CONCEPT: FUNCTIONAL GROUPS

● We can group several millions of different molecules into subsets of similar _____

1. Hydrocarbons

Alkanes	Alkenes	Alkynes
Single Bonds	Double Bonds	Triple Bonds
$H_3C—CH_3$	$H_2C=CH_2$	$HC\equiv CH$

● All carbon groups regardless of size can be symbolized using an _____ group.

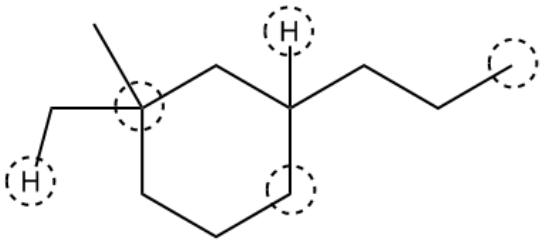
● When an alkane is attached to a greater carbon chain, it is given an _____ suffix. (i.e. _____ group)

● Carbons are given a "degree" based on how many other _____ they are attached to

□ Hydrogens possess the _____ degree as the carbon they are attached to

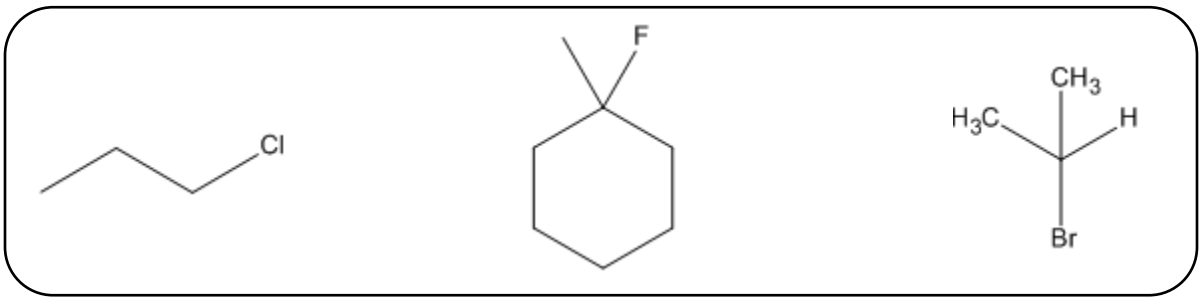
□ Degrees are expressed as primary, secondary, tertiary and quaternary (1°, 2°, 3°, 4°)

EXAMPLE: Determine the degree of the indicated carbons and hydrogens



2. Alkyl Halide _____

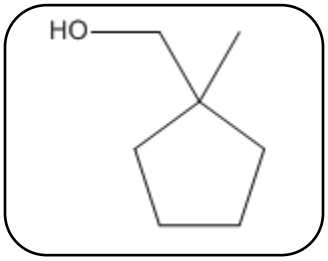
- Any –R group directly attached to a halogen.
- The degree of alkyl halide is determined the same way as _____



The carbonyl _____ is NOT a functional group, but it is a major component of many functional groups

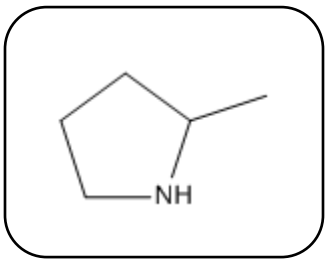
3. Alcohol _____

- Degree of alcohol is determined the same way as ____



4. Amine _____

★ Degree of alcohol is determined the same way as ____.



5. Ether _____

6. Carboxylic Acid _____(_____)

- The acid of organic chemistry

7. Amide _____(_____)

- Degree of alcohol is determined the same way as ____.

8. Ester _____(_____)

9. Carbonyls

The term " carbonyl" is not the proper name of the functional groups because the functionality of the group depends on its location on the carbon chain.

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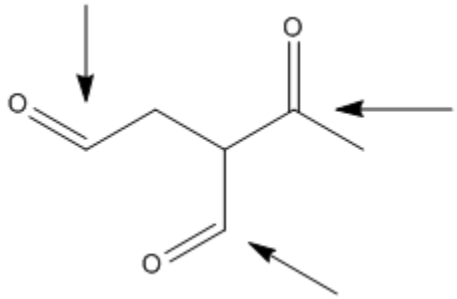
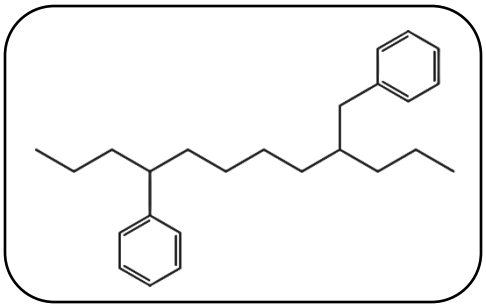
- ● Ketone _____(_____)
  - _____carbonyl group
- ● Aldehyde _____(_____)
  - _____carbonyl group



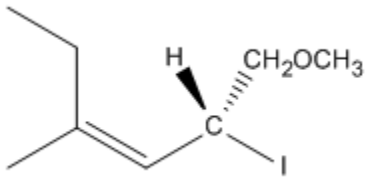
10. Nitrile _____



11. Benzene

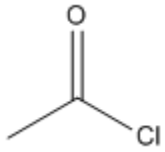
- ● Directly attached to –R group _____ (_____)(_____)
- ● Extra CH_2 between –R group _____ (_____)(_____)

EXAMPLE: Identify all the functional groups in the following compound. Show degrees where applicable.

