CHE105 SU17 Exam 2

Your Name: _____   **Your ID:** _____

_____

Question #: 1

The percent yield of a reaction is 68.9%. What is the actual yield for this reaction,
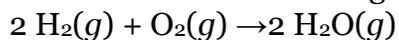if the theoretical yield is 26.0 grams?
Actual yield = __1__ g
Report your answer with **three** significant figures. Do **NOT** include units in your answer.

    1. _____

_____

Question #: 2

What mass of H_2O can be produced from the reaction of 2.6 grams of H_2 with 2.8 grams of O_2?
$$2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(g)$$
__1__ grams H_2O
Report your answer with **three** significant digits. Do **NOT** include units in your answer.

    1. _____

_____

Question #: 3

Fill in the blanks with **letters** that match the terms that define the molarity formula.
Molarity = ___1___ / ___2___

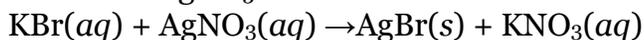| A. | moles of solute | D. | grams of solution |
| B. | grams of solute | E. | milliliters of solvent |
| C. | liters of solute | F. | liters of solution |

A. moles of solute

1. _____
2. _____

Question #: 4

What is the molarity of a solution formed by dissolving 0.537 g of NaCl (58.44 g/mol) in enough water to yield 75.0 mL of solution?

A. 0.00902 M
B. 0.0187 M
C. 0.674 M
D. 0.123 M

Question #: 5

How many grams of KBr (119.0 g/mol) are required to precipitate all of the Ag^+ from 15.0 mL of a 0.100 M $AgNO_3$ solution?
$KBr(aq) + AgNO_3(aq) \rightarrow AgBr(s) + KNO_3(aq)$

A. 182 g KBr
B. 0.179 g KBr
C. 0.371 g KBr
D. 15.2 g KBr

Which **two** are **electrolytes** when dissolved in water?

    A. $C_6H_{12}O_6$ (glucose)
    B. NaCl
    C. HCl
    D. $C_2H_6O_2$ (ethylene glycol)

What is the salt formed when $Ba(OH)_2$ reacts with H_2SO_4? __1__
Enter the formula without subscripts or spaces and use parentheses if needed.   For example,
C4H4O2 or (NH4)2S

    1. _____

If MX_2 is a **strong electrolyte** in water, which equation best represents its behavior?

    A.
$$MX_2(aq) \rightleftharpoons M^{2+}(aq) + X_2^{2-}(aq)$$

    B.
$$MX_2(s) \rightleftharpoons MX_2(aq)$$

    C.
$$MX_2(aq) \rightarrow M^{2+}(aq) + 2X^-(aq)$$

    D.
$$MX_2(s) \rightarrow MX_2(aq)$$

Give the **net ionic equation** for the reaction that occurs when aqueous solutions of Li_3PO_4 and $SrCl_2$ are mixed.

A. $3\ Sr^{2+}(aq) + 2\ PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2\ (s)$
B. $3\ Sr^{2+}(aq) + 6\ Cl^-(aq) + 6\ Li^+(aq) + 2\ PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2(s) + 6\ LiCl(s)$
C. $Cl^-(aq) + Li^+(aq) \rightarrow LiCl(s)$
D. $Sr^{2+}(aq) + PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2(s)$

Select the **two true** statements below.

A. AgBr is insoluble in water.
B. Na_2SO_4 is insoluble in water.
C. $Pb(NO_3)_2$ is insoluble in water
D. $PbSO_4$ is insoluble in water.

What is the **solid product** when aqueous solutions of $Pb(NO_3)_2$ and LiCl are combined?

A. $LiNO_3$
B. $Li(NO_3)_2$
C. PbCl
D. $PbCl_2$

Determine the concentration of a solution prepared by diluting 60.0 mL of 0.700 M NaF to 300.0 mL.

    A. 0.700 M
    B. 0.350 mM
    C. 3.50 M
    D. 0.140 M

A 25 mL sample of an aqueous $Ba(OH)_2$ solution requires 40. mL of a 0.20 M hydrochloric acid (HCl) solution to reach the equivalence point. The concentration of the $Ba(OH)_2$ solution is __1__ M.
Report your answer with **two** significant figures.   Do **NOT** include units in your answer.

    1. _____

Determine the oxidation number for each element in Na_3PO_3.
Na __1__
P __2__
O __3__

    1. _____
    2. _____
    3. _____

Select the **two true** statements about the following oxidation-reduction (redox) reaction.
$Mg(s) + Br_2(l) \rightarrow MgBr_2(s)$

    A. Mg is oxidized.
    B. Mg is reduced.
    C. Mg is the oxidizing agent.
    D. Mg is the reducing agent.

The atmospheric pressure supports a column of mercury 742 mm tall in a barometer.
What is this pressure in torr and in atmospheres?
The pressure is ___1___ torr and ___2___ atm.
Report your answers with **three** significant figures. Do **NOT** include units in your answer.

