Chapter 2: "Methane" Worksheet

1. Fill-in the "Hydrocarbon Tree" and give an example of each:
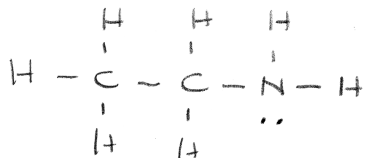
Hydrocarbons

Aliphatic

Aromatic

Alkanes

$$H - \overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}} - \overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}} - H$$

Alkenes

$$\overset{H}{\underset{H}{\diagup}} C = C \overset{\diagup H}{\diagdown H}$$

Alkynes

$$H C \equiv C H$$

Cyclic Aliphatic
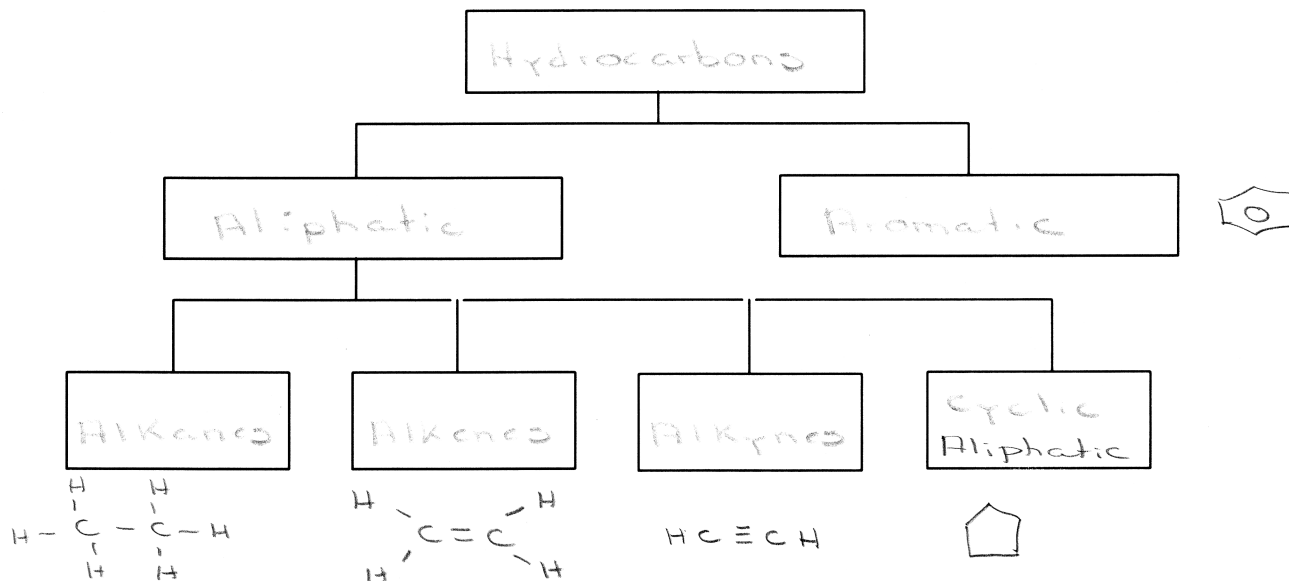
2. Calculate ΔH for the corresponding steps in the reaction of methane with iodine.

$CH_3 - H$ + $I - I$ ⟷ _____ $CH_3 - I$ + $H - I$

+104 + 36 (Endothermic) −56 −71

+140
−127
‾‾‾‾‾
+13
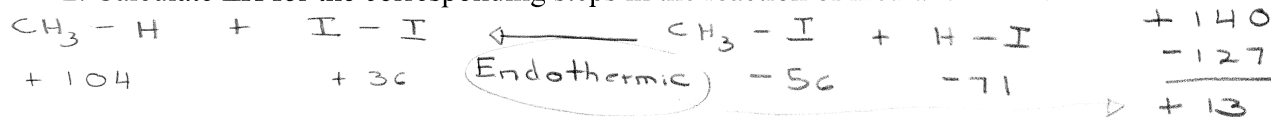
3. AX_4 is a molecule in which the A atom is ___sp^3___ hybridized and the XAX bond angle is __109.5__.

4. Formal Charge = $\dfrac{Group\ \#}{\ } - \dfrac{Non- Bonding\ e's}{\ } - \dfrac{½\ shared\ e's}{\ }$

The formal charge on the N in the following molecule is??

$CH_3CH_2NH_2$

$$H - \overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}} - \overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}} - \overset{\overset{H}{}}{\underset{\underset{..}{}}{N}} - H$$

$5 - 2 - (½(6))$

$5 - 2 - 3 = "0"$