

## Round 1

## Round 2 (HA)

## Semis (A-)

## FINALS

Cyanic Acid

Hydrocyanic Acid

1a)

Acetic Acid *(ethanoic acid)*Formic Acid *(methanoic acid)*

1b)

Benzoic Acid

Nitrous Acid

2a)

Hydrofluoric Acid

Oxalic Acid - 2nd proton  $\text{HC}_2\text{O}_4^-$ 

2b)

Carbonic Acid

Sulfuric Acid - 2nd proton  $\text{HSO}_4^-$ 

3a)

Hydrosulfuric Acid  
(aka: Hydrogen Sulfide)

Hypochlorous Acid

3b)

Carbonic Acid - 2nd proton  $\text{HCO}_3^-$ Hydrogen Sulfide - 2nd proton  $\text{HS}^-$ 

4a)

Boric Acid

Oxalic Acid

4b)

Name: \_\_\_\_\_

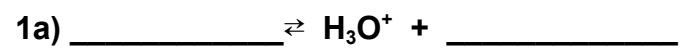
- **WARM UP (your brain)**
  - First start by writing the formulas for all the compounds
- **Round 1: THE STRONGER ACID moves on!**
  - Use the table to find which acid has the highest  $K_a$
- **Round 2: Highest pH moves on!**
  - If the acid is combined with its conjugate base, which buffer solution would have a higher pH
  - Assume the concentration of the acid (HA) is 0.10 M and its conjugate base ( $A^-$ ) is 0.10M
  - **The conjugate base from the most basic buffer solution moves on**
- **Round 3: The Most MASSIVE moves on!**
  - Calculate formula mass.
  - The winner has the greatest formula mass.
- **Round 4: It's a SOLID winner**
  - When in a solution with  $Ca^{2+}$ , which compound will precipitate out?
  - **The precipitate is the winner!**
- **PROVE YOUR HONOR:** Draw the Lewis Dot Diagram of  $SO_4^{2-}$  (must use Formal Charge & Resonance for the correct structure)



**TABLE 16.1****Acid-Ionization Constants at 25°C\***

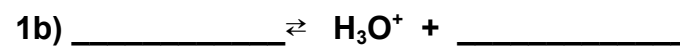
Substance	Formula	$K_a$
Acetic acid	$\text{HC}_2\text{H}_3\text{O}_2$	$1.7 \times 10^{-5}$
Benzoic acid	$\text{HC}_7\text{H}_5\text{O}_2$	$6.3 \times 10^{-5}$
Boric acid	$\text{H}_3\text{BO}_3$	$5.9 \times 10^{-10}$
Carbonic acid	$\text{H}_2\text{CO}_3$	$4.3 \times 10^{-7}$
	$\text{HCO}_3^-$	$4.8 \times 10^{-11}$
Cyanic acid	$\text{HOCN}$	$3.5 \times 10^{-4}$
Formic acid	$\text{HCHO}_2$	$1.7 \times 10^{-4}$
Hydrocyanic acid	$\text{HCN}$	$4.9 \times 10^{-10}$
Hydrofluoric acid	$\text{HF}$	$6.8 \times 10^{-4}$
Hydrogen sulfate ion	$\text{HSO}_4^-$	$1.1 \times 10^{-2}$
Hydrogen sulfide	$\text{H}_2\text{S}$	$8.9 \times 10^{-8}$
	$\text{HS}^-$	$1.2 \times 10^{-13\dagger}$
Hypochlorous acid	$\text{HClO}$	$3.5 \times 10^{-8}$
Nitrous acid	$\text{HNO}_2$	$4.5 \times 10^{-4}$
Oxalic acid	$\text{H}_2\text{C}_2\text{O}_4$	$5.6 \times 10^{-2}$
	$\text{HC}_2\text{O}_4^-$	$5.1 \times 10^{-5}$

Work For Round 2 - include both hydrolysis of weak acid and pH calc.

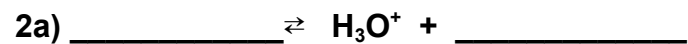


pH =

VS

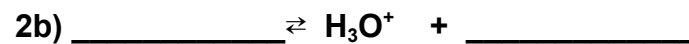


pH =

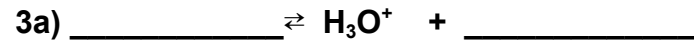


pH =

VS

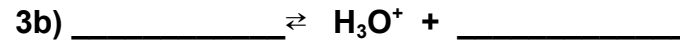


pH =

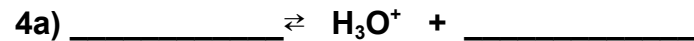


pH =

VS

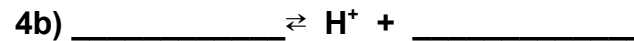


pH =



pH =

VS



pH =