    1. _____
    2. _____

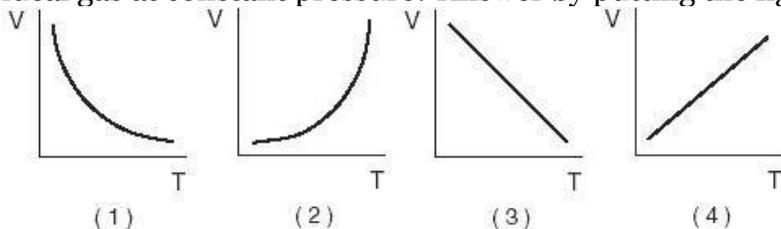
A gas is compressed to one-half its initial volume at contant temperature. Select the **two** statements that are true.

    A. The pressure will be cut in half.
    B. The pressure will double.
    C. The behavior is a direct proportional relationship.
    D. The behavior is an inverse proportional relationship.

Which of the following figures depicts the relationship between volume and temperature for an ideal gas at constant pressure? Answer by putting the figure number in the blank.

  1

1. _____

At STP, a gas occupies 8.0 L. What is the volume if the number of moles is doubled?
  1 L
Report your answer with **two** significant figures. Do **NOT** include units in your answer.

1. _____

At standard temperature and pressure (STP), the molar volume of an ideal gas is 22.4 L/mol. Select the **true** statement.

A. At 1.00 atm and 273 K, one mole of an ideal gas will occupy 22.4 liters.
B. At all temperatures, one liter of an ideal gas will contain 22.4 moles.
C. At 1.00 atm and 273 K, one liter of an ideal gas will contain 22.4 moles.
D. At standard temperature and pressure, one mole of an ideal gas will have a mass of 22.4 grams.

Question #: 21

Which gas has the greatest volume at STP?

    A. 10.0 grams of O_2
    B. 1.50 moles of CO_2
    C. 10.0 grams of He
    D. 2.0 moles of Cl_2

———

Question #: 22

A 2.45 L container is filled with nitrogen at 37 °C to a pressure of 2.15 atm. How many **moles** of nitrogen are in this container?

    A. 0.207 mol
    B. 1.31 mol
    C. 0.565 mol
    D. 5.83 mol

———

Question #: 23

What is the density of chlorine gas, $Cl_2(g)$, at 2.79 atm and 29 °C?

    A. 0.0395 g/L
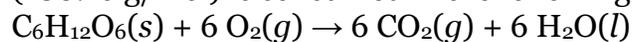   B. 4.20 g/L
    C. 0.0790 g/L
    D. 7.98 g/L

———

A 1.00 L container has a total pressure of 0.995 atm and contains 0.0150 mol CH_4, 0.00750 mol N_2, and 0.00850 mol Ar.   What is the partial pressure of CH_4?

   A. 0.446 atm
   B. 0.481 atm
   C. 0.0150 atm
   D. 0.230 atm

_____

What is the volume of carbon dioxide produced at 25 °C and 1.20 atm when 6.40 g of glucose (180.16 g/mol) is consumed in the following reaction?
$C_6H_{12}O_6(s) + 6\ O_2(g) \rightarrow 6\ CO_2(g) + 6\ H_2O(l)$

   A. 3.77 L
   B. 4.34 L
   C. 4.02 L
   D. 3.86 L

CHE105 SU17 Exam 2 - Confidential

Your Name: _____   **Your ID:** _____

Periodic Table of the Elements

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Question #: 1

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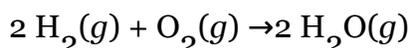
Actual yield = __1__ g

Report your answer with **three** significant figures. Do **NOT** include units in your answer.

1. 17.9|18.0|17.8|

Question #: 2

What mass of H_2O can be produced from the reaction of 2.6 grams of H_2 with 2.8 grams of O_2?

$$2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(g)$$

__1__ grams H_2O

Report your answer with **three** significant digits. Do **NOT** include units in your answer.

    1. 3.15|3.14|3.16|

Fill in the blanks with **letters** that match the terms that define the molarity formula.

Molarity = ___1___ / ___2___

A.	moles of solute	D.	grams of solution
B.	grams of solute	E.	milliliters of solvent
C.	liters of solute	F.	liters of solution

A. moles of solute

    1. A|A.|
    2. F|F.|

What is the molarity of a solution formed by dissolving 0.537 g of NaCl (58.44 g/mol) in enough water to yield 75.0 mL of solution?
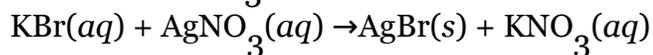
    A. 0.00902 M
    B. 0.0187 M
    C. 0.674 M
    ✓D. 0.123 M

How many grams of KBr (119.0 g/mol) are required to precipitate all of the Ag^+ from 15.0 mL of a 0.100 M $AgNO_3$ solution?

