Acid-Base Equilibrium - SET I

$pH = -\log[H^+]$ $pOH = -\log[OH^-]$ $10^{-14} = [H^+][OH^-]$ $[OH^-] = 10^{-pOH}$ $[H^+] = 10^{-pH}$ $K_w = K_aK_b$

1. Complete the following using the given piece of information:

a) $[H^+]$ = _____ $[OH^-]$ = _____ pH = _____ pOH = 4

b) $[H^+] = 1 \times 10^{-3}$ $[OH^-]$ = _____ pH = _____ pOH = _____

c) $[H^+]$ = _____ $[OH^-]$ = _____ pH = 9 pOH = _____

d) $[H^+]$ = _____ $[OH^-]$ = _____ pH = _____ pOH = 5

e) $[H^+]$ = _____ $[OH^-] = 10^{-6}$ pH = _____ pOH = _____

f) $[H^+]$ = _____ $[OH^-]$ = _____ pH = 2 pOH = _____

2. Differentiate between a strong and weak acid.

3. Complete the following acid/base ionization reactions. In each case, a conjugate acid and base are produced.

a) $H_2S_{(aq)}$ + $H_2O_{(l)}$ $\Leftrightarrow$

b) $CH_3NH_{2(aq)}$ + $H_2O_{(l)}$ $\Leftrightarrow$

c) $H_2CO_{3(aq)}$ + $H_2O_{(l)}$ $\Leftrightarrow$

d) $CO_3^{2-}{}_{(aq)}$ + $H_2O_{(l)}$ $\Leftrightarrow$

e) $NH_{3(aq)}$ + $H_2O_{(l)}$ $\Leftrightarrow$

4. For each the following solutions calculate :

a) 0.0001 M HI $[H^+]$ = _____ $[OH^-]$ = _____ pH = _____ pOH = _____

b) 0.1 M KOH $[H^+]$ = _____ $[OH^-]$ = _____ pH = _____ pOH = _____

c) 0.001 M HNO_3 $[H^+]$ = _____ $[OH^-]$ = _____ pH = _____ pOH = _____

d) 0.002 M $Mg(OH)_2$ $[H^+]$ = _____ $[OH^-]$ = _____ pH = _____ pOH = _____

5. What is the conjugate acid of: a) OH^- _____ b) NH_3 _____ c) HPO_4^- _____ d) H_2O _____

6. What is the conjugate base of: a) H_3PO_4 _____ b) NH_3 _____ c) HPO_4^{-2} _____ d) OH^- _____