

CHE 105 Fall 16 - Exam 2

Your Name: _____

Your ID: _____

Question #: 1

Calculate the number of **atoms** in a 4.54 g sample of CH₄.

- A. 1.25
 - B. 8.52×10^{23}
 - C. 2.27×10^{23}
 - D. 0.295
-

Question #: 2

What is the name of BaCl₂? 1

1. _____

Question #: 3

Which of the following is the formula for vanadium(IV) oxide?

- A. VO₂
 - B. V₂O₃
 - C. VO
 - D. V₂O₅
-

Question #: 4

What is the chemical name for XeF₄?

- A. xenon(IV) fluoride
 - B. monoxenon difluoride
 - C. xenic fluorine
 - D. xenon tetrafluoride
-

Question #: 5

A 33.33 g sample of a compound containing only phosphorus and sulfur was found to contain 9.29 g of phosphorus.

What is the empirical formula of the compound? .

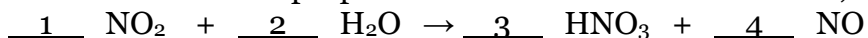
Fill in the blank with the appropriate subscripts. Enter a 1 (one), if needed, so there is a number in both blanks.

P 1 S 2

- 1. _____
 - 2. _____
-

Question #: 6

Balance the following chemical equation with the smallest possible whole numbers by filling in each blank with the proper coefficient. If the coefficient is 1, fill in 1.



- 1. _____
 - 2. _____
 - 3. _____
 - 4. _____
-

Question #: 7

What is the mass in grams for 150.1 moles of potassium nitrate?

- A. 1.518×10^4 g
 - B. 1.485 g
 - C. 0.6736 g
 - D. 1.938×10^4 g
-

Question #: 8

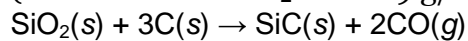
What is the mass of 7.21×10^{21} molecules of carbon dioxide (CO_2 , 44.01 g/mol)?

- A. 368 g
 - B. 2.72 g
 - C. 1.90 g
 - D. 0.527 g
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Question #: 9

How many grams of $\text{CO}(g)$ will be formed when 17.0 g of SiO_2 completely reacts with excess carbon as described by the equation below?

(molar mass of $\text{SiO}_2 = 60.09$ g/mol, molar mass of $\text{CO} = 28.01$ g/mol)

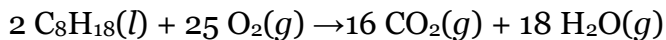


- A. 11.3 g
 - B. 15.8 g
 - C. 31.2 g
 - D. 7.33 g
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Question #: 10

What is the percent yield of $\text{CO}_2(g)$ when 28.16 g of $\text{CO}_2(g)$ (molar mass of CO_2 is 44.01 g/mol) are produced

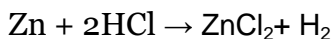
from the combustion of 0.1000 moles of $\text{C}_8\text{H}_{18}(l)$ in the presence of excess $\text{O}_2(g)$?



- A. 79.98%
 - B. 0.7813%
 - C. 125.0%
 - D. 15.63%
-

Question #: 11

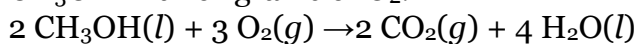
What is the mass of the **excess** reactant after 3.27 grams of Zn react with 3.30 grams of HCl?



- A. 0.03 g
 - B. 0.35 g
 - C. 0.38 g
 - D. 0.31 g
-

Question #: 12

A maximum of 1 grams of CO_2 can be produced from the reaction of 105 grams of CH_3OH with 61 grams of O_2 .



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

1. _____

Question #: 13

What volume, in mL, of a 0.135 M KNO_3 solution contains 0.285 g of KNO_3 ?
Report your answer with **three** significant figures. Do **NOT** include units in your answer.
 1 mL

1. _____

Question #: 14

195 mL of a 1.81 M HCl solution is diluted with H_2O to make a 1.30 M solution. What is the volume of the final solution?
Report your answer with **three** significant figures. Do **NOT** include units in your answer.
 1 mL

1. _____

Question #: 15

Select **two** electrolytes.

- A. $\text{HI}(\text{aq})$
 - B. K_2SO_4
 - C. C_6H_6 (benzene)
 - D. $\text{C}_4\text{H}_{10}\text{O}$ (diethyl ether)
-

Question #: 16

What is the precipitate, if any, when aqueous solutions of potassium iodide and silver nitrate are mixed?

- A. potassium iodide
 - B. silver nitrate
 - C. silver iodide
 - D. potassium nitrate
 - E. No precipitate will form.
-

Question #: 17

The net ionic equation for the reaction, if any, of aqueous solutions of copper (II) sulfate (CuSO_4) and sodium carbonate (Na_2CO_3) is:

- A. $\text{Cu}^{2+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{CuCO}_3(\text{s})$
 - B. $\text{CuSO}_4(\text{aq}) + \text{Na}_2\text{CO}_3(\text{aq}) \rightarrow \text{CuCO}_3(\text{aq}) + \text{Na}_2\text{SO}_4(\text{aq})$
 - C. $\text{CuSO}_4(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{CuCO}_3(\text{s}) + \text{SO}_4^{2-}(\text{aq})$
 - D. No reaction occurs.
-

Question #: 18

Which one of the following compounds is **insoluble** in water?

