**Name: Period: Seat#:**

**Worksheet #10**

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

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| 1. Calculate the equilibrium constant, Kneut for the neutralization of hydrocyanic acid by ammonia: *0.72*   **HCN(aq) + NH3(aq)** ⇔ **NH4+(aq) + CN**−**(aq)**  Ka for hydrocyanic acid = 4.0 x 10-10 at 25°C, Kb for ammonia = 1.8 x 10-5 at 25°C |
| 1. 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* |
| 1. **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). *1.92* |
| **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* |
| 1. A solution contains KH2PO4 and K2HPO4 and has a pH of 7.10. What is the mole ratio of K2HPO4 to KH2PO4? Ka = 6.17 x 10-8 *0.776 : 1* |