Gen Chem I (CHM 201) Fall 18 Dr. Hahn MWF 8 am Quiz V form A 10/24 W Exam # _____

Name Key Name _____
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Please **show work on all questions** for **full credit & partial credit**. (20 total pts) Green

1. Given the following balanced chemical reaction: BA = bad attempt NA = not attempt

$C + 2\,Cl_2 \rightarrow C\,Cl_4$

(a) Calculate the theoretical yield of CCl_4 (FW CCl_4 = 154.01 g/mole) in grams if you start with 80.2 grams of C. (carbon, FW C = 12.01 g/mol) (show work) (7 pts)

$$80.2\,g\,C \times \frac{1\,mol\,C}{12.01\,g\,C} \times \frac{1\,mol\,CCl_4}{1\,mol\,C} \times \frac{154.01\,g\,CCl_4}{1\,mol\,CCl_4} = 1028.44\,g\,CCl_4$$

1pt 2pt 2pt 1pt 1pt

$1.03 \times 10^3\,g\,CCl_4$

BA −3 ½

(b) Calculate the theoretical yield of CCl_4 if you start with 80.2 grams of Cl_2 (FW Cl_2 = 71.00 g / mole) (show work) . (7 pts)

$$80.2\,g\,Cl_2 \times \frac{1\,mol\,Cl_2}{71.00\,g\,Cl_2} \times \frac{1\,mol\,CCl_4}{2\,mol\,Cl_2} \times \frac{154.01\,g\,CCl_4}{1\,mol\,CCl_4} = 86.98\,g\,CCl_4$$

(86 87.0 g CCl_4) 3 s.f.

BA −3 ½ attempt −2

(c) Which is the limiting reagent [(C) or (Cl_2)] (circle one) (3 pts) (show work)

Graded consistent w above @ 1b

attempt −1

(d) what is the percentage yield if you experimentally made 90.2 grams of the CCl_4 ? (3 pts) (show work)

$$\frac{90.2\,g\,CCl_4}{87.0\,g\,CCl_4} \times 100 = 104\,\%$$

Graded Consistent w above

used inconsistent # −½

Extra Credit: (4 pts)

If you made up a solution of Na_2CO_3 (FW Na_2CO_3 = 106.01 grams / mol) in water by dissolving 380.2 grams to make up 250.5 mL of solution, what is the molarity of the solution ? (Molarity = moles solute / liter solution) (show work)

BA −2

$$380.2\,g\,Na_2CO_3 \times \frac{1\,mol\,Na_2CO_3}{106.01\,g\,Na_2CO_3} = 3.586\,mol\,Na_2CO_3$$

$$250.5\,mL \times \frac{1\,L}{1000\,mL} = 0.2505\,L$$

$$M = \frac{3.586\,mol}{0.2505\,L} = 14.32\,M\,Na_2CO_3$$

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Please **show work on all questions** for **full credit & partial credit**. (20 total pts)

1. Given the following balanced chemical reaction: NA = not attempt (BA − ½)

$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$

(a) calculate the theoretical yield of H_2O (FW H_2O = 18.02 g / mole) in grams if you start with 80.2 grams of C_3H_8 (FW C_3H_8 = 39.06 g / mole) (show work) (7 pts)

$$80.2\ g\ C_3H_8 \times \frac{1\ mol\ C_3H_8}{39.06\ g\ C_3H_8} \times \frac{4\ mol\ H_2O}{1\ mol\ C_3H_8} \times \frac{18.02\ g\ H_2O}{1\ mol\ H_2O} = 147.998$$

1pt 2pt 2pt 1pt

3 sif. 1pt

148 g H_2O

(b) calculate the theoretical yield of H_2O if you start with 80.2 grams of O_2 (FW O_2 = 32.00 g/mole). (show work) (7 pts)

$$80.2\ g\ O_2 \times \frac{1\ mol\ O_2}{32.00\ g\ O_2} \times \frac{4\ mol\ H_2O}{5\ mol\ O_2} \times \frac{18.02\ g\ H_2O}{1\ mol\ H_2O} = 36.1\ g\ H_2O$$

1pt 2pt 2pt 1pt 1pt

(BA − ½) (latter pt) graded consistent w above

(c) Which is the limiting reagent [(C_3H_8) or (O_2)] (circle one) (3 pts)

used inconsistent (A − ½)

(d) If you made experimentally 25.2 grams of the product H_2O, what is the percent yield ? (3 pts) (show work)

$$\left(\frac{25.2\ g}{36.1\ g}\right) * 100 = 69.8\%$$

Extra Credit: (4 pts)

If you made up a solution of Na OH (FW NaOH = 40.01 grams / mol) in water by dissolving 2.892 kilograms to make up 1.37 Liters of solution, what is the molarity of the solution ? (Molarity = moles solute / liter solution) (show work)

(BA − 2)

$$2.892\ kg \times \frac{1000\ g}{1\ kg} \times \frac{mol\ NaOH}{40.01\ g\ NaOH} = 72.28\ mol\ NaOH$$

$$M = \frac{72.28\ mol\ NaOH}{1.37\ l} = 52.76\ M$$

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Please **show work on all questions** for **full credit & partial credit**. (20 total pts) green

1. Given the following balanced chemical reaction:

$C + 2\ Cl_2 \rightarrow C\ Cl_4$

(a) Calculate the theoretical yield of CCl_4 (FW CCl_4 = 154.01 g/mole) in grams if you start with 80.2 grams of C. (carbon, FW C = 12.01 g/mol) (show work) (7 pts)

(b) Calculate the theoretical yield of CCl_4 if you start with 80.2 grams of Cl_2 (FW Cl_2 = 71.00 g / mole) (show work) . (7 pts)

(c) Which is the limiting reagent [(C) or (Cl_2)] (circle one) (3 pts) (show work)

(d) what is the percentage yield if you experimentally made 90.2 grams of the CCl_4 ? (3 pts) (show work)

Extra Credit: (4 pts)

If you made up a solution of Na_2CO_3 (FW Na_2CO_3 = 106.01 grams / mol) in water by dissolving 380.2 grams to make up 250.5 mL of solution, what is the molarity of the solution ? (Molarity = moles solute / liter solution) (show work)

Gen Chem I (CHM 201) Fall 18 Dr. Hahn MWF 8 am Quiz V form B 10/24 W Exam # 19

Name _____ Name _____
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Please **show work on all questions** for **full credit & partial credit.** (20 total pts)

1. Given the following balanced chemical reaction:

$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$

(a) calculate the theoretical yield of H_2O (FW H_2O = 18.02 g / mole) in grams if you start with 80.2 grams of C_3H_8 (FW C_3H_8 = 39.06 g / mole) (show work) (7 pts)

(b) calculate the theoretical yield of H_2O if you start with 80.2 grams of O_2 (FW O_2 = 32.00 g/mole). (show work) (7 pts)

(c) Which is the limiting reagent [(C_3H_8) or (O_2)] (circle one) (3 pts)

(d) If you made experimentally 25.2 grams of the product H_2O, what is the percent yield ? (3 pts) (show work)

Extra Credit: (4 pts)

If you made up a solution of Na OH (FW NaOH = 40.01 grams / mol) in water by dissolving 2.892 kilograms to make up 1.37 Liters of solution, what is the molarity of the solution ? (Molarity = moles solute / liter solution) (show work)