Acids and Bases - pH/Worksheet **Name:** ICE

1) Write the conjugate base for the following acids:
H_3PO_4, $H_2PO_3^{\ominus}$ HCl, $Cl^{\ominus}$ H_2S $HS^{\ominus}$

2) Write the conjugate acid for the following bases:
OH^-, H_2O HSO_4^-, H_2SO_4 ClO^- $HClO$

3) Identify the acid-base and conjugate acid/conjugate base pair in the following equations.
a) $HCO_3^- + OH^- \rightleftharpoons CO_3^{2-} + H_2O$
A B CB CA

b) $C_5H_5NH^+ + H_2O \rightleftharpoons C_5H_5N + H_3O^+$
A B CB CA

4) Circle the stronger acid in the following pairs:

a) H_2S vs H_2Se b) HNO_3 vs HNO_2 c) $HClO_3$ vs HIO_3

5) Calculate the pH, pOH, $[H_3O^+]$ or $[OH^-]$ concentrations as indicated in the problem:
a) pH for 0.65 M HBr

$-\log [0.65] = \boxed{0.19}$

b) pOH for 0.073 M LiOH

$-\log [OH^{\ominus}] = -\log [0.073] = \boxed{1.14}$

c) pH for 0.070 M KOH

$-\log [OH^{\ominus}] = -\log [0.07] = 1.15 = pOH$ $pH = 14 - 1.15$
$\boxed{12.8}$

d) $[H_3O^+]$ for lemonade, pH 2.91

antilog 2.91 $\boxed{1.23 \times 10^{-3}\ M}$

e) $[OH^-]$ for blood plasma, pH 7.42

$[OH^{\ominus}] = 14 - 7.42 = 6.58 \rightarrow$ take antilog. $\boxed{2.63 \times 10^{-7}\ M}$

6) Identify the Lewis acid and the base in the following reactions.
a) $Cu^{2+} + 4NH_3 \rightleftharpoons [Cu(NH_3)_4]^{2+}$
LA LB

b) $CO_2 + OH^- \rightleftharpoons HCO_3^-$
LA LB