CHM151Y:

CHEMISTRY, THE MOLECULAR SCIENCE.

- ALKANES & THEIR PROPERTIES
- CONFORMATIONS
- CYCLOALKANES AND RING STRAIN:

→ CONFORMATION OF 3-5 MEMBERED RINGS

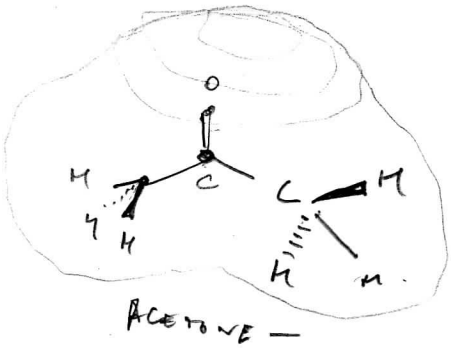
- CONFORMATIONS OF CYCLOALKANES.

OBJECTIVES

- IUPAC
- ISOMERIC ALKANES
- NEWMAN PROJECTIONS
  SAWHORSE PROJECTIONS
- & MORE

FUNCTIONAL GROUP ∴ A GROUP OF ATOM THAT HAS A CHARACTERISTIC CHEMICAL BEHAVIOUR IN EVERY MOLECULE IT OCCURS

→ PRESENT ELECTRON DENSITY & ELECTRON DEFICIENCY



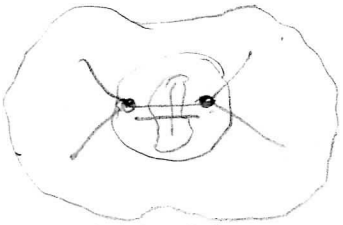
ACETONE — A TYPICAL CARBONYL COMPOUND

HYDROCARBONS

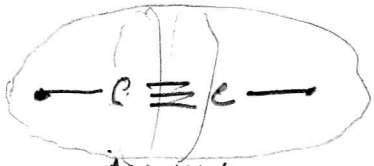
ALKANES :: SATURATED (ALIPHATIC) COMPOUNDS

ALKENES
ALKYNES
ARENES
} UNSATURATED HYDROCARBONS

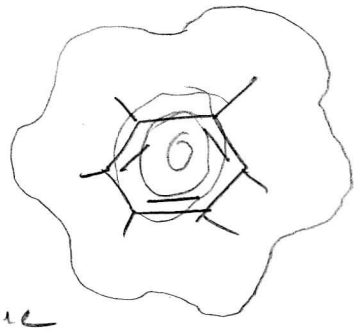
UNSATURATION GIVES RISE TO CHEMICAL REACTIVITY ::



ALKENE



ALKYNE



ALKANE	MNEMONIC
1] 2]	ME
3] 4]	PB "PERSONAL BEST"
5] 6 7 8 9]	PHON "PHONE"
10	DECANE
11	UNDECANE
12	DODECANE
13	TRIDECANE
20	ICOSANE
30	TRIACONTANE

n-butane

NOMENCLATURE

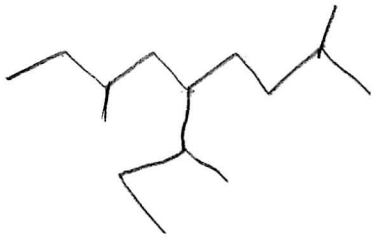
PREFIX — LOCANT — PARENT — SUFFIX

PREFIX	LOCANT	PARENT	SUFFIX
WHERE AND WHAT ARE THE SUBSTINTUENTS?	WHERE IS THE PRIMARY FUNCTIONAL GROUP?	HOW MANY PARENT CARBON ATOMS?	WHAT IS THE FUNCTIONAL GROUP?

