

CHEM 1105**PROBLEM SET 6**

1. Give the conjugate acids for:

- (a) N_2H_4 (b) S^{2-} (c) PO_4^{3-} (d) HSO_4^-

2. Give the conjugate bases for:

- (a) N_2H_4 (b) H_2O (c) NH_4^+ (d) HCO_3^-

3. Calculate the pH for solutions which have

- (a) $[\text{H}^+] = 2.8 \times 10^{-8} \text{ M}$ (b) $[\text{H}^+] = 0.0123 \text{ M}$
(c) $[\text{OH}^-] = 0.00025 \text{ M}$ (d) $[\text{OH}^-] = 7.3 \times 10^{-9} \text{ M}$

In each case, say if the solution is acidic or basic.

4. Calculate:

- (a) $[\text{H}^+]$ if $\text{pH} = 5.9$ (b) $[\text{OH}^-]$ if $\text{pH} = 4.7$
(c) the mass (in grams) of NaOH in 650 mL of a solution of NaOH if the $\text{pH} = 11.4$
(d) the mass (in grams) of HI in 25.0 mL of a solution of HI if the $\text{pH} = 5.4$

5. Label the following as strong acid, weak acid, strong base or weak base:

- (a) HF (b) NH_4^+ (c) CN^- (d) H_2SO_4 (e) LiOH (f) NH_3
(g) HNO_3 (h) H_2S (i) CH_3COO^- (j) KOH (k) H_2PO_4^-

6. Identify the acids and bases in the following equilibrium:

