

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 test 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</u> circles 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! In columns A thru H, put in your 8 DIGIT STUDENT ID NUMBER (do not use the 9 at the beginning of your number). Do not use Column I or 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 "1" blank in the J column under IDENTIFICATION NUMBER (to indicate Hour Examination I).
SPECIAL CODES:	Use for course and section number; in positions K-P write in the following: 113000
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 20 questions in this examination. Your score is the sum of the appropriate credit for each response. Soon after the examination is finished, an examination key will be posted on Blackboard sometime after 9:15 PM.

Grading and Reporting:

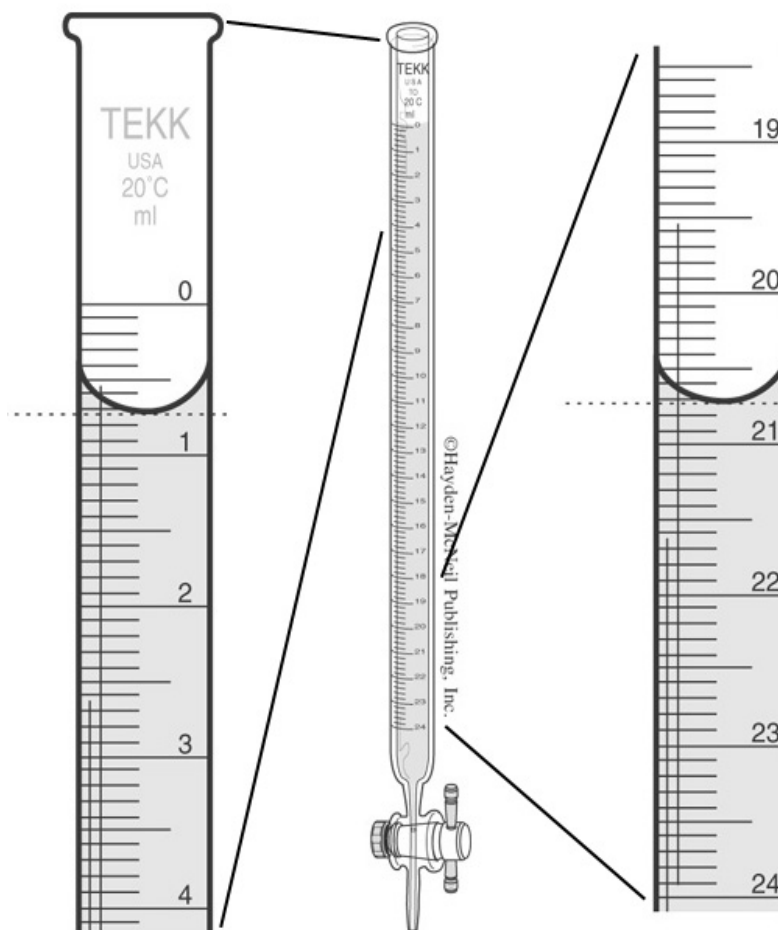
The examination scores will be posted in Blackboard within 96 hours after the examination. If an error has been made in scoring your answers, tell your instructor within 48 hours of the posting of your score.

BE SURE THAT YOUR TEST HAS 20 QUESTIONS, A PERIODIC TABLE, AND ONE SHEET OF SCRATCH PAPER. You may NOT use your own scratch paper during this examination. Cell phones and pagers are to be turned off and out of sight during the exams.

