Unit 1: Organic Chemistry

1.1 Functional Groups

- Just over 100 elements in the Periodic Table.
- Over 10 million organic compounds exist and over 300 000 new ones are synthesized each year.
- The modern definition of organic chemistry states: “Organic chemistry is the chemistry of carbon compounds”.

What makes Carbon Compounds Different?

- Carbon is tetravalent and can form 4 strong covalent bonds with other carbon atoms.
- In non-polar molecules we find London dispersion forces forces. In polar molecules we find dipole-dipole bonding. In molecules containing –OH or –NH we find hydrogen bonding.
- Carbon compounds are unusual in that they can form extended chains and rings of carbon atoms.

Shapes of Organic Molecules

- In organic molecules containing only single bonds, carbon bonds tetrahedrally with a bond angle of 109.5°.
- Double and triple bonds are not as strong as single bonds and are usually sites of reactivity.
- The carbon chain (the carbon skeleton) in an organic molecule is so strongly bonded together they often don’t react even though functional groups attached to the chain can be changed.
- Organic substances are often divided into the “carbon skeleton” and the “functional groups” (e.g. –OH)

For a list of functional groups see page 93.

Homework

- Practice 1,2,3,4
- Questions 1,2