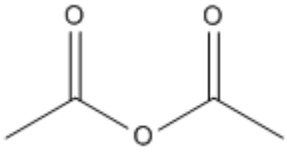


12. Other Carbonyl Compounds

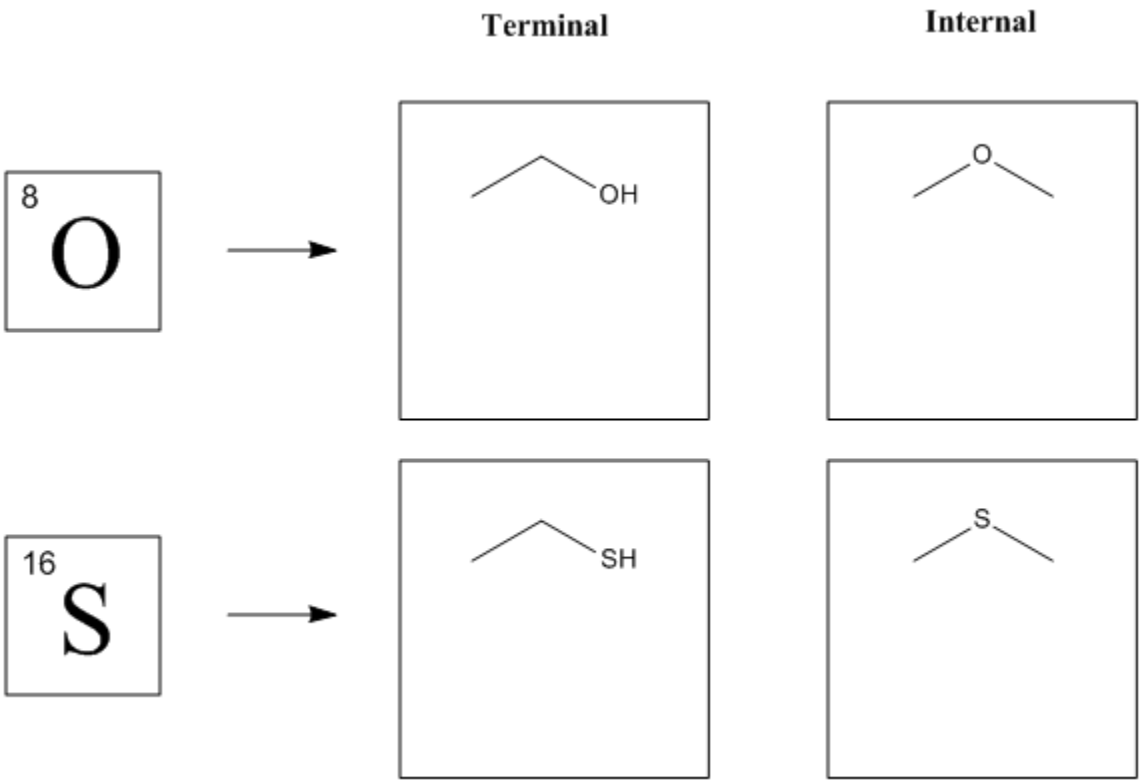
- Acyl Chloride (_____)



- Anhydride (_____)

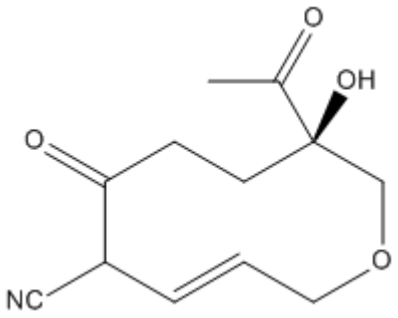


13. Sulfur Compounds

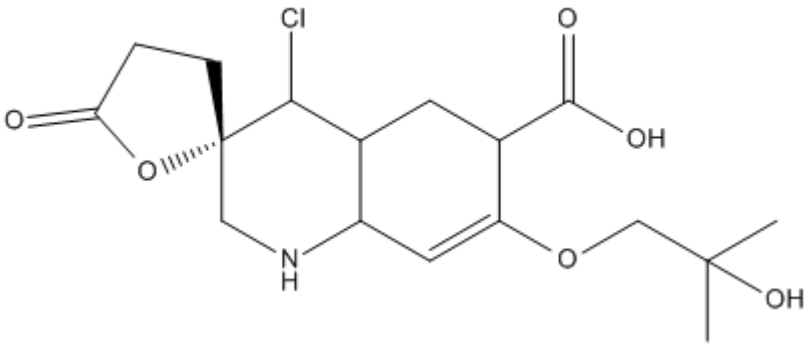


PRACTICE: Identify all the functional groups in the following compound. Show degrees where applicable.

a.



b.



c.