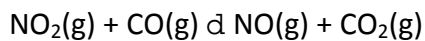
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1. Which of the following statements is true?
- It is okay to dispose of aqueous waste in an organic waste container.
 - Broken glass may be disposed of in the regular trash can as long as it's wrapped in paper towels.
 - Filter paper may be disposed of in the trash can even if it has chemical residue on it.
 - Multiple waste containers are in the lab for multiple types of waste.
-
2. When is it okay to wear gloves outside of the lab?
- It is never okay to wear gloves out of the lab.
 - When you are just stepping into the hall to make a phone call.
 - When you are getting a drink at the water fountain.
 - When you have put on your gloves but haven't actually started the experiment.
-
3. Which of the following is/are important when dispensing solids from a stock reagent bottle?
- Remove the lid and lay it top down or hold it while obtaining reagent.
 - Pour an approximate amount into a secondary container rather than putting a spatula into the bottle.
 - Share excess reagent or dispose of in the appropriate waste container instead of returning it to the stock bottle.
 - All of the above are important.
-

4. The image to the right shows the initial state of a buret (left) and the buret after some volume of liquid was dispensed (right). What volume of liquid was dispensed?

- 20.48 mL
- 19.99 mL
- 20.0 mL
- 20 mL



13. What is the general rate law for the reaction shown below based on the given data?



[NO ₂] (M)	[CO] (M)	Initial rate (M/s)
0.15	0.25	1.31 x 10 ⁻³
0.15	0.50	1.29 x 10 ⁻³
0.45	0.25	3.88 x 10 ⁻³

a. rate = $k[\text{NO}_2]$

b. rate = $k[\text{NO}_2][\text{CO}]$

c. rate = $k[\text{NO}_2]^3$

d. rate = $k[\text{NO}_2]^3[\text{CO}]$

14. If the value of the rate constant, k , has the units $\text{M}^{-2} \text{s}^{-1}$, what is the overall order of the reaction?

a. First

b. Second

c. Third

d. Fourth

15. What is the CH_3COOH concentration when 25.0 mL of water is added to 75.0 mL of 8.0 M CH_3COOH ?

a. 6.0 M

b. 24 M

c. 2.7 M

d. 2.0 M

16. A certain reaction is monitored at 25°C and 45°C to determine the experimental value of the rate constant. It is discovered that with the increase in temperature, the rate constant triples. What is the activation energy of the reaction?

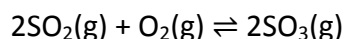
a. 1.9 kJ/mol

b. 43 kJ/mol

c. 514 J/mol

d. 162 J/mol

17. The system shown below is at equilibrium in a closed container. Which of the following will lead to the formation of more reactants?



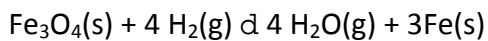
a. Increasing the volume of the container.

b. Decreasing the volume of the container.

c. Addition of the inert gas, N_2 .

d. Addition of $\text{O}_2(\text{g})$.

18. What is the equilibrium expression for the reaction shown below?



a. $K = \frac{[\text{H}_2\text{O}][\text{Fe}]}{[\text{Fe}_3\text{O}_4][\text{H}_2]}$

c. $K = \frac{[\text{H}_2\text{O}]}{[\text{H}_2]}$

b. $K = \frac{[\text{H}_2\text{O}]^4[\text{Fe}]^3}{[\text{Fe}_3\text{O}_4][\text{H}_2]^4}$

d. $K = \frac{[\text{H}_2\text{O}]^4}{[\text{H}_2]^4}$

19. The absorbance of solutions of varying concentration are measured using a colorimeter. If a 0.25 M solution has an absorbance value of 0.30, what is the concentration of a solution with an absorbance of 0.80? Assume that the solutions are following Beer's Law and show a linear relationship in this concentration range.

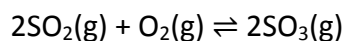
a. 0.96 M

b. 1.0 M

c. 0.67 M

d. 0.094 M

20. A container containing only 0.500 atm of SO_3 proceeds to equilibrium according to the following reaction



If, at equilibrium, the pressure of SO_2 is 0.120 atm, what is the value of the equilibrium constant, K_p .

a. 53

b. 167

c. 84

d. 42

CHE 113					MIDTERM Key							February 12, 2009								
Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Correct Answer	D	A	D	B	D	C	A	C	C	B	D	B	A	C	A	B	A	D	C	B