Chemistry 115 Name

Dr. Cary Willard

Quiz 6a (20 points) March 22, 2011

All work must be shown to receive credit. Avogadro’s number = 6.022 x 1023/mol

Iron oxide ore is converted to iron metal in a reaction with carbon.

2 Fe2O3(s) + 3 C(s) 🡪 4 Fe(s) + 3 CO2(g)

1. (4 points) How many atoms of iron will be formed from the reaction of 48 atoms of carbon with excess iron oxide?

$$?atoms Fe=48 atoms C×\frac{4 atoms Fe}{3 atoms C}=64 atoms Fe$$

1. (4 points) How many moles of carbon are required to react with 8.35 moles of iron oxide?

$$?mol C=8.35 mol Fe\_{2}O\_{3}×\frac{3 mol C}{2 mol Fe\_{2}O\_{3}}=12.5 mol C$$

1. (4 points) How many grams of carbon dioxide will produced by the reaction of 0.183 moles of iron oxide?

$$?g CO\_{2}=0.183 mol Fe\_{2}O\_{3}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}×\frac{44.01 g CO\_{2}}{1 mol CO\_{2}}=12.1 g CO\_{2}$$

1. (4 points) How many grams of iron oxide are required to produce 50.0 grams of elemental iron?

$$?g Fe\_{2}O\_{3}=50.0 g Fe×\frac{1 mol Fe}{55.85 g Fe}×\frac{2 mol Fe\_{2}O\_{3}}{4 mol Fe}×\frac{159.7 g Fe\_{2}O\_{3}}{1 mol Fe\_{2}O\_{3}}=71.5 g Fe\_{2}O\_{3}$$

1. (4 points) How many molecules of carbon dioxide will be produced from the reaction of 5.83 moles of iron oxide with excess carbon?

$$?molec CO\_{2}=5.83 mol Fe\_{2}O\_{3}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}×\frac{6.022×10^{23}molec CO\_{2}}{1 mol CO\_{2}}=5.27×10^{24}molec CO\_{2}$$

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Quiz 6b (20 points) March 22, 2011

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Iron oxide ore is converted to iron metal in a reaction with carbon.

2 Fe2O3(s) + 3 C(s) 🡪 4 Fe(s) + 3 CO2(g)

1. (4 points) How many atoms of iron will be formed from the reaction of 33 atoms of carbon with excess iron oxide?

$$?atoms Fe=54 atoms C×\frac{4 atoms Fe}{3 atoms C}=72 atoms Fe$$

1. (4 points) How many moles of carbon are required to react with 5.95 moles of iron oxide?

$$?mol C=5.95 mol Fe\_{2}O\_{3}×\frac{3 mol C}{2 mol Fe\_{2}O\_{3}}=8.93 mol C$$

1. (4 points) How many grams of carbon dioxide will produced by the reaction of 0.216 moles of iron oxide?

$$?g CO\_{2}=0.216 mol Fe\_{2}O\_{3}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}×\frac{44.01 g CO\_{2}}{1 mol CO\_{2}}=14.3 g CO\_{2}$$

1. (4 points) How many grams of iron oxide are required to produce 60.0 grams of elemental iron?

$$?g Fe\_{2}O\_{3}=60.0 g Fe×\frac{1 mol Fe}{55.85 g Fe}×\frac{2 mol Fe\_{2}O\_{3}}{4 mol Fe}×\frac{159.7 g Fe\_{2}O\_{3}}{1 mol Fe\_{2}O\_{3}}=85.8 g Fe\_{2}O\_{3}$$

1. (4 points) How many molecules of carbon dioxide will be produced from the reaction of 7.26 moles of iron oxide with excess carbon?

$$?molec CO\_{2}=7.26 mol Fe\_{2}O\_{3}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}×\frac{6.022×10^{23}molec CO\_{2}}{1 mol CO\_{2}}=6.56×10^{24}molec CO\_{2}$$

Chemistry 115 Name

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Quiz 6c (20 points) March 24, 2011

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Iron oxide ore is converted to iron metal in a reaction with carbon.

