Chemistry 141 Name key

Dr Cary Willard September 28, 2010

Quiz 4a (20 points)

1. (10 points) Balance the following redox reaction in acid. Show the two half reactions and tell which is an oxidation and which is a reduction.

Cr2O7-2(aq) + Zn(s) 🡪 Zn+2(aq) + Cr+3(g)

Half reaction 1 - (oxidation or reduction)

Cr2O7–2(aq) + 14 H+ + 6 e– 🡪 2 Cr+3(g) + 7 H2O

Half reaction 2 - (oxidation or reduction)

3(Zn(s) 🡪 Zn+2(aq) + 2 e–)

Overall reaction balanced in acid

Cr2O7-2(aq) + 14 H+ + 6 e–  + 3 Zn(aq) 🡪 2 Cr+3(g) + 7 H2O + 3 Zn+2(aq) + 6 e–

Cr2O7-2(aq) + 14 H+ + 3 Zn(aq) 🡪 2 Cr+3(g) + 7 H2O + 3 Zn+2(aq)

1. (10 points) Balance the following redox reaction in base. Show the two half reactions and tell which is an oxidation and which is a reduction.

MnO4-1 + CN-1 🡪 MnO2 + CNO-1

Half reaction 1 - (oxidation or reduction)

3(CN–1 + H2O 🡪 CNO-1 + 2 H+ + 2 e–)

Half reaction 2 - (oxidation or reduction)

2(MnO4–1 + 4 H+ 3 e– 🡪 MnO2 + 2 H2O)

Overall reaction balanced in acid (optional)

2 MnO4–1 + 8 H+ + 6 e– + 3 CN–1 + 3 H2O 🡪 2 MnO2 + 4 H2O + 3 CNO–1 + 6 H+ + 6 e–

2 MnO4–1 + 2 H+ + 3 CN-1 🡪 2 MnO2 + H2O + 3 CNO–1

Overall reaction balanced in base

2 MnO4–1 + 2 H+ + 3 CN–1 🡪 2 MnO2 + H2O + 3 CNO–1

2H2O 🡪 2 H+ + 2 OH–1

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2 MnO4–1 + 2 H+ + 3 CN–1 + 2H2O 🡪 2 MnO2 + H2O + 3 CNO–1 + 2 H+ + 2 OH–1

2 MnO4–1 + 3 CN–1 + H2O 🡪 2 MnO2 + 3 CNO–1 + 2 OH–1

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Quiz 4b (20 points)

1. (10 points) Balance the following redox reaction in acid. Show the two half reactions and tell which is an oxidation and which is a reduction.

MnO4-1(aq) + C2O4-2(aq) 🡪 Mn+2(aq) + CO2(g)

Half reaction 1 - (oxidation or reduction)

5 (C2O4–2(aq) 🡪 2 CO2(g) + 2 e–)

Half reaction 2 - (oxidation or reduction)

2 (MnO4–1 + 8 H+ + 5e–🡪 Mn+2 + 4 H2O)

Overall reaction balanced in acid

5 C2O4–2(aq) + 2 MnO4–1 + 16 H+ + 10e–🡪 2 Mn+2 + 8 H2O + 10 CO2(g) + 10 e–

5 C2O4–2(aq) + 2 MnO4–1 + 16 H+ 🡪 2 Mn+2 + 8 H2O + 10 CO2(g)

1. (10 points) Balance the following redox reaction in base. Show the two half reactions and tell which is an oxidation and which is a reduction.

MnO4-1 + I-1 🡪 MnO2 + IO3-1

Half reaction 1 - (oxidation or reduction)

 I–1 + 3 H2O 🡪 IO3–1 + 6 H+ + 6 e–

Half reaction 2 - (oxidation or reduction)

2(MnO4–1 + 4 H+ +3 e– 🡪 MnO2 + 2 H2O)

Overall reaction balanced in acid (optional)

I–1 + 3 H2O + 2MnO4–1 + 8 H+ + 6 e– 🡪 2 MnO2 + 4 H2O+ IO3–1 + 6 H+ + 6 e–

I–1 + 2MnO4–1 + 2 H+ 🡪 2 MnO2 + H2O+ IO3–1

Overall reaction balanced in base

I–1 + 2MnO4–1 + 2 H+ 🡪 2 MnO2 + H2O+ IO3–1

2H2O 🡪 2 H+ + 2 OH–1

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I–1 + 2MnO4–1 + 2 H+ + 2H2O 🡪 2 MnO2 + H2O+ IO3–1 + 2 H+ + 2 OH–1

I–1 + 2MnO4–1 + H2O 🡪 2 MnO2 + IO3–1 + 2 OH–1