

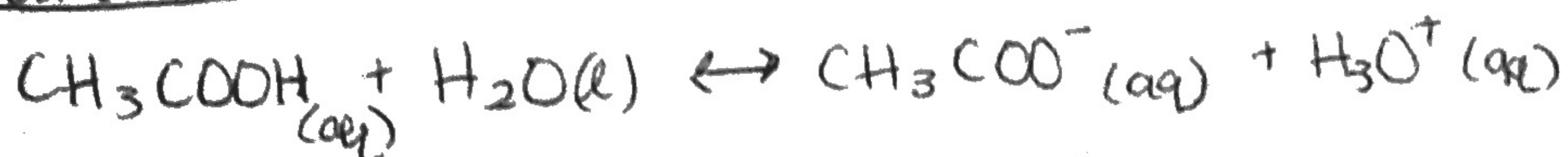
- $\Delta H < 0$ exothermic rxns:

If inc temp, K will dec. (only time K changes),

so if inc temp, rxn will not shift.

ACTIVITY

Part I



1. Write equilibrium expression.

2. $K = 1.8 \times 10^{-5}$, favor products/reactants?
reactants because $K < 1$.

* $[\text{CH}_3\text{COOH}] \gg [\text{CH}_3\text{COO}^-]$
b/c $K < 1$.
most of acid is still in protonated form.

3. ΔG° reaction is pos. or neg.?
pos. \rightarrow uphill in free energy

4. Start with .02M conc. of CH_3COOH and no products, do you expect to have a higher conc. of CH_3COOH or CH_3COO^- @ equilibrium?

5. Start w/ 0.2M CH_3COOH and assume 0 conc. of products. What's the conc. of all species @ eq.?

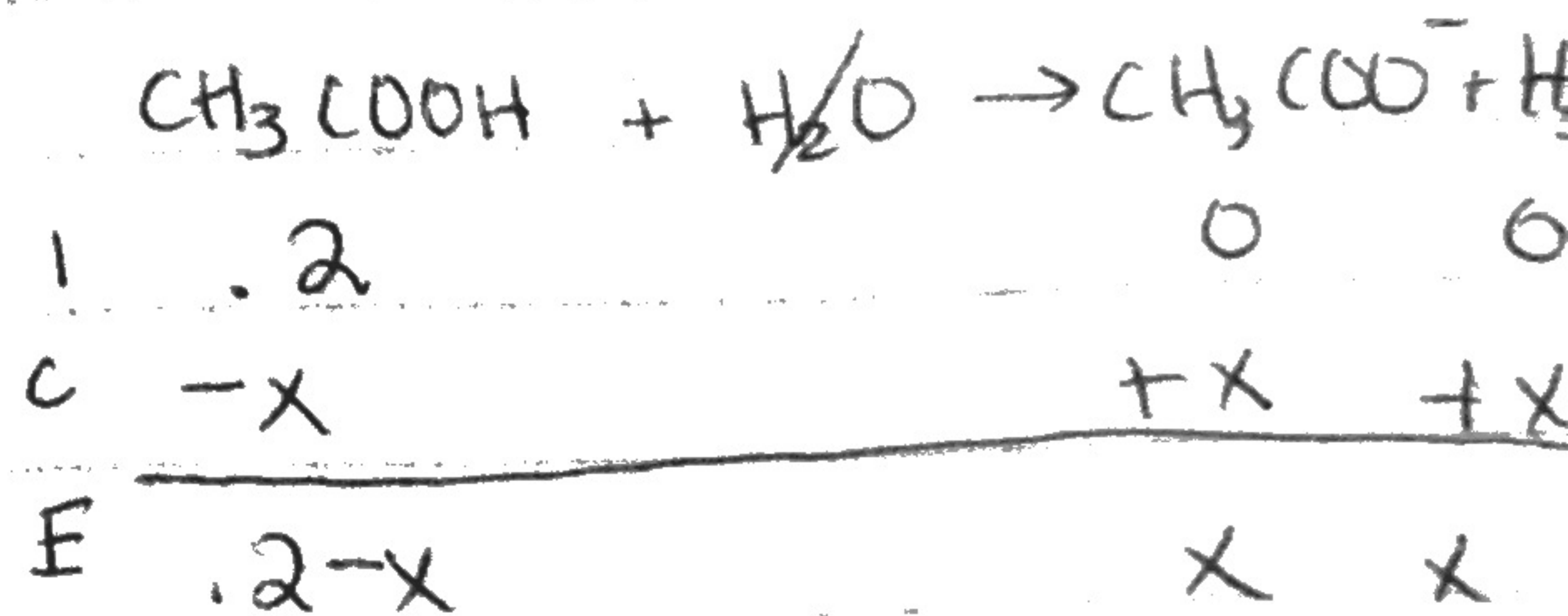
$$K = 1.8 \times 10^{-5}$$

$$\frac{[\text{CH}_3\text{COO}^-][\text{H}_3\text{O}^+]}{[\text{CH}_3\text{COOH}]} = 1.8 \times 10^{-5}$$

$$\frac{x^2}{.2-x} = 1.8 \times 10^{-5}$$

here, x is small, so change is small, so estimate.

$$x = 1.89 \times 10^{-3}$$



- If inc. H_3O^+ conc. what will happen to CH_3COOH conc?

increase, if you had something to the right, will inc. on the left too.

Part II

1. Calc. hydronium ion conc. for:

starts conc. of 0.2M HCl.



K_m for HCl = $1.3 \times 10^6 \times 10^8$

$$\frac{[Cl^-][H_3O^+]}{[HCl]} = 1.3 \times 10^6$$

$[HCl] @ eq = 0$
It all reacts.

2. What's the assumed conc. of hydronium in 0.2M of HCl @ eq.

$$[H_3O^+] = 0.2$$

100% of HCl fell apart and made H_3O^+ .

<p>.2M solution. $[CH_3COOH] = .2M$ $[H_3O^+] = 1.8 \times 10^{-3}M$</p>	<p>.2M soln. $[HCl] = 0M$ $[H_3O^+] = 0.2M$</p>
<p>* almost <u>none</u> reacted. * lightbulb lights up a little bit.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> CH_3COOH CH_3COO^- CH_3COOH CH_3COO^- </div> <p>only few molec. fell apart WEAK</p>	<p>* almost <u>all</u> reacted * lightbulb lights up BRIGHT. - b/c a lot more ions present to conduct electricity.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Cl^- H^+ Cl^- H^+ </div> <p>STRONG, falls apart 100%.</p>

pH →

- measure of H_3O^+

~~- add acid to point eq. shifted so~~

ACIDS

- sour

- low pH < 7

- pH paper → red

- proton donors

- corrosive

- proton "on" b/c
proton donor

BASES

- bitter

- high pH ^{> 7}

- pH paper → blue

- Slippery → react w/ skin;
skin falling off.

- proton acceptors.

- proton "off", proton accep

strong base: if make
a lot of OH^- , it's a
strong base.