

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! Put in your 8 DIGIT NEW 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) under IDENTIFICATION NUMBER; 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 1).
SPECIAL CODES:	Use for course and section number; in positions K-P write in the following: 113 followed by your section number.
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.

Grading and Reporting:

The examination scores will be posted in Blackboard. 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.

Name: _____ SID: _____ Seat No.: _____ Room: _____

1. While working in the lab, you break a small test tube. How should you dispose of it?
- A. Place it in the broken glass box. C. Toss it in the trash can.
B. Leave it on the lab bench. D. Take it to the stockroom.
-
2. Which of the following items is required in the laboratory for safety reasons?
- A. Chairs B. Chalkboards C. Waste containers D. Kimwipes
-
3. Which of the following behaviors would be inappropriate in the lab?
- A. Quietly discussing the experiment with your lab partner.
B. Yelling a question across the room to the TA.
C. Arriving on time and prepared to start the experiment.
D. Returning all lab equipment and glassware to the correct location.
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4. Which of the following students is best prepared for lab?
- A. Has goggles and wearing appropriate clothing and shoes.
B. Read the experiment and has goggles.
C. Wearing appropriate clothing and shoes.
D. Read the experiment, wearing appropriate clothing and shoes, and has goggles.
-
5. Which of the following correctly pairs the formula with its number of valence electrons?
- A. SO_3^{2-} , 26 electrons C. SCN^- , 15 electrons
B. HCO_2^- , 16 electrons D. NH_4^+ , 10 electrons
-
6. What is the correct electron pair geometry for XeF_4 ?
- A. octahedral B. square planar C. tetrahedral D. trigonal bipyramidal
-
7. What is the electron pair geometry and molecular geometry (shape) for PF_3 ?
- | <u>electron pair geometry</u> | <u>molecular geometry (shape)</u> |
|-------------------------------|-----------------------------------|
| A. tetrahedral | tetrahedral |
| B. tetrahedral