DIRECTED WORK N°2

Ex1- Give Brönsted's definition of an acid and a base.
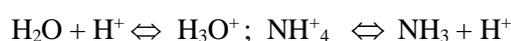
Ex2- We consider the following acid/base pairs:

$$HCOOH / HCOO^- ; HF/F^- ; HCN/CN^- ; H_2CO_3/HCO_3^- ; HCO_3^-/CO_3^{-2}$$

a- Indicate which of the above pairs are acids?

b- The acid-base half-equation for each pair?

Ex3- Consider the two acid-base half- equations:

$$H_2O + H^+ \Leftrightarrow H_3O^+ ; \quad NH^+_4 \Leftrightarrow NH_3 + H^+$$

a- Which of the above chemical species are bases?

b- Write down the acid-base pair for each half-equation?

c-What acid-base property does water have?

Don't forget to draw your future.

Ex4-a- Identify an acid-base reaction.

b- Write the acid-base equation between **nitrous acid HNO₂** and **ammoniac NH₃.**

c- Write the equation for the acid-base reaction between the **C₆H₅NH₃⁺** ion and the **OH⁻** ion.

Ex5- Write down, in ascending order, the acidity (Ka) of the pairs below for C = const:

acid/base Couple	pKa
CH₃-COOH / CH₃-COO⁻ : ethanoïc Acid	4,75
ClCH₂-COOH/ClCH₂-COO⁻ : Mono chloro éthanoïc Acid	2,85
CH₃-CH₂-NH₃⁺/CH₃-CH₂-NH₂:Ethanamine	10,8
C₆H₅NH₃⁺/C₆H₅NH₂ : Aniline	4,6

Ex6 :

a- Calculate the pH of an aqueous solution of a strong acid noted HA of molar concentration:

$C_0 = 10^{-1}$ mol/L then $C_0 = 10^{-4}$ mol/L.

b-Calculate the pH of an aqueous solution of a weak acid noted HA (pKa=3.6) of molar concentration:

$C_0=10^{-1}$ mol/L then $C_0 = 10^{-4}$ mol/L.

Ex7- What volume of water should be added to 24 mL NaOH solution 0.3 mol/L to obtain a solution at pH = 11.8?

Ex8- Write down the hydrolysis reaction of the acetate ion? What is the pK_b of this base?
 Data : pKa (CH_3COOH/CH_3COO^-) = 4,75.

Ex9-Taking into account that **hydrofluoric acid HF** 0.1 mol.L-1 dissociates at 7.9%, calculate the concentrations of HF, F^- and H_3O^+ at equilibrium, and calculate the acidity constant **Ka**.

Ex10-What is the pH of the solution resulting from mixing 20 mL **HCl** 0.5 mol.L^{-1} with 9 mL **NaOH** 1 mol.L^{-1}?

Ex11-17.4 mL barium hydroxide Ba $(OH)_2$ 0.05 mol.L^{-1} was required to neutralize 236 mg of a monobasic acid. Determine the molar mass of this monoacid.

Ex12-Dosing of 20 mL of an HA acid solution of unknown initial concentration with a 0.1 mol.L^{-1} sodium hydroxide solution. The following results are obtained:

V_{NaOH} (mL)	0	2	4	6	8	10	12	14	16
pH	2,65	3,2	3,6	3,8	4	4,2	4,3	4,45	4,7

V_{NaOH} (mL)	18	19	20	20,4	20,6	21	23	25
pH	5,05	5,3	6,45	9,1	10,35	11	11,45	11,6

a- Draw the **pH= f(V_{NaOH})** curve on graph paper?
b- Determine the equivalence point and the initial concentration of the acid?
c- What is the **pKa** of this acid?

If you want a solution, create an idea