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✓B. NaCl
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D. $C_2H_6O_2$ (ethylene glycol)

What is the salt formed when $Ba(OH)_2$ reacts with H_2SO_4? __1__
Enter the formula without subscripts or spaces and use parentheses if needed. For example, C4H4O2 or (NH4)2S

1. BaSO4

If MX_2 is a **strong electrolyte** in water, which equation best represents its behavior?

A.

$$MX_2(aq) \rightleftharpoons M^{2+}(aq) + X_2^{2-}(aq)$$

B.

$$MX_2(s) \rightleftharpoons MX_2(aq)$$

✓C.

$$MX_2(aq) \rightarrow M^{2+}(aq) + 2X^-(aq)$$

D.

$$MX_2(s) \rightarrow MX_2(aq)$$

Give the **net ionic equation** for the reaction that occurs when aqueous solutions of Li_3PO_4 and $SrCl_2$ are mixed.

✓A. $3 Sr^{2+}(aq) + 2 PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2 (s)$
B. $3 Sr^{2+}(aq) + 6 Cl^-(aq) + 6 Li^+(aq) + 2 PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2(s) + 6 LiCl(s)$
C. $Cl^-(aq) + Li^+(aq) \rightarrow LiCl(s)$
D. $Sr^{2+}(aq) + PO_4^{3-}(aq) \rightarrow Sr_3(PO_4)_2(s)$

Select the **two true** statements below.

✓A. AgBr is insoluble in water.
B. Na_2SO_4 is insoluble in water.
c. $Pb(NO_3)_2$ is insoluble in water
✓D. $PbSO_4$ is insoluble in water.

What is the **solid product** when aqueous solutions of $Pb(NO_3)_2$ and LiCl are combined?

A. $LiNO_3$
B. $Li(NO_3)_2$
C. PbCl
✓D. $PbCl_2$

Determine the concentration of a solution prepared by diluting 60.0 mL of 0.700 M NaF to 300.0 mL.

A. 0.700 M

B. 0.350 mM

C. 3.50 M

✓D. 0.140 M

Question #: 13

A 25 mL sample of an aqueous $Ba(OH)_2$ solution requires 40. mL of a 0.20 M hydrochloric acid (HCl) solution to reach the equivalence point. The concentration of the $Ba(OH)_2$ solution is ___1___ M.

Report your answer with **two** significant figures. Do **NOT** include units in your answer.

1. 0.16|.16|

Question #: 14

Determine the oxidation number for each element in Na_3PO_3.
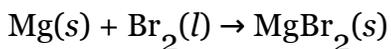
Na ___1___

P ___2___

O ___3___

1. +1|1|1+|one|
2. three|+3|3|3+|
3. -2|2-|

Question #: 15

Select the **two true** statements about the following oxidation-reduction (redox) reaction.

$Mg(s) + Br_2(l) \rightarrow MgBr_2(s)$

✓A. Mg is oxidized.

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What is this pressure in torr and in atmospheres?
The pressure is ___1___ torr and ___2___ atm.
Report your answers with **three** significant figures. Do **NOT** include units in your answer.

    1. 742
    2. 0.976|.976|

Question #: 17

A gas is compressed to one-half its initial volume at contant temperature. Select the **two** statements that are true.

    A. The pressure will be cut in half.
  ✓B. The pressure will double.
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Question #: 18

Which of the following figures depicts the relationship between volume and temperature for an ideal gas at constant pressure? Answer by putting the figure number in the blank.

    1
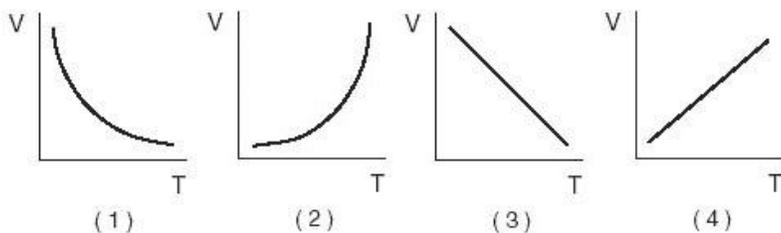
    1. 4|four|(4)|

Question #: 19

At STP, a gas occupies 8.0 L. What is the volume if the number of moles is doubled?

___1___ L

Report your answer with **two** significant figures. Do **NOT** include units in your answer.

  1. 16

Question #: 20

At standard temperature and pressure (STP), the molar volume of an ideal gas is 22.4 L/mol. Select the **true** statement.

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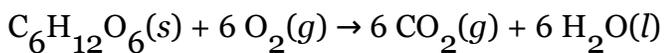   ✓D. 7.98 g/L

Question #: 24

A 1.00 L container has a total pressure of 0.995 atm and contains 0.0150 mol CH_4, 0.00750 mol N_2, and 0.00850 mol Ar. What is the partial pressure of CH_4?

    A. 0.446 atm
    ✓B. 0.481 atm
    C. 0.0150 atm
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    A. 3.77 L
    ✓B. 4.34 L
    C. 4.02 L
    D. 3.86 L