

5) Using the following pK_b ($pK_b = 4.11$) of an unknown base, calculate the K_a of the corresponding conjugate acid and use the K_a value to identify the unknown base. Be careful to show all the steps used to convert pK_b to K_a .

Conjugate Acid		K_a	Corresponding Conjugate Base	
Phenol:	C_6H_5OH	1.3×10^{-10}	Phenolate:	$C_6H_5O^-$
Formic acid:	$HCOOH$	1.8×10^{-4}	Formate:	$HCOO^-$
Benzoic acid:	C_6H_5COOH	6.3×10^{-5}	Benzoate:	$C_6H_5COO^-$
Acetic acid:	CH_3COOH	1.8×10^{-5}	Acetate:	CH_3COO^-

6.

6) Potassium hydrogen phthalate (KHP, $K^+OOC-C_6H_4-COOH$) is a carboxylic acid which can be accurately weighed and yields solutions of stable pH. For this reason, KHP is used to standardize alkaline solution and to calibrate instruments capable of measuring pH.

25.00 mL of 0.7692 M KHP solution was titrated using 0.1000 M NaOH.

a) Calculate the pH of the KHP solution before the titration begins. ($K_a = 3.91 \times 10^{-6}$)

b) Calculate the pH of the NaOH solution before the titration begins.

c) Calculate the pH at the equivalence point.

d) Calculate the pH after the addition of 29.23 mL of NaOH solution.