Chemistry 141 Name Key

Dr. Cary Willard

Quiz 4A (20 points) February 17, 2011

1. (5 points) Assign oxidation states to each atom in the following species
   1. NaClO2 Na +1 Cl +3 O -2
   2. MnO4-2 Mn +6 O -2
2. (4 points) For the following balanced redox reaction identify the elements oxidized and reduced as well as the oxidizing and reducing agents

+2 -2 +1 +5 -2 +1 +6 -2 +2 -2 +1 +6 -2 +3 +5 -2 +1 -2

FeS + 3 KNO3 + 2 H2SO4 🡪 3NO + K2SO4 + Fe(NO3)3 + 2H2O

Element oxidized sulfur and iron Element reduced nitrogen

Oxidizing agent KNO3 Reducing agent FeS

1. (4 points) Balance the following half reaction in basic solution.

CrO4-2(aq) + 3 e-1 + 4 H+1🡪 CrO2-1(aq) + 2 H2O

4 H2O 🡪 4 H+1 + 4 OH-1

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CrO4-2(aq) + 2H2O + 3 e-1 🡪 CrO2-1(aq) + 4 OH-1

1. (6 points) Balance the following reaction in acid.

I2 + OCl-1 🡪 IO3-1 + Cl-1

I2 + 6 H2O 🡪 2 IO3-1 + 12H+1 + 10e-1

( OCl-1 + 2H+1 + 2e-1🡪 Cl-1 + H2O ) 5

I2 + 6H2O + 5OCl-1 + 10H+1 + 10e-1 🡪 2IO3-1 + 12H+1 + 10e-1 + 5Cl-1 + 5 H2O

I2 + H2O + 5OCl-1 🡪 2IO3-1 + 2H+1 + 5Cl-1

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Quiz 4B (20 points) February 17, 2011

1. (5 points) Assign oxidation states to each atom in the following species
   1. Sr(IO3)2 Sr +2 I +5 O -2
   2. ClO4-1 Cl +7 O -2
2. (4 points) For the following balanced redox reaction identify the elements oxidized and reduced as well as the oxidizing and reducing agents

+1 +3 -2 +1 +7 -2 +1 +6 -2 +1 +6 -2 +4 -2 +2 +6 -2 +1 -2

5H2C2O4+ 2KMnO4+ 3H2SO4🡪 K2SO4 + 10CO2 + 2 MnSO4 + 8 H2O

Element oxidized carbon Element reduced manganese

Oxidizing agent KMnO4 Reducing agent H2C2O4

1. (4 points) Balance the following half reaction in basic solution.

CrO2-1(aq) + 2 H2O 🡪 CrO4-2(aq) + 3 e-1 + 4 H+1

4 H+1 + 4 OH-1 🡪 4 H2O

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CrO2-1(aq) + 4 OH-1 🡪 CrO4-2(aq) + 2H2O + 3 e-1

1. (6 points) Balance the following reaction in acid.

Cr+3 + BiO3-1 🡪 Cr2O7-2 + Bi+3

2Cr+3 + 7H2O 🡪 Cr2O7-2 +14H+1 + 6e-1

( BiO3-1 + 6 H+1 + 2 e-1 🡪 Bi+3 + 3H2O ) 3

2Cr+3 + 7H2O + 3BiO3-1 + 18H+1 + 6e-1🡪Cr2O7-2 +14H+1 + 6e-1 + 3Bi+3 + 9H2O

2Cr+3 + 3BiO3-1 + 4H+1 🡪Cr2O7-2 + 3Bi+3 + 2H2O