- A. PbSO_4
 - B. $\text{Pb}(\text{NO}_3)_2$
 - C. CaS
 - D. KOH
-

Question #: 19

A 10.0 mL sample of an unknown H_2SO_4 solution requires titration with 15.0 mL of 0.350 M NaOH to reach the equivalence point.

What is the concentration of the unknown H_2SO_4 solution? (Remember to write a balanced equation for the reaction.)

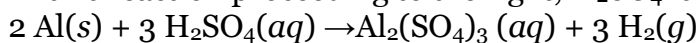
Report your answer with **three** significant figures. Do **NOT** include units in your answer.

 1 M

1. _____

Question #: 20

In this reaction proceeding to the right, H_2SO_4 is the 1 agent and Al is the 2 agent.



Fill in each blank with one of these words: **precipitating**, **reducing**, **oxidizing**, **dehydrating**

1. _____

2. _____

Question #: 21

The oxidation number of manganese in Mn_2O_7 is 1 . Include a number **and** a sign (+ or -) in your answer.

1. _____

Question #: 22

Which **two** of the following substances would react with an acid to evolve a gas?

- A. NaOH
 - B. NaI
 - C. Na_2CO_3
 - D. NaHCO_3
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Question #: 23

The pressure of a gas is 750.0 torr when its volume is 400.0 mL. What is the pressure if the gas is allowed to expand to 600.0 mL at constant temperature?

- A. 500.0 torr
- B. 1125 torr
- C. 320.0 torr
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Question #: 24

The volume of a gas is increased from 150.0 mL to 350.0 mL by heating it at constant pressure. If the original temperature of the gas was 25.0°C, what is the final temperature?

- A. 146°C
 - B. 10.7°C
 - C. 423°C
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Question #: 25

How many moles of air are in a bicycle tire with a volume of 2.26 L and an internal pressure of 6.90 atm at 17 °C?

Report your answer with **three** significant figures in scientific notation with the format 2.22E2 or 2.22E-2. Do **NOT** include units in your answer.

 1 moles

1. _____

Question #: 26

A tank has a volume of 12.4 liters of carbon dioxide gas at 722 torr and 298 K.

If the CO₂(g) is compressed to a volume of 10.5 L at a temperature of 293 K, what is the new pressure of the gas?

- A. 682 torr
 - B. 838 torr
 - C. 5.08 × 10⁴ torr
 - D. 931 torr
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Question #: 27

A 3.635 g sample of gas in a 0.326 L vessel exerts a pressure of 1.20 atm at 338 K. What is the molar mass of the gas?

- A. 56.6 g/mol
 - B. 91.7 g/mol
 - C. 164 g/mol
 - D. 258 g/mol
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Question #: 28

A sample of natural gas contains 9.89 moles of CH₄, 0.841 moles of C₂H₆, and 0.253 moles of C₃H₈.

If the total pressure of the gases is 2.57 atm, the partial pressure of C₂H₆ is 1 atm.

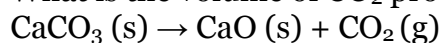
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1. _____

Question #: 29

Quicklime (CaO) is produced by the thermal decomposition of calcium carbonate (CaCO₃).

What is the volume of CO₂ produced **at STP** from the decomposition of 152 g CaCO₃?



- A. 44.5 L
 - B. 55.1 L
 - C. 34.0 L
 - D. 25.3 L
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Question #: 30

A gaseous compound is decomposed and found to contain 85.63 % carbon and 14.37 % hydrogen by mass.

The mass of 258 mL of the gas, measured at STP, was 0.646 g. What is the **molecular** formula of the compound?

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C 1 H 2

1. _____

2. _____

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What is the name of BaCl₂? 1

1. barium chloride

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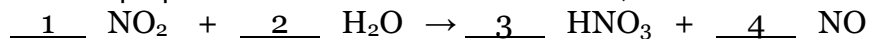
P 1 S 2

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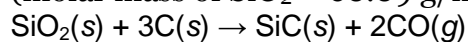
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 $2 \text{C}_8\text{H}_{18}(l) + 25 \text{O}_2(g) \rightarrow 16 \text{CO}_2(g) + 18 \text{H}_2\text{O}(g)$

- A. 79.98%
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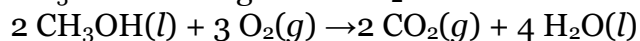
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1. 55|56|57|

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1 mL

1. 272|271|

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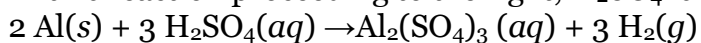
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 1 M

1. 0.262|2.62E-1|0.263|2.63E-1|

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Fill in each blank with one of these words: **precipitating**, **reducing**, **oxidizing**, **dehydrating**

1. oxidizing|oxdizing|oxidant|oxidize|
 2. reducing|reducing|reductant|reduce|
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1. +7|7+|seven plus|plus seven|
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1. 0.655|.655|

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Report your answer with **two** significant figures, and **not** in scientific notation. Do **NOT** include units in your answer.

1. 0.20|0.20|0.19|0.19|0.21|.21|

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CaCO₃ (s) → CaO (s) + CO₂ (g)

- A. 44.5 L
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C 1 H 2

1. 4

2. 8