

Easy Packet 1

Team ID:

**Thermodynamics**

**0.4446-0.4914 J/K·g**

**Electrochemistry**

Reducing Agent:  **$\text{BCl}_3$**

**Physical Properties**

**0.017-0.019 moles**

**Physical Properties**

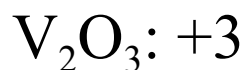
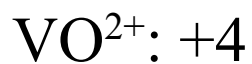
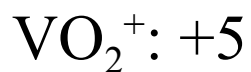
**30-40 g of NaCl**  
**60-70 g of CaCl<sub>2</sub>**  
(order doesn't matter)

**Chemical Reactions**

1.  $CH_3COONa(aq) + H_2O(l)$
2.  $H_2O(l) + O_2(g)$
3. *No reaction*

**Acid/Base Chemistry**

1. Weakly acidic
2. Strongly basic
3. Neutral
4. Strongly acidic
5. Strongly basic

**Chemical Reaction****Acid/Base Chemistry****Physical Properties**

**HBr is a reducing agent**  
**HClO<sub>4</sub> is an oxidizing agent**

**Kinetics**

Rate equation:  $k[\text{NO}]^2[\text{Cl}_2]$

**Acid/Base Chemistry**

- a) **Acidic**
- b) **Neutral**
- c) **Basic**
- d) **Basic**

**Equilibrium**

- a) would shift to the **left**
- b) would shift to the **right**
- c) would shift to the **right**

**Physical Properties**

- 1) is **ionic**
- 2) is **ionic**
- 3) is **covalent**
- 4) is **covalent**

**Physical Properties**

- 1) **Bent**
- 2) **Tetrahedral**
- 3) **T-shaped**
- 4) **Trigonal planar**

**Physical Properties**

**RbOH or C**

**Physical Properties**



**Thermodynamics**

**Acceptable answers: -950 to -1050 kJ/mol**

**Electrochemistry**

**(Strongest)  $Y > Z > X$  (Weakest)**

**Physical Properties**

Nitrogen: **Excited**

Neon: **Impossible**

Oxygen: **Excited**

Fluorine: **Ground**

**Physical Properties**

**a) Trigonal Pyramidal**

**b) Trigonal Bipyramidal**

**c) See Saw**

**Physical Properties**

Smallest **Li<sup>+</sup> < Na<sup>+</sup> < F<sup>-</sup> < O<sup>2-</sup> < S<sup>2-</sup>** Largest

**Acid/Base Chemistry**

$$\text{pOH} = 13 - 13.5$$

**Physical Properties**

**2**

**Physical Properties**

**-3 to +5**



**Thermodynamics**

The reaction is **spontaneous**

**Chemical Reactions**

- a) A reaction **would not** occur
- b) A reaction **would not** occur
- c) A reaction **would** occur

**Acid/Base Chemistry**

**48-52 mL**

**Physical Properties**

**-255 to -270 C**

**Equilibrium**

**$8.5 \times 10^{-5}$  and  $9.5 \times 10^{-5}$  mol/L**

**Physical Properties**

**18 electrons**

**Acid/Base Chemistry**

**$3.2 \times 10^{-3} \text{ mol/L}$**

**Equilibrium**

- a) **reverse**
- b) **reverse**
- c) **no effect**

**Electrochemistry**

**Li and  $\text{Cu}^{2+}$  and 3.385 V**  
Also acceptable  $\text{Li}^+$  and Cu

**Kinetics**

$$\text{Rate: } k_f[A]^2[B]$$

**Equilibrium**

$$K_{\text{eq}} \text{ for eq1: } [\text{Ca}^{2+}] / [\text{H}^+]^2$$

$$K_{\text{eq}} \text{ for eq2: } 1/[\text{Cl}_2]^2$$

$$K_{\text{eq}} \text{ for eq3: } [\text{Zn}(\text{NH}_3)^{2+}] / [\text{Zn}^{2+}][\text{NH}_3]^2$$

**Equilibrium**

$$K_{\text{sp}} = 2.4 \text{ to } 2.6 \times 10^{-9}$$

Acid/Base Chemistry

**A**

Acid/Base Chemistry

**pH = 0.46 to 0.53**

Acid/Base Chemistry

The titration is a **strong base** titrating a **weak acid**. **Phenol Red** should be used for the indicator.

**Kinetics**

**Rate order: 1st order**  
**K: 1.2 to 1.4 1/min**

**Acid/Base Chemistry**

**C**

**Physical Properties**

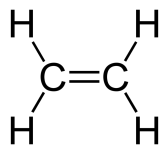
**C**

**Thermodynamics**

The  $\Delta S$  for the reaction is **negative** because the reaction causes the disorder to **decrease**.

**Equilibrium**

- a) is a **strong** electrolyte
- b) is a **strong** electrolyte
- c) is a **weak** electrolyte
- d) is a **strong** electrolyte
- e) is a **non** electrolyte
- f) is a **weak** electrolyte
- g) is a **non** electrolyte

**Physical Properties**

Hybridization:  $sp^2$  and  $sp^2$

**Physical Properties**

Steric number: **5**  
Number of lone pairs: **1**  
Electronic Geometry: **Trigonal Bipyramidal**  
Molecular (VSEPR) geometry: **Seesaw**

**Physical Properties**

Ground State: **[Xe] 6s<sup>1</sup> 4f<sup>14</sup> 5d<sup>10</sup>**  
Excited State: **[Xe] 6s<sup>2</sup> 4f<sup>14</sup> 5d<sup>9</sup>**

**Electrochemistry**

Weakest **MgCl** < **Fe(OH)<sub>3</sub>** < **HNO<sub>3</sub>** < **KMnO<sub>4</sub>** Strongest



**Physical Properties**

**1.9 to 2.3 grams**

**Physical Properties**

**183.6 torr**

**Physical Properties**

**Copper**

**Physical Properties**

**Lowest Ne < H<sub>2</sub>S < HF, MgO Highest**

**Physical Properties**

**71.5-72.65 % Rb<sup>85</sup>  
27.35-28.36 % Rb<sup>87</sup>**

**Physical Properties**

**Carbon and Hydrogen**

**Physical Properties**

Lithium is **red**  
Sodium is **orange**  
Potassium is **pink/purple**  
Barium is **green**

**Physical Properties**

**C**

**Chemical Reactions**

**3350 - 3490** seconds

**Physical Properties**

**1, 3, 4**

**Kinetics**

Rate: **(0.0080) [C]<sup>2</sup>[O]<sup>2</sup>[X]**  
Overall reaction order: **5**

**Equilibrium**

**3.3-4.0 x 10<sup>-9</sup> M**