

University of Kentucky

Department of Chemistry

READ THESE DIRECTIONS CAREFULLY BEFORE STARTING THE EXAMINATION!

It is *extremely* important that you fill in the answer sheet EXACTLY as indicated, otherwise your answer sheet may not be processed; ALL entries are to be made on SIDE 1 of the answer sheet. Use a #2 pencil (or softer); fill in the circles completely and firmly. Erasures must be complete. Use only the following categories:

NAME:	Print your name starting at the first space, LAST NAME first, then a space, followed by your FIRST NAME, then another space, followed by your MIDDLE INITIAL. Fill in the <u>correct circles</u> below your printed name corresponding to the letters of your name; for the spaces, fill in the top blank circle.
STUDENT NUMBER:	This is VERY IMPORTANT! Under IDENTIFICATION NUMBER, put in your 8 DIGIT STUDENT ID NUMBER (do not use the 9 at the beginning of your number) beginning in column A and continuing through column H, column I will be blank, (do NOT use column J at this time); be sure to fill in the correct circles (a common error to be avoided is mistaking "0" for "1").
TEST FORM:	Fill in the "2" blank in the J column under IDENTIFICATION NUMBER (to indicate Hour Examination II).
SPECIAL CODES:	Use for course and section number; in positions K-P write in one of the following: <div style="text-align: center;"> Dr. Woodrum 105-001, 105-005 Dr. Guzman 105-002 Dr. Soult 105-003, 105-004 Dr. Ladipo 105-006 Dr. Kuhler 105-007 Dr. Holler 105-401 </div>
SIGNATURE:	You MUST sign the examination answer sheet (bubble sheet) on the line directly above your printed name. Use your legal signature.

Answering Questions:

Starting with answer "1" on SIDE 1, fill in the circle indicating the one best answer for each of the **30 questions** in this examination. Your score is the sum of the appropriate credit for each response. On the day following the examination, an examination key will be posted on Blackboard.

Grading and Reporting:

The examination scores will be posted in Blackboard as soon as possible after the examination. If an error has occurred in scoring your answers, inform your instructor within 48 hours of the posting of your score.

<p>BE SURE THAT YOUR TEST HAS 30 QUESTIONS, A PERIODIC TABLE, AND ONE SHEET OF SCRATCH PAPER. You may <u>NOT</u> use your own scratch paper during this examination. Cell phones, computer, and pagers are to be turned off and out of sight during the exam.</p>
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1. Calculate the molecular mass of fructose, $C_6H_{12}O_6$.

A. 246.17 amu

C. 164.16 amu

B. 196.16 amu

D. 180.16 amu

2. How many fluorine atoms are in 25.0 grams of SF_4 ?

A. 1.18×10^{24} atoms

C. 5.57×10^{23} atoms

B. 1.39×10^{23} atoms

D. 3.48×10^{22} atoms

3. Calculate the mass percent of Cl in $RuCl_3$.

A. 51.27%

C. 35.45%

B. 55.46%

D. 48.20%

4. For the equation: $2H_2O_2 \rightarrow 2H_2O + O_2$

Calculate the number of moles of oxygen gas that is produced from the complete decomposition of 30.0 g of H_2O_2 .

A. 0.500 mole

C. 2.00 mole

B. 1.00 mole

D. 0.441 mole

5. A hydrocarbon contains 82.66% carbon and the rest is hydrogen. Determine the empirical formula of the compound.

A. C_2H_5

C. C_3H_8

B. C_2H_6

D. C_4H_{10}

6. A certain compound has an empirical formula NO_2 . If the ratio of the molar mass to the empirical formula molar mass is 2:1, what is the molecular formula of the compound?

A. NO_2

C. N_2O_2

B. N_2O_4

D. N_4O_2

7. When the equation for the reaction of gaseous carbon dioxide with liquid water to produce aqueous glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) and oxygen gas is balanced with the lowest whole numbers, what is the coefficient of oxygen?

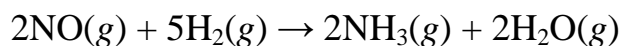
A. 1

C. 3

B. 6

D. 9

8. Nitrogen monoxide reacts with hydrogen to produce ammonia and water. Find the number of moles of hydrogen gas consumed when 9.4 moles of NH_3 is produced.



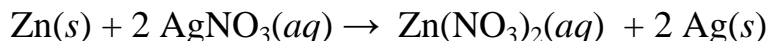
A. 3.8 mol H_2

C. 24 mol H_2

B. 9.4 mol H_2

D. 47 mol H_2

9. Zinc metal reacts with silver nitrate according to the reaction:



Calculate the mass of Ag that forms when 3.00 g of zinc metal is placed in an aqueous solution containing 3.75 g of silver nitrate.

