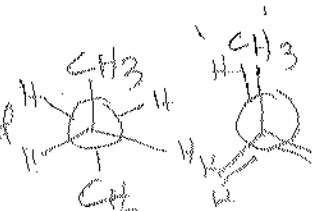


d) Geometric stereoisomers:
An example: the arrangement of alkyl groups with res to the plane of the ring or double/triple bo



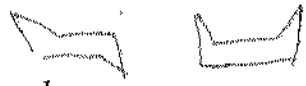
e) Optical stereoisomers (d and l Enantiomers):
An example:

8. Describe the conformational isomerism in following alknes:
a) Butane, C_4H_{10}: Staggered or eclipsed



b) Cyclopenatane, C_5H_{10}: Planar or envelope

c) Cyclohexane C_6H_{12}: Chair or boat



8) Calculate the units of unsaturation in following hydrocarbons
a) Butane, C_4H_{10}: 1

b) Cyclopenatane, C_5H_{10}: 1

c) Ethene (ethylene), C_2H_4: 1

d) Cyclohexa-1,3,5-triene (Benzene), C_6H_6: 3