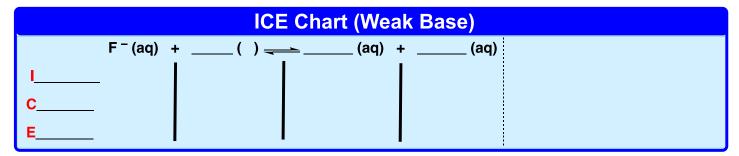
CONCEPT: PH OF WEAK BASES

Calculating Equilibrium Amount

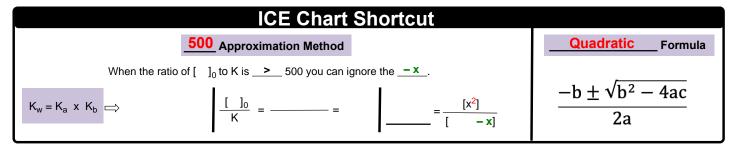
- Recall, Weak Bases represent _____ electrolytes that only partially dissociate into aqueous ions.
 - □ They require the use of an ICE (I_____, C____, E_____) Chart to calculate equilibrium amounts.
 - □ The units of an ICE Chart will be in _____ and use ____.

EXAMPLE: Calculate the hydroxide ion concentration of a 0.55 M KF solution at 25°C. The acid dissociation constant of HF is 3.5 x 10⁻⁴.

- STEP 1: Setup an ICE Chart for the weak base that has it reacting with . .
 - □ For **lonic Bases**, the neutral metal cation.
 - □ Use the Bronsted-Lowry definition to predict the products formed.
 - Make sure that _____ is used in the presence of the weak base.



- STEP 2: Using the INITIAL ROW, place the amount given for the weak base.
 - $\hfill\Box$ Place a ____ for any substance not given an initial amount.
- STEP 3: We _____ reactants to _____ products.
 - □ Using the **CHANGE ROW**, place a _____ for the reactants and a _____ for the products.
- STEP 4: Using the EQUILIBRIUM ROW, setup the equilibrium constant expression with _____ and solve for ____.
 - □ Check if a shortcut can be utilized to avoid the ______ formula.



CONCEPT: PH OF WEAK BASES

Calculating pH

- The pH or pOH of a weak base can be calculated once the [equilibrium] of _____ is found.
 - □ Determined by using the **EQUILIBRIUM ROW** of an ICE Chart.

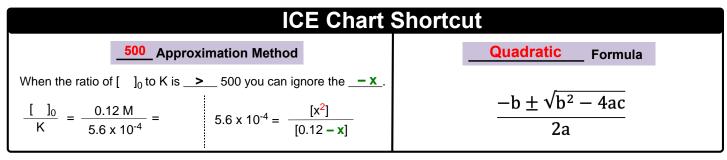
EXAMPLE: What is the pH of a 0.12 M ethylamine, C₂H₅NH₂, solution? The K_b value of ethylamine is 5.6 x 10⁻⁴.

Use STEPS 1 to 3 to setup the ICE Chart.

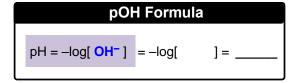
ICE Chart (Weak Base)
C ₂ H ₅ NH ₂ (aq) + () (aq) + (aq)
<u>c</u>
E

STEP 4: Using the **EQUILIBRIUM ROW**, setup the equilibrium constant expression and solve for _____.

□ Check if a shortcut can be utilized to avoid the _____ formula.



STEP 5: The _____ variable will equal [] and can be used to solve pOH.



CONCEPT: PH OF WEAK BASES

Calculating Percent Ionization/Dissociation

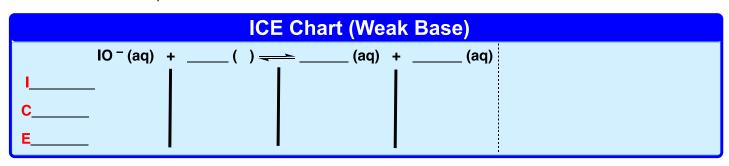
- Weak Bases also represent _____ electrolytes that only partially ionize or dissociate into aqueous ions.
 - □ Weak Bases ionize < _____

□ Strong Bases ionize _____

% Ionization = — x 100

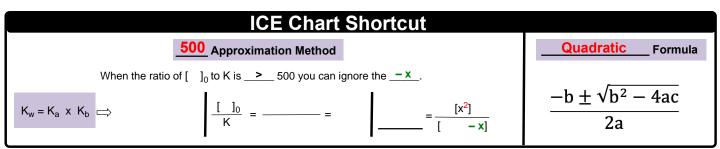
EXAMPLE: Calculate the percent ionization when 73.2 g sodium hypoiodite, NaIO, are dissolved with 500 mL of solution. The K_a value of hypoiodous acid, HIO, is 2.3 x 10⁻¹¹.

Use **STEPS 1 to 3** to setup the ICE Chart.



STEP 4: Using the **EQUILIBRIUM ROW**, setup the equilibrium constant expression and solve for _____.

□ Check if a shortcut can be utilized to avoid the _____ formula.



STEP 5: Use the _____ variable to calculate the percent ionization or dissociation.

CONCEPT: PH OF WEAK BASES
PRACTICE : Determine the pH of a solution made by dissolving 6.1 g of sodium cyanide, NaCN, in enough water to make a
500.0 mL of solution. (MW of NaCN = 49.01 g/mol). The K _a value of HCN is 4.9×10^{-10} .
PRACTICE : An unknown weak base has an initial concentration of 0.750 M with a pH of 8.03. Calculate its equilibrium base
constant.