NAMING ALKANES [CH 3, pp 73-77]

TIP: FIND THE LONGEST HYDROCARBONS.
IF TWO CHAINS OF EQUAL LENGTH ARE PRESENT, CHOOSE THE ONE WITH THE GREATEST NUMBER OF BRANCHES

EXAMPLE:



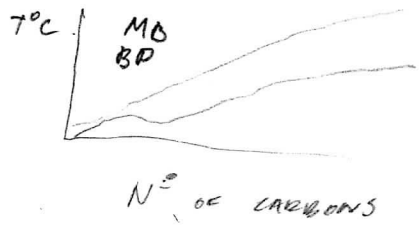
2, 7- DIMETHYL-5-(1-methyl-Propyl) NONANE

5-SECBUTYL-2,7-DIMETHYL NONANE

PROPERTIES OF ALKANES

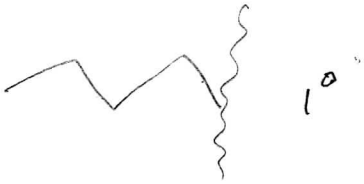
PARRAFFINS - LITTLE AFFINITY

THE DISPERSION FORCES HOLDING THE MOLECULES ARE RATHER WEAK.

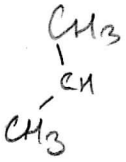


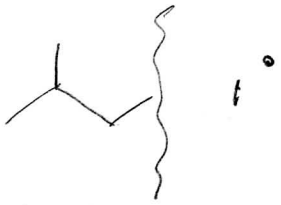
BRANCHED ALKYL GROUPS

BUTYL GROUPS

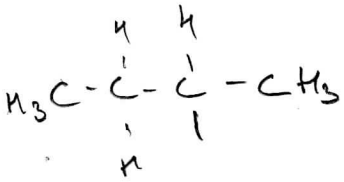


$CH_3-CH_2-CH_2-CH_2-$

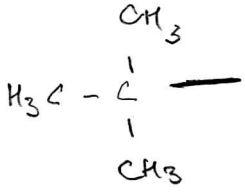




ISOBUTYL



SECBUTYL



TERTBUTYL

PRIMARY CH_3 1°

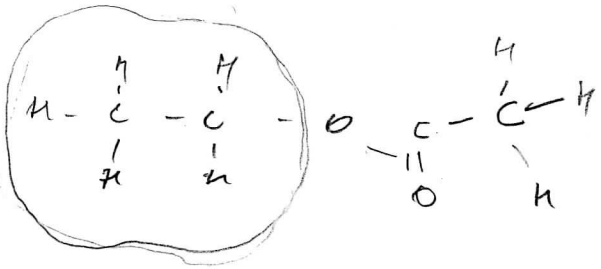
METHYLENE CH_2 2°

METHINE CH 3°

ALKYL GROUPS

ALKYL GROUPS ARE THE FRAGMENTS GENERATED BY REMOVING A HYDROGEN ATOM FROM AN ALKANE AT A GIVEN POSITION

NOT STABLE MOLECULES, BUT CAN BE ATTACHED TO OTHER FRAGMENTS (ALKYL GROUPS, FUNCTIONAL GROUPS) TO MAKE MOLECULES.



ETHYL ACETATE

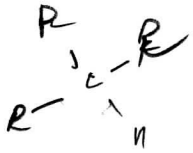
BRANCHING

BRANCHED ALKYL GROUPS ARE GENERATED BY REMOVING A HYDROGEN ATOM FROM AN INTERNAL, RATHER THAN A TERMINAL, CARBON

PRIMARY ALCOHOL

ISOPROPYL

SECONDARY ALCOHOL



TERTIARY

QUATERNARY CARBON

ALKANE ISOMERS

ISOMERS ∴ COMPOUNDS THAT HAVE THE SAME NUMBERS/KINDS OF ATOMS ("MOLECULAR FORMULAS") BUT DIFFERENT STRUCTURES

CONSTITUTIONAL ISOMERS ∴ DIFFER IN THE WAY THAT ATOMS ARE CONNECTED TO EACH OTHER

n-BUTANE

ISOBUTANE

C_3H_8O

NOT ALKANE

ETHER — ANAESTHETIC

$CH_3CH_2OCH_3$

ETHYLMETHYL ETHER

ALCOHOLS

1-PROPANOL

$CH_3CH_2CH_2OH$

2-PROPANOL

$CH_3CH_2(OH)CH_3$