

1. (10 pts.) Explain how water can act as both a Brønsted-Lowry base and a Brønsted-Lowry acid. In the explanation provide examples of water acting in both ways. 1. _____

2. _____

3. _____

4. _____

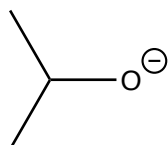
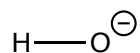
5. _____

6. _____

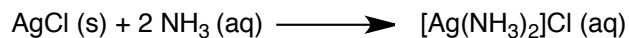
2. (10 pts.) Explain why H_2SO_4 is a stronger acid than H_2SO_3 . In your explanation, remember to consider the structure of the conjugate bases.

7. _____

3. (10 pts.) Hydroxide and isopropoxide are both bases. Ignoring any possible solvent effects, determine which is the stronger base and explain your choice.



4. Silver chloride can be made to dissolve in water if ammonia is added to the water. A balanced chemical equation describing the reaction is drawn below.

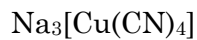
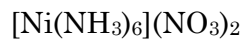
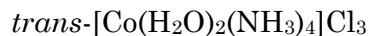
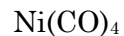
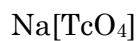
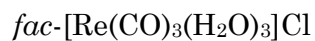


a. (5 pts.) Is the ammonia acting as a Lewis acid or a Lewis base? Explain your response.

b. (5 pts.) Is the metal acting as a Lewis acid or a Lewis base? Explain your response.

5. (10 pts.) What is the strongest acid that can exist in water? Explain.

6. (12 pts.) Determine the oxidation numbers for the transition metals in the following coordination complexes



7. (9 pts.) Draw a three-dimensional representations for the following coordination complexes. Only draw structures for the coordination complex (complex ion).

