6.4 Explaining Acids and Bases /18

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use the modified Arrhenius theory to suggest a chemical reaction to explain the acidic properties of the following solutions: **(3marks)**

1. HI(aq)
2. HOCl(aq)
3. H3PO4(aq)

Use the modified Arrhenius theory to suggest a chemical reaction to explain the basic properties of the following solutions: **(3marks)**

1. Na2SO4(aq)
2. NaCH3COO(aq)
3. Sr(OH)2(aq)
4. Carbon dioxide is a major air pollutant of fossil fuels. Suggest a possible chemical reaction that explains the acidity of the carbon dioxide solution. **(2marks)**

Test the explanatory power of the modified Arrhenius definitions by explaining the following evidence. For each of the following compounds, write a dissociation equation where appropriate, and then write a chemical equation showing reactions with water to produce either hydronium or hydroxide ions (consistent with the evidence): **(7marks)**

1. HBr(g) in solution shows a pH of 2 on pH paper.
2. Na3PO4(s) forms a solution with a pH of 8.
3. NaHSO3(s) in solution turns blue litmus red.
4. Na2HPO4(s) in solution turns red litmus blue.
5. Na2O(s) in solution turns red litmus blue.
6. SO3(g) in solution turns blue litmus red.
7. KOH(s) yields a solution with a pH of 12.
8. According to the modified Arrhenius theory, what is the balanced chemical equation for the reaction of aqueous nitric acid and aqueous potassium hydroxide? **(2marks)**
9. Describe how the modified Arrhenius theory simplifies the many different examples that you have previously seen of the neutralization of an acid with a base. **(1marks)**