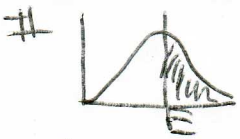
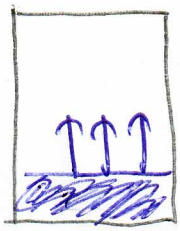
11/1/11

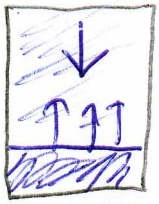
vapor pressure



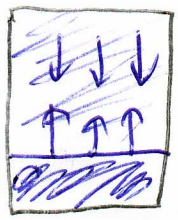
forward- evaporation reverse- condensation



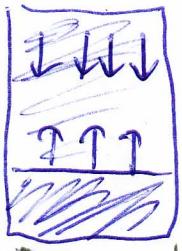
t = 0
[P] = 0
$R_r = 0$; only evaporation



just after t=0
$R_f > R_r$



t = equilibrium
$R_f = R_r$
no more change



past equilibrium
[P] too great
$R_r > R_f$

@ t = 0, water is suddenly introduced into a completely empty chamber (under vacuum)

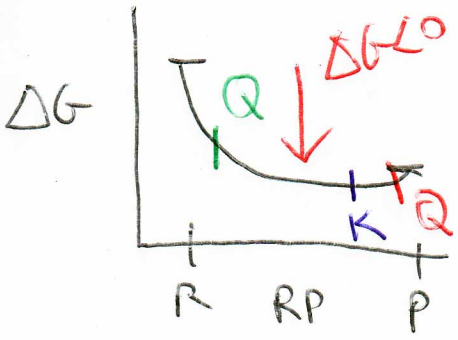
Le Châtelier's Principle

When a system @ equilibrium is stressed (changed), the system will respond in a way that relieves that stress.

Q = reaction quotient

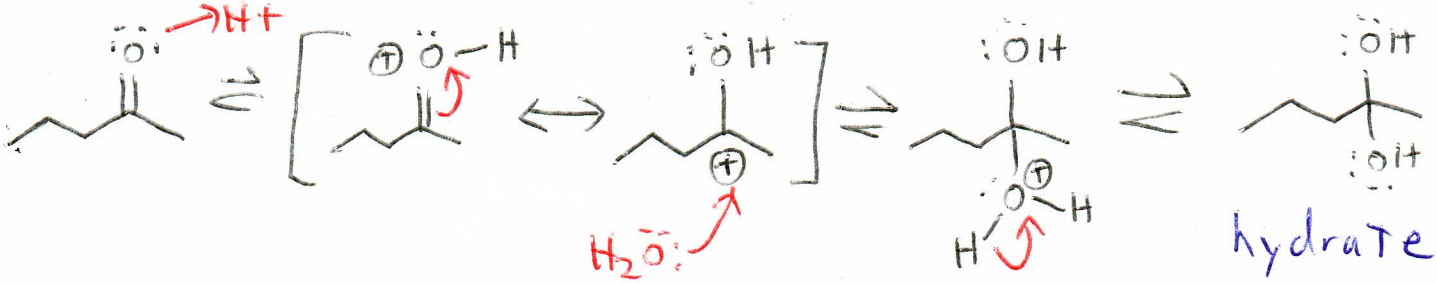
Q is mathmatically identical to K, except K is only calculated using equilibrium concentrations, while Q can be calculated at any point in a rxn.

Q = products / reactants



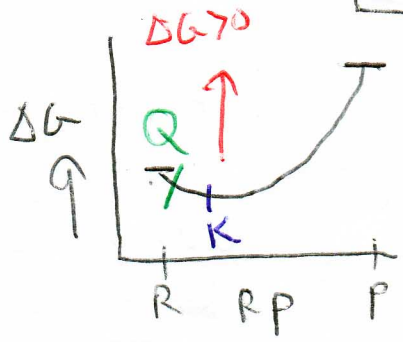
If Q<K, not enough products have formed, and/or there are too many reactants present.

If Q>K, not enough reactants are present and/or too many products have formed.



The rxn above is reversible and non-spontaneous,

If products are removed as the rxn tries to reach equilibrium:



1) $Q < K$ since [products] just decreased.

2) $R_s > R_r$, since products were removed (but not reactants)

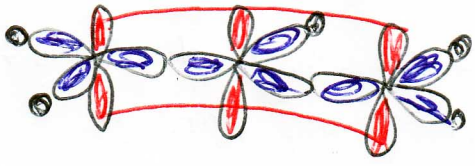
3) Potential E of the system is effectively increased.

∴ The rxn will move forward to make more products to re-establish equilibrium,

— If products are continuously removed as they form, the rxn can be forced to completion, even though it is non-spontaneous,

K is only affected by temperature, not [ ].

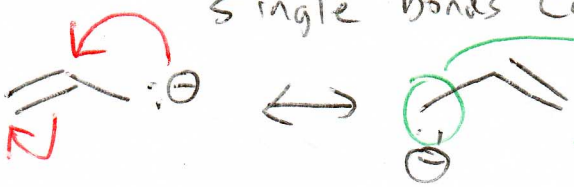
Delocalization



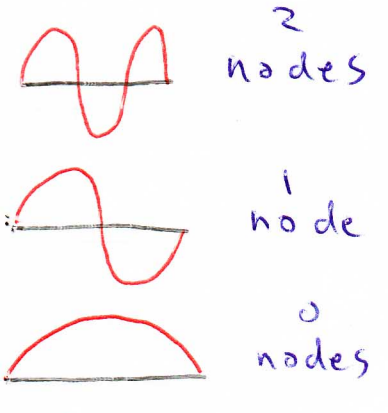
- Resonance structures only exist because the system used to write structures (L.D.S.) is unable to unambiguously represent bonds that cover more than two atoms.
- No single resonance structure correctly reflects the true structure of a molecule,
- The true structure of a molecule can be estimated by averaging all of the possible resonance structures together.

Rules for writing resonance structures

- Only lone pairs and π bonds are able to move; single bonds can never be formed or broken.

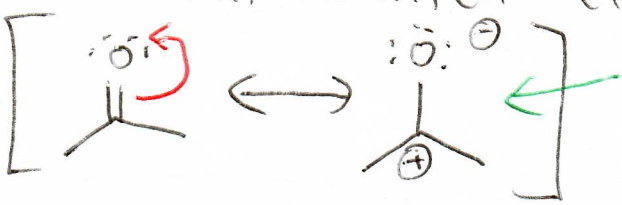


This carbon is sp^2 hybridized, It appears that it is sp^3 hybridized in this resonance structure, but that is because resonance structures fail to show delocalized bonding.

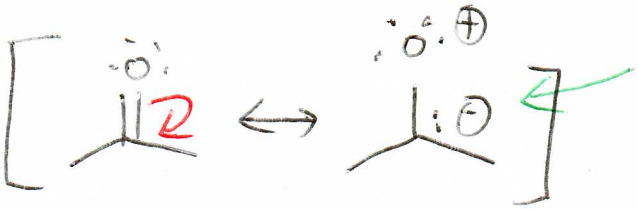


A non-bonding orbital is the same in energy as the atoms would be if they had never undergone bonding.

- Better resonance structures generally have full octets (when possible), lack charge separation, and have charges that match electronegativity,



unfavorable due to charge separation.



even worse since oxygen is now ⊕ charged.