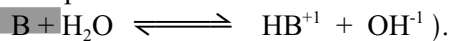


## Calculating the pH of Weak Base Solutions

You are provided with a list of the name of the weak bases, the concentration, and the base ionization constant,  $K_b$ ; in the table below. These may be used to insert in the statement of the problem to solve.

To write a base ionization equation for the base, you may use the boldface first letters of the base name to represent the base and the and the cation formed by the ionization of the base, ( for example:



Your task is to determine the pH of the base. In order to achieve this, complete the following statement:

To determine the pH of a \_\_\_\_\_ mol dm<sup>-3</sup> solution of \_\_\_\_\_ base, given,  $K_b =$

Weak Base	$K_b$	concentration (mol dm <sup>-3</sup> )
Aniline	$4.62 \times 10^{-10}$	0.150
Codeine	$1.65 \times 10^{-6}$	0.220
Ephedrine	$9.08 \times 10^{-5}$	0.324
Nicotine	$1.05 \times 10^{-6}$	0.125
Pyridine	$1.71 \times 10^{-9}$	0.555
Strychnine	$1.85 \times 10^{-6}$	0.336

1. Choose a base from the above table, use the  $K_b$  of the base given in the table above.
2. Rewrite the statement of the problem, fill in the blanks with the specified base name, its concentration and its given  $K_b$ .
3. Solve the problem using the following technique:
  - a. Write the ionization equation for the base dissolving in water. Use the boldfaced letters to represent the base and the cation formed.
  - b. Write the  $K_b$  expression for the specific base.
  - c. Calculate the pH of the base solution, showing steps to justify your answer. Do not forget sig. figs. and correct units.

### For further practice:

Simply repeat step 1 (i.e. pick a base and its  $K_b$ ), but now in step 2 use one of the different concentration given.

Now, repeat step 3.

By changing the concentration each time, you actually have a total of 36 weak base problems to solve.