Chemistry 141 Name

Dr. Cary Willard

Quiz 4.5 (20 points) October 17, 2012

1. (12 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)

(MnO4-1 + 8 H+ + 5 e-1 🡪 Mn+2 + 4 H2O) 2

 -1 +8 -5 = +2 0

Half reaction 2 - (oxidation or reduction)

(C2O4-2 🡪 2 CO2 + 2 e-1) 5

Overall reaction balanced in acid

2MnO4-1 + 16 H+ + ~~10 e~~~~-1~~ + 5C2O4-2 🡪 2Mn+2 + 8H2O + 10 CO2 + ~~10 e~~~~-1~~

2MnO4-1 + 16 H+ + 5C2O4-2 🡪 2Mn+2 + 8H2O + 10 CO2

1. (4 points) Identify the following for the balanced chemical reaction below

 +1 -2 +1 +2 -2 +1 0 +4 -2

4 NaOH(aq) + Ca(OH)2(aq) + C(S) + 4 ClO2(g)

 +1 +3 -2 +2 +4 -2 +1 -2

🡪 4 NaClO2(aq) + CaCO3(s) + 3 H2O(l)

Element oxidized C Oxidizing agent ClO2

Element reduced Cl Reducing agent C

1. (4 points) Balance the half reaction below in base.

~~2 H~~~~+1~~ + 2e-1 + ClO-1 🡪 Cl-1 ~~+ H~~~~2~~~~O~~

1 ~~2~~ H2O 🡪 ~~2 H~~~~+1~~ + 2 OH-1

2e-1 + ClO-1 + H2O 🡪 Cl-1 + 2 OH-1

Chemistry 141 Name Key

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1. (12 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) + Cl-1(aq) 🡪 Cr+3 (aq) + Cl2(g)

Half reaction 1 - (oxidation or reduction)

Cr2O7-2 (aq) + 14 H+1 + 6 e-1 🡪 2 Cr+3 (aq) + 7 H2O

 -2 +14 +6 0

Half reaction 2 - (oxidation or reduction)

(2 Cl-1(aq) 🡪 Cl2(g) + 2 e-1) 3

Overall reaction balanced in acid

Cr2O7-2 (aq) + 14 H+1 ~~+ 6 e~~~~-1~~ +6 Cl-1(aq) 🡪2 Cr+3 (aq) + 7 H2O + 3Cl2(g) ~~+ 6 e~~~~-1~~

Cr2O7-2 (aq) + 14 H+1 6 Cl-1(aq) 🡪2 Cr+3 (aq) + 7 H2O + 3Cl2(g)

1. (4 points) Identify the following for the balanced chemical reaction below

+1 +7 -2 +1 -1 +2 -1

KMnO4(aq) + 8 HCl(aq) + 5 FeCl2(aq)

 +2 -1 +3 -1 +1 -2 +1 -1

 🡪 MnCl2(aq) + 5 FeCl3(aq) + 4 H2O(l) + KCl(aq)

Element oxidized Fe Oxidizing agent KMnO4

Element reduced Mn Reducing agent FeCl2

1. (4 points) Balance the half reaction below in base.

6 H2O + Br2 🡪 2 BrO3-1 + ~~12 H~~~~+1~~ + 10 e-1

~~12 H~~~~+1~~ + 12 OH-1 🡪 12 H2O

Br2 + 12 OH-1 🡪 2 BrO3-1 + 6 H2O + 10 e-1