Formulas

Formal Charge	FC = electrons around nuclei - (electrons in lone pairs + 1/2 electrons in bonding pairs)

Resonance Structure Rules

All resonance structures must have same valence electrons

Octet rule must be obeyed

Nuclei Positions do not change

Functional Groups

Alkane	Single Bond	Ethane
Alkene	Double Bond	Ethene
Alkyne	Triple Bond	Ethyne
Aromatic	Aromatic ring (3 single bonds, 3 double bonds)	Benzene
Haloalkane	Halogen (atom with 3 lone pairs)	Chloro/Bromo/etc + ethane
Alcohol	OH on it's own	Ethanol
Phenol	Aromatic Ring + OH	Phenol
Ether	O in the middle of a chain	Methoxymethane
Amine	N on it's own	Methanamine
Aldehyde	Double bonded O on the end with an H	Ethanal
Ketone	Double bonded O on it's own	Propanone
Carboxylic Acid	Double bonded O with an OH at the end of a chain	Ethanoic acid
Ester	Double bonded O with an O in the chain	Methyl ethanoate
Amide	Double bonded O with an N	Ethanamide
Nitrile	C triple bonded with N	Ethanenitrile

Naming Chain Fragment

Primary	One x attached
Secondary	Two xs attached
Tertiary	Three xs attached
Iso___	CH3-CH (functional group)-CH3
Sec___	CH3-CH (functional group)-CH2-CH3
Tert___	CH3-CH (CH3)(functional group)-CH3
1 Carbon	meth(ane/yl)
2 Carbons	eth()
3 Carbons	prop()

Naming Chain Fragment (cont)

4 Carbons	but()
5 Carbons	pent()
6 Carbons	hex()
7 Carbons	hept()
8 Carbons	oct()
9 Carbons	non()
10 Carbons	dec()
Radicals	All carbons and hydrogens
Carbocations	R groups and hydrogens bonded to a carbon

Rules

pKa	As pKa Decreases Acidity Increases, as pKa increases Basicity decreases.
% S character	Higher s character means electrons are closer to nucleus, therefore energy for acidity is lower
Radical Selectivity (Faster to slower formation)	Tertiary > Secondary > Primary > Methyl
Carbocations Selectivity (Faster to slower formation)	Tertiary > Secondary > Primary > Methyl

IUPAC Nomenclature Rules

Identify longest chain of Carbons - Determines Parent name

IF there are a couple of possible chains of equal length, choose chain with MORE substituents - avoids complex substituents

Number chain so that the substituents have the smallest possible number

Place substitute names in alphabetical order (ignore all prefixes EXCEPT iso and cyclo)

No spaces! only hyphens and commas

Bicyclic Compounds

Start numbering at bridgehead - go around longest/biggest bridge first