**Dougherty Valley HS Chemistry - AP**
**Acid Base – Study Questions 2**

# Worksheet #10

**Name:** **Period:** **Seat#:**

**Directions:** Show all work. Box your final answer.

**1)** Calculate the equilibrium constant, Kneut for the neutralization of hydrocyanic acid by ammonia: *0.72*

$$\mathbf{HCN(aq) + NH_3(aq) \Leftrightarrow NH_4^+(aq) + CN^-(aq)}$$

$K_a$ for hydrocyanic acid = $4.0 \times 10^{-10}$ at 25°C, $K_b$ for ammonia = $1.8 \times 10^{-5}$ at 25°C

**2)** If exactly 50 mL of a 0.050M solution of hydrochloric acid is added to exactly 50 mL of 0.050M ammonia, what is the pH of the resulting solution? *5.43*

**3)** **a)** What is the pH of 100 mL of pure water at 25° C? Use the Kw to show how this is true. *7.0*

**b)** What would the pH of this 100 mL water sample be if 0.10 mL of 12M HCl was added to it? (Assume the volume doesn't change). *1.962*

**c)** Calculate the pH of a buffer solution composed of 0.20M ammonia and 0.20M ammonium chloride. *9.26*

**d)*** Calculate the pH of 100 mL of this buffer solution if 0.10mL of 12M hydrochloric acid is added to it. (Assume the volume doesn't change). *9.2*

**4)** A solution contains $KH_2PO_4$ and $K_2HPO_4$ and has a pH of 7.10. What is the mole ratio of $K_2HPO_4$ to $KH_2PO_4$? Ka = $6.17 \times 10^{-8}$ *0.776 : 1*