Chemistry 141 Name

Cary Willard

Quiz 3a (20 points) September 17, 2009

All work must be show to receive credit. Remember, significant figures are important!

1. (8 points) Combustion of a 34.8 mg sample of benzaldehyde, which contains only carbon, hydrogen, and oxygen, produced 101 mg of CO2 and 17.7 mg of H2O. Determine the empirical formula of benzaldehyde.

The molar mass of benzaldehyde is 106.12 g/mol. What is the molecular formula for benzaldehyde?

C7H6O 🡪 106g/mol --- need 1 units to get a molar mass of 106.12 g/mol

1. (4 points) For the following balanced redox reaction identify the elements oxidized and reduced as well as the oxidizing and reducing agents

4HCl(aq) + Hg2Cl2(s) + 2KNO2(aq) 🡪 2HgCl2(aq) + NO(g) + 2KCl(aq) +2H2O(l)

 Element oxidized Hg Element reduced N

 Oxidizing agent KNO2 or NO2-1 Reducing agent Hg2Cl2

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

S2O3-2(aq) + 5 H2O(l) 🡪 2 SO4-2(aq) + 10 H+1 + 8 e-1

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

Sb(s) + 2 H2O(l) 🡪 SbO2-1(aq) + 4 H+1 + 3 e-1

4 H+1 + 4 OH-1 🡪 4 H2O

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Sb(s) + ~~2H~~~~2~~~~O~~(l) + ~~4H~~~~+1~~ + 4OH-1 🡪 SbO2-1(aq) + ~~4H~~~~+1~~ + 2~~4~~H2O + 3e-1

Sb(s) + 4OH-1 🡪 SbO2-1(aq) + 2H2O + 3e-1

Chemistry 141 Name

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Quiz 3b (20 points) September 17, 2009

All work must be show to receive credit. Remember, significant figures are important!

1. (8 points) Combustion of a 43.5 mg sample of salicylic acid which contains only carbon, hydrogen, and oxygen, produced 97.1 mg of CO2 and 17.0 mg of H2O. Determine the empirical formula of salicylic acid.

The molar mass of salicylic acid is 138.12 g/mol. What is the molecular formula for salicylic acid?

C7H6O3 🡪 106g/mol --- need 1 units to get a molar mass of 138.12 g/mol

1. (4 points) For the following balanced redox reaction identify the elements oxidized and reduced as well as the oxidizing and reducing agents

6HCl(aq) + 2KMnO4(aq) + 5H2O2(aq) 🡪 2MnCl2(aq) + 5O2(g) + 8 H2O(l) + 2KCl(aq)

 Element oxidized O Element reduced Mn

 Oxidizing agent KMnO4 Reducing agent H2O2

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

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

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

2 CrO4-2(aq) + 10 H+1 + 6 e-1 🡪 Cr2O3(s) + 5 H2O(l)

10 H2O 🡪 10 H+1 + 10 OH-1

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2CrO4-2(aq)+ ~~10H~~~~+1~~ + 6e-1 + 5~~10~~H2O 🡪Cr2O3(s) + ~~5H~~~~2~~~~O(l)~~ + ~~10H~~~~+1~~ + 10OH-1

2CrO4-2(aq)+ 6e-1 + 5H2O 🡪Cr2O3(s) + 10OH-1