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1. If you have a test tube of NH_4NO_3 and add water to it, how much does the temperature change and in what direction?
2. $\text{NH}_4\text{NO}_3 + \text{H}_2\text{O} = \text{NH}_4 + \text{NO}_3$
Is this an endothermic or exothermic reaction? Rewrite the equation adding heat to the proper side.
3. If you add anhydrous CaCl_2 to water in a test tube what is the temperature change and in what direction?
4. $\text{CaCl}_2 + \text{H}_2\text{O} = \text{Ca} + 2\text{Cl}$.
Is this an endothermic or an exothermic reaction? Rewrite the equation adding heat to the proper side.
5. If you add 10 ml of 1.0 M HCL to a test tube that contains magnesium will that be an endothermic or exothermic reaction? What will the bottom of the test tube fill like?
6. If you increase the HCL solution in # 5 to 2.0 M HCL , what does it do to the reaction time? Is this an endothermic or exothermic reaction?
7. Now do the same with a 3.0 M HCL solution and is this exothermic or endothermic?
8. Rate the reaction times with Mg with 1.0 M HCl, 2.0 M HCl and 3.0 M HCl
Which reaction is fastest? Which reaction is slowest?
9. You have 10 ml of vinegar in each of two test tubes. One test tube is placed in crushed ice and cooled to a temperature of 10 degrees Celsius. The other test tube is placed in a 400 ml beaker half filled with water and heated to 50-60 degrees Celsius. now 1 scoop of NaHCO_3 is added to each sample. What will happen in each test tube and which test tube will clear first?
10. You have FeSCN^{2+} in an equilibrium mixture. Tell me if adding each of the following increases or decreases the FeSCN^{2+} and the reason why.
 - a. Fe^{3+}
 - b. heat
 - c. Cl minus
 - d. cooling
 - e. SCN minus
11. $\text{Cu}(\text{OH})_2 = \text{Cu}^{2+} + 2\text{OH}^-$, This is a reversible equation.
You have 3 ml of 0.1M CuCl_2 in each of 3 test tubes. You add drops of 0.1 M NaOH until a white, cloudy precipitate forms (solid $\text{Cu}(\text{OH})_2$).
 - a. To the first tube you added more 0.1 M NaOH, which increased the amount of OH(minus)
How would the appearance change? Which component increased or decreased? How did the equilibrium shift in response to this stress?
 - b. To the second test tube add drops of 1 M NH_4OH ($\text{NH}_3 + \text{H}_2\text{O}$). What will be the change in appearance? **Deep blue $\text{Cu}(\text{NH}_3)_4$ is formed which decreases the amount of Cu^{+} in the equilibrium.**
 $\text{Cu}^{2+} + 4\text{NH}_3 = \text{Cu}(\text{NH}_3)_4$ (Two plus) which is deep blue.

In the equilibrium equation what component increased or decreased? How did the equilibrium respond to this stress?
 - c. To the third test tube you add a few drops of 0.1M HCl. What will be the change in appearance?
 $\text{H}^+ + \text{OH}(\text{minus}) = \text{H}_2\text{O}$

In the equilibrium equation for $\text{Cu}(\text{OH})_2$, what is the component that increased or decreased?
How did the equilibrium shift in response to this stress?

12. In each of 6 test tubes you place 3 ml of a stock solution which is a mixture of 10 ml of 0.01 M $\text{Fe}(\text{NO}_3)_3$ and 10 ml of 0.01 M KSCN. The following items are added to each tube. For each, what will be the initial color, final color, ions that increase, ions that decrease, and what the equilibrium shifted towards.
1. water. (this is is control tube. Just need initial color and final color
 2. 10 drops of 1 M $\text{Fe}(\text{NO}_3)_3$ Cork top put on and mixed
 3. 10 drops of 1 M KSCN Cork top put on and mixed
 4. 10 drops of 3 M HCl Cork top put on and mixed
 5. 10 drops of water. Tube is placed in a beaker of warm water and the heat source is turned off to prevent boiling. Color is observed after 10 minutes.
 6. 10 drops of water. Tube is placed in a beaker of ice. What is the color after 10 minutes

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