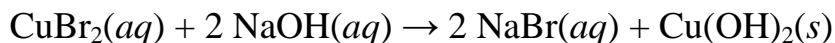
A. 1.59 g

C. 3.69 g

B. 2.38 g

D. 4.90 g

15. What is the balanced net ionic equation for the following reaction?



- A. $\text{Cu}^{2+}(aq) + 2 \text{OH}^{-}(aq) \rightarrow \text{Cu}(\text{OH})_2(s)$
B. $\text{Cu}^{2+}(aq) + 2 \text{Br}^{-}(aq) + 2 \text{Na}^{+}(aq) + 2 \text{OH}^{-}(aq) \rightarrow 2 \text{Na}^{+}(aq) + 2 \text{Br}^{-}(aq) + \text{Cu}(\text{OH})_2(s)$
C. $2 \text{Br}^{-}(aq) + 2 \text{Na}^{+}(aq) \rightarrow 2 \text{NaBr}(aq)$
D. $\text{Cu}^{2+}(aq) + 2 \text{Br}^{-}(aq) + 2 \text{Na}^{+}(aq) + 2 \text{OH}^{-}(aq) \rightarrow 2 \text{NaBr}(aq) + \text{Cu}(\text{OH})_2(s)$

16. If 45.7 mL of 0.500 M H_2SO_4 is required to neutralize a 20.0 mL sample of NaOH solution used in an analysis, what is the concentration of the NaOH solution?

- A. 4.56 M
B. 0.00456 M
C. 2.29M
D. 0.00248 M

17. What is the oxidation number of manganese in KMnO_4 ?

- A. -2
B. 0
C. +3
D. +7

18. Which of the following is an oxidation-reduction reaction?

- A. $\text{H}_2\text{SO}_4(aq) + 2\text{NaOH}(aq) \rightarrow \text{Na}_2\text{SO}_4(aq) + 2\text{H}_2\text{O}(aq)$
B. $\text{Zn}(s) + \text{Cu}(\text{NO}_3)_2(aq) \rightarrow \text{Cu}(s) + \text{Zn}(\text{NO}_3)_2(aq)$
C. $\text{NH}_3(aq) + \text{CH}_3\text{COOH}(aq) \rightarrow \text{NH}_4^{+}(aq) + \text{CH}_3\text{COO}^{-}(aq)$
D. $\text{KCl}(aq) + \text{AgNO}_3(aq) \rightarrow \text{AgCl}(s) + \text{KNO}_3(aq)$

19. Your local weather person announces that the barometric pressure is 30.14 inches of Hg today in Lexington. Convert this pressure to atm.

- A. 1.007 atm
B. 2.050 atm
C. 3.966×10^{-2} atm
D. 2.974×10^{-4} atm
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27. Heat released by a system and work done by a system on its surroundings are assigned a _____ sign and a _____ sign, respectively.

- A. negative; negative C. negative; positive
B. positive; negative D. positive; positive

28. Calculate the change in the internal energy of the system for a process in which the system absorbs 140 J of heat from the surroundings and does 85 J of work on the surroundings.

- A. +55 J C. +225 J
B. -55 J D. -225 J

29. Increasing amounts of greenhouse gases in the atmosphere contribute to global warming mainly by

- A. reacting with other gases in the atmosphere in exothermic reactions.
B. altering the pH of the oceans so that they do not absorb as much heat.
C. decreasing the efficiency of internal combustion engines so that more heat is released into the atmosphere.
D. preventing heat from being radiated back into outer space.

30. Acetylene gas, C_2H_2 , undergoes combustion to form carbon dioxide and water. Which of the following statements is *false*?

- A. The reaction is a redox reaction in which oxygen is reduced.
B. When the reaction occurs at STP, the total volume of all gases present decreases.
C. As the reaction occurs, the system (reaction) gains energy and the surroundings lose the same amount of energy.
D. If equal volumes of acetylene and oxygen are combined, acetylene is the limiting reactant.
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CHE 105 FALL 2011 Exam 2 key

1. D
2. C
3. A
4. D
5. A
6. B
7. B
8. C
9. B
10. C
11. B
12. D
13. C
14. D
15. A
16. C
17. D
18. B
19. A
20. C
21. D
22. A
23. B
24. B
25. C
26. B
27. A
28. A
29. D
30. C