Organic Chemistry Review

1. Organic compounds must contain Carbon (and usually H), they are molecular compounds
2. Carbon always makes 4 covalent bonds (wide variety of compounds)
3. Molecular formulas show exact numbers of atoms in a compound.
4. Structural formulas show the bonding arrangement of atoms
5. Empirical formulas show lowest whole number mole ratio of atoms
6. Hydrocarbons contain only C & H (table Q)
7. Saturated hydrocarbons contain only single carbon to carbon bonds (alkanes)
8. Unsaturated hydrocarbons have 1 double or triple carbon to carbon bond (alkenes & alkynes)
9. Properties of organic compounds
   A. low melting points and boiling points, weak imf's
   B. melting points/ boiling points increase with mass (imf's increase with size)
   C. slow reaction rates due to strong covalent bonds
   D. Catalysts are used to speed up organic reactions (enzymes)
   E. Hydrocarbons are always non polar and do not dissolve well in water
10. Isomers are compounds with the same molecular formula but a different structure. They have different properties due to differences in structure.
11. The greater the number of carbon atoms the greater the number of isomers, minimum of 4 C's needed for a different structural arrangement
12. Use table P and R to name hydrocarbons

A. alkanes – end in ane B. alkenes - end in ene C. alkynes - end in yne

Meth = 1 C Eth = 2 C Prop = 3 C But = 4 C

13. Functional groups give rise to unique properties. Table R lists functional groups
14. Alcohols are the most common nonelectrolyte
15. Esters smell good. Esterification is organic acid + alcohol → ester + water
16. Organic acids are weak electrolytes (COOH)
17. Alkanes + halogen = substitution reaction
18. Alkenes (ynes) + halogen = addition reaction (the double bond breaks and they become saturated)
19. Fermentation sugar → (ethanol) C_2H_5OH + CO_2
20. Saponification fat + base → soap + glycerol
21. Combustion reactions organic compound + O_2 → CO_2 and H_2O (top of table I)
22. Polymerization makes long chained molecules from smaller units (monomers)
23. Fractional distillation is used to separate mixtures of hydrocarbons (petroleum) due to differences in boiling points