Nomenclature: CYCLOALKANES, ALKANES, ALKYL SUBSTITUENTS Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Table 1**. CYCLOALKANES

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| name | structure | name of polygon (# sides and vertices) | molecular formula/# carbon atoms | hybridization of carbon atoms |
| cyclopropane |  |  |  |  |
| cyclobutane |  |  |  |  |
| cyclopentane |  |  |  |  |
| cyclohexane |  |  |  |  |
| cycloheptane |  |  |  |  |
| cyclooctane |  |  |  |  |

1. For polygons with greater than 5 sides/vertices, how are the names related to the number of sides/vertices?

2. What is the relationship between the name of the polygon and the name of the cycloalkane for those compounds containing 5 or more carbons? We will designate this part of the name as the “root” and underline it. What feature of the cycloalkane is captured by the root in the name?

3. What are the roots of the names of the cycloalkanes with less than 5 carbons? How are they related to the names of the polygons?

**Table 2**. ALKANES/ALKYL SUBSTITUENT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| name | structure alkane/alkyl substituent | # carbon atoms/ molecular formula | hybridization of carbon atoms | root |
| methane/methyl |  |  |  |  |
| ethane/ethyl |  |  |  |  |
| propane/propyl |  |  |  |  |
| butane/butyl |  |  |  |  |
| pentane/pentyl |  |  |  |  |
| hexane/hexyl |  |  |  |  |
| heptanes/heptyl |  |  |  |  |
| octane/octyl |  |  |  |  |
| nonane/nonyl |  |  |  |  |
| decane/decyl |  |  |  |  |
| undecane/undecyl |  |  |  |  |
| dodecane/dodecyl |  |  |  |  |

4. What is the hybridization of the carbon atoms in the alkanes and cycloalkanes shown the 2 tables?

5. What is the relationship between the “–ane” suffix and the structure of the compounds in the two tables?

6. What is the relationship between the “–yl” suffix and the structure of the compounds in the Table 2?

7. What is the relationship between the names for the cycloalkanes (Table 1) and alkanes (Table 2)? What does the prefix “cyclo” mean?

8. Write a procedure for determining the name of a simple cycloalkane, alkane, or alkyl substituent if given the skeletal structure of the compound.

9. Write a procedure for drawing the skeletal structure of a linear alkane/alkyl substituent or cycloalkane if given the systematic name.

10. Draw the structure that corresponds to the name “cyclodecyl”.