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| Conjugate Acids and BasesCλeMis+ry: http://genest.weebly.com Stop in for help every day at lunch and Tues,&Thurs after school! |  | Name\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_ |

1. Give the formula of the conjugate acid of each: NO3-, H2O, HSO4-

***Identify the acid, base, conjugate acid and conjugate base for each of the following.***

1. HClO4(aq) + H2O(l) ⇄ H3O+(aq) + ClO4–(aq)
2. H2SO3(aq) + H2O(l) ⇄ H3O+(aq) + HSO3–(aq)
3. HC2H3O2(aq) + H2O(l) ⇄ H3O+(aq) + C2H3O2–(aq)
4. H2S(g) + H2O(l) ⇄ H3O+(aq) + HS–(aq)
5. These are all either acids or bases. **Draw a slash** through the molecule to show the half that would fall off. How many pieces will this fall apart into if made into an aqueous solution? (circle your choice)

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| NaOH(aq) | 1? 2? 3? 4? 5?  | HBr | 1? 2? 3? 4? 5?  |
| HNO3(aq) | 1? 2? 3? 4? 5?  | KOH | 1? 2? 3? 4? 5?  |
| H2CO3 | 1? 2? 3? 4? 5?  | HCH3COO)2 | 1? 2? 3? 4? 5?  |

1. Circle the CATION element in each.

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| *Circle any element that is a metal* | This substance is… | When one of these dissolves, how many aqueous ions form? |  | *Circle any element that is a metal* | This substance is… | When one of these dissolves, how many aqueous ions form? |
| H2SO4(aq) | acid / base / neither |  |  | NaOH(aq) | acid / base / neither |  |
| Mg(OH)2(aq) | acid / base / neither |  |  | HNO3(aq)  | acid / base / neither |  |

1. Give the formula for the conjugate acid of CH3NH2.
2. Give the conjugate base of each: HCl, HBr, HI,

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| 1. Draw gas in the left beaker and aqueous, per the following instructions:
 | http://www.clipartbest.com/cliparts/jix/Gg8/jixGg84iE.pngGAS In gas phase draw a half dozen molecules of the only substance in HCl(g) |  | http://www.clipartbest.com/cliparts/jix/Gg8/jixGg84iE.pngAQUEOUSIn gas phase draw three particles of all three substances present in HCl(aq)  |

1. Write a balanced equation that shows HClO4, losing a H+ to form its conjugate base.
2. Write a balanced equation that shows HNO3,losing a H+ to form its conjugate base.
3. What happens to hydroxide concentration in water when base is added?

( it rises / it falls / it doesn’t change )

1. What happens to the hydronium concentration in water when base is added?

( it rises / it falls / it doesn’t change )

1. The following substances act as Bronsted acids in water. Write a chemical equation for each that illustrates its reaction with water.

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| --- | --- |
| ammonium ion, NH4+ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| H3PO4 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| HBr | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. The following substances act as Bronsted bases in water. Write a chemical equation for each that illustrates its reaction with water.

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| --- | --- |
| CHOO– | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| hydride ion: H- | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| ammonia NH3 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. What is the conjugate acid of HSO4- ?
2. What is the conjugate base of HSO4-?

***Identify the acid, base, conjugate acid and conjugate base for each of the following.***

1. HSO3–(aq) + H2O(l) ⇄ H3O+(aq) + SO32–(aq)
2. NH3(g) + H2O(l) ⇄ NH4+(aq) + OH–(aq)
3. HF(aq) + HSO3–(aq) ⇄ F–(aq) + H2SO3(aq)
4. HNO2(aq) + HS–(aq) ⇄ NO2–(aq) + H2S(aq)
5. What is the formula for the conjugate acid of water?
6. What is the formula for the conjugate base of water?

**Atomic Radius Trends.**

1. In each pair, circle the element that has a greater radius.
2. Neon or Helium
3. Hydrogen or Helium
4. Magnesium or Potassium
5. Write a balanced equation for neutral fluorine atom gaining one electron:

\_\_\_\_ + \_\_\_\_ \_\_\_\_

1. Write a balanced equation for S2- anion losing two electrons:

\_\_\_\_ \_\_\_\_ + \_\_\_\_

**Electronegativity Trends.**

1. In each pair, circle the element that has a greater electronegativity.
2. phosphorous or chlorine
3. phosphorous or antimony
4. fluorine or iodine

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| IONIZATION ENERGY (kJ per mole) |  | 1. One this graph, next to all twenty dots write words similar to CLOSE or FAR or OTHER WORDS to describe where you think the electron is compared to the nucleus.
2. Write the number-number-number style of electron orbits for this atom based on the graph shown here.
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1. Draw a stable Lewis Dot structure for each molecule:

|  |  |
| --- | --- |
| H2S | N2 |

1. Draw a stable Lewis Dot structure for each molecule:

|  |  |
| --- | --- |
| HCl | F2 |

|  |
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| 1. for a NEUTRAL atom with the following electron configuration:
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| 1s22s22p63s23p64s23d105s24d105p1 |
| Write a ‘number-number-number’ diagram for this atom | Write a Lewis dot diagram (Letter and dots) for this atom | This atom has \_\_\_\_\_\_\_\_ valence e-therefore it is (stable / unstable ) |

1. Use your shape table to write the name of the geometric shape based on each molecule’s central atom. **Assume each line is a connection between two atoms.**

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. Fill in the missing numbers for these two test tube:

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| Test Tube | OH- concentration | H+ concentration | pH |
| A |  |  | 2.50 |
| B | 8.04 x 10-5 M |  |  |