2 Fe2O3(s) + 3 C(s) 🡪 4 Fe(s) + 3 CO2(g)

1. (4 points) How many atoms of carbon are required to react with 62 formula units of iron oxide?

$$?atoms C=62 units Fe\_{2}O\_{3} ×\frac{3 atoms C}{2 units Fe\_{2}O\_{3}}=93 atoms C$$

1. (4 points) How many moles of carbon dioxide will be formed by the reaction of 7.51 moles of iron oxide with excess carbon?

$$?mol CO\_{2}=7.51 mol Fe\_{2}O\_{3}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}=11.3 mol CO\_{2}$$

1. (4 points) If 94.2 grams of iron oxide react with excess carbon, how many moles or carbon dioxide will be produced?

$$?mol CO\_{2}=94.2 g Fe\_{2}O\_{3}×\frac{1 mol Fe\_{2}O\_{3}}{159.7 g Fe\_{2}O\_{3}}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}=0.885 mol CO\_{2}$$

1. (4 points) How many grams of carbon are required to produce 50.0 grams of elemental iron?

$$?g C=50.0 g Fe×\frac{1 mol Fe}{55.85 g Fe}×\frac{3 mol C}{4 mol Fe}×\frac{12.01 g C}{1 mol C}=8.06 g C$$

1. (4 points) How many moles of iron oxide will form 8.24 x 1023 molecules of carbon dioxide?

$$?mol Fe\_{2}O\_{3}=8.24×10^{23}molec CO\_{2}×\frac{1 mol CO\_{2}}{6.022×10^{23}molec CO\_{2}}×\frac{2 mol Fe\_{2}O\_{3}}{3 mol CO\_{2}}=0.912 mol Fe\_{2}O\_{3}$$

Chemistry 115 Name

Dr. Cary Willard

Quiz 6d (20 points) March 24, 2011

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Iron oxide ore is converted to iron metal in a reaction with carbon.

2 Fe2O3(s) + 3 C(s) 🡪 4 Fe(s) + 3 CO2(g)

1. (4 points) How many atoms of carbon are required to react with 56 formula units of iron oxide?

$$?atoms C=56 units Fe\_{2}O\_{3} ×\frac{3 atoms C}{2 units Fe\_{2}O\_{3}}=84 atoms C$$

1. (4 points) How many moles of carbon dioxide will be formed by the reaction of 6.83 moles of iron oxide with excess carbon?

$$?mol CO\_{2}=6.83 mol Fe\_{2}O\_{3}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}=10.2 mol CO\_{2}$$

1. (4 points) If 71.5 grams of iron oxide react with excess carbon, how many moles or carbon dioxide will be produced?

$$?mol CO\_{2}=71.5 g Fe\_{2}O\_{3}×\frac{1 mol Fe\_{2}O\_{3}}{159.7 g Fe\_{2}O\_{3}}×\frac{3 mol CO\_{2}}{2 mol Fe\_{2}O\_{3}}=0.672 mol CO\_{2}$$

1. (4 points) How many grams of carbon are required to produce 60.0 grams of elemental iron?

$$?g C=60.0 g Fe×\frac{1 mol Fe}{55.85 g Fe}×\frac{3 mol C}{4 mol Fe}×\frac{12.01 g C}{1 mol C}=9.68 g C$$

1. (4 points) How many moles of iron oxide will form 4.97 x 1023 molecules of carbon dioxide?

$$?mol Fe\_{2}O\_{3}=4.97×10^{23}molec CO\_{2}×\frac{1 mol CO\_{2}}{6.022×10^{23}molec CO\_{2}}×\frac{2 mol Fe\_{2}O\_{3}}{3 mol CO\_{2}}=0.550 mol Fe\_{2}O\_{3}$$