

2b Lec 21, slides 13-35
SOLUTION ≡ homogeneous mixture (s) of 2 or more substances

- 1a CFC PROPERTIES and USES**
- low bp (less, less, less)
 - INERT (nonflamm, nontoxic)
 - long LIFE TIME in STRATOSPHERE TROPOSPHERE
- 1b USES**
- REFRIG (and AC)
 - SPRAYS
 - PROPELLANT (drugs, asthma, ...)
 - FIRE FIGHTING → halons → F, E, F
 - foaming agents

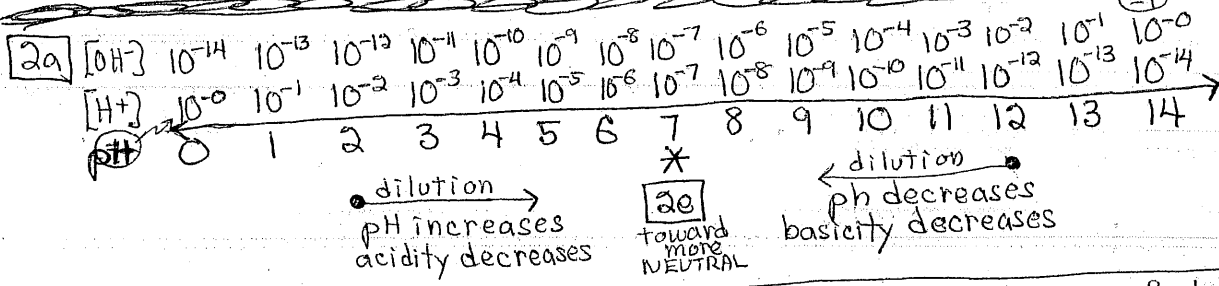
- 1c CFC**
- H C F C
 - H F C
 - B C F C (halons)

if Cl (or Br), O₃ ↓
if H, less INERT (LIFE TIME ↓) and more FLAM TOXIC

APPROXIMATE?

- HOUSEHOLD AMMONIA
- LAUNDRY DISH SOAP
- RAIN WTR
- ORANGE; CRANBRY; POWERADE
- COLA
- LEMON; VINEGAR

acid rain: H₂SO₄, HNO₃
normal rain: H₂CO₃, CO₂



2e toward more NEUTRAL

2a [H⁺][OH⁻] = 1 × 10⁻¹⁴
(3.8 × 10⁻⁹)[OH⁻] = 1 × 10⁻¹⁴
[OH⁻] = 2.63 × 10⁻⁶

pH ≡ -log [H⁺]
pH = -log (3.8 × 10⁻⁹)
pH = 8.42

ORDER INTO CALCTR
if [H⁺] = 10⁻⁹, be careful. put "1 EXP -9" into CALCTR, not "10 EXP -9" (w/ 10 × 10⁻⁹ = 10⁻⁸)

SHOW WORK: (A) EQUATION, (B) SUBSTITUTE #s, (C) SOLVE and CALCULATE

2b SOLUTION ≡ SOLUTE in SOLVENT (larger amount) WATER

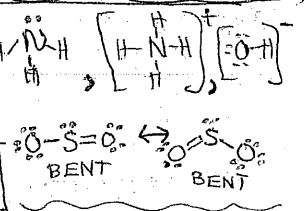
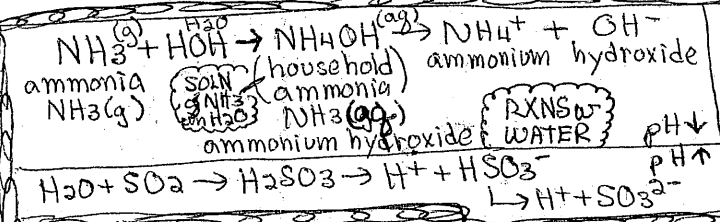
IONIC POLAR (electrolytes) → NH₃, HCl, NaCl, ...
NON-POLAR (non-electrolytes) → sugar, alcohol, ...

molarity ≡ moles of SOLUTE / L of SOLVENT

if [H⁺] = 10⁻⁴ M, is 1 × 10⁻⁴ mole H⁺ / 1 L SOLUTION

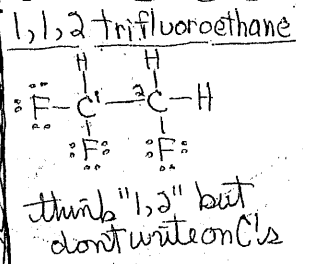
3a LIKE DISSOLVES LIKE

	(alcohol) POLAR	GASOLINE NON-POLAR
water	YES	no
oil	no	YES



NH₃ - HCl, HNO₃, ... WASH OUT IN RAIN
CO₂ - CFC, HCFC don't remain in atmosphere as gases
O₃
Na

# of directions for electrons	4	4	4	3	3	2
# of directions for bonded atoms	4	3	2	3	2	2
	CH ₄	NH ₃	H ₂ O	SO ₃	SO ₂	CO ₂
	tetrahedral	trigonal pyramidal	bent	trigonal planar	bent	linear



- 3c**
- F, Cl, Br, I, H → non-metals
 - metals

- 3b**
- 1a) ELECTRONEGATIVITY → BOND polar? MOLECULE polar?
 - 1b) MOLECULAR SHAPE GEOMETRY, SYMTRY
 - 2) PROPERTIES (LIKE DISSOLVES LIKE, ...)