CYCLIC AND BRANCHED ALKANES

A. Cyclic Alkanes or Ring Structures

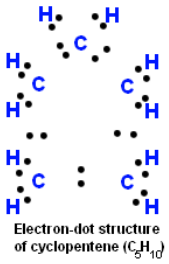
- instead of having a straight chain the carbons are in a ring structure
- molecules make geometric shapes ie: 3 carbons = triangle, 4 carbons = square etc.
- Cyclic alkanes start at three carbons
- **General Formula:** C_nH_{2n} (short two hydrogens)
- **Naming:**

  -Determine the longest possible chain

  -Name as before except use the prefix 'cyclo'

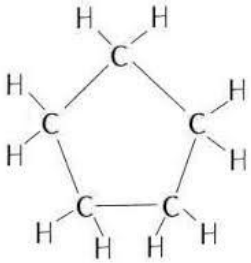
  -Eg: cyclopentane

- **Structural - Lewis**

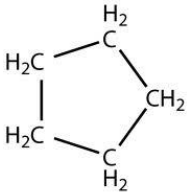


Electron-dot structure of cyclopentene (C_5H_{10})

- **Expanded Structural**



- **Condensed Structural**



- **Molecular Formula** C_5H_{10}

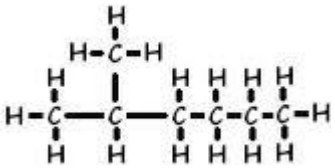
- **Line Diagram**

C. Branched Alkanes

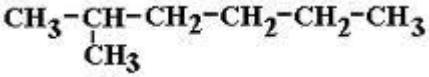
- "branches" come off of the parent chain of carbons instead of having a straight chain
- **General formula –** C_nH_{2n+2}
- **Naming:**
  - find the longest possible chain and circle it
  - number the chain so that the branches have the lowest possible numbers
  - use a number to indicate where the branches are hanging off of the main chain
  - use the organic prefixes to indicate how long the branch is and use the suffix "yl"
  - if there is more than one branch of the same length, use the following prefixes
    - 2 = di
    - 3 = tri
    - 4 = tetra
    - 5 = penta
  - if there is more than one branch with different lengths, name them in alphabetical order
  - name the longest chain as before
  - be sure to use a comma between numbers, and a hyphen between numbers & letters

Example a: 2-methylhexane

- **Expanded Structural**



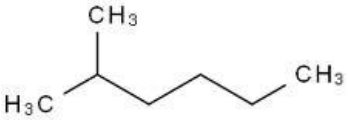
- **Condensed Structural**

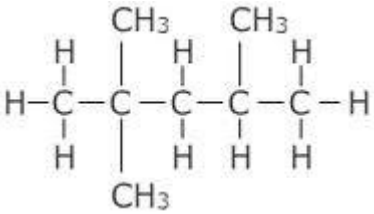


- **Molecular Formula** C_7H_{16}

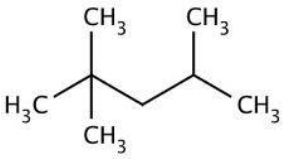
- **Line Diagram**

or





Example b: 2,2,4-trimethylpentane



CYCLIC & BRANCHED ALKANE QUESTIONS

1. Draw the expanded structural formulae and the line diagram for each of the following alkanes.

   a. 2-methylheptane

   b. 3-ethylnonane

   c. cyclohexane

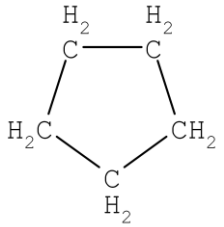
   d. cyclopropane

   e. methylcyclohexane

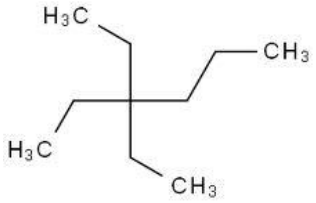
   f. 2,3-dimethyl-4-ethyloctane

2. Name each of the following alkanes.

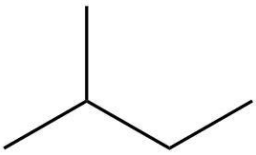
a.



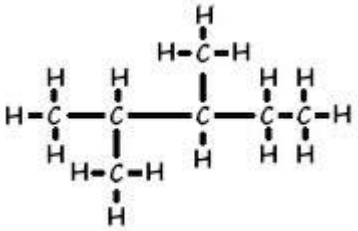
b.



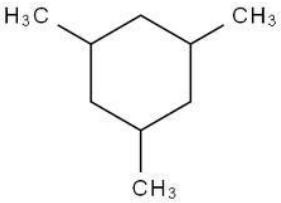
c.



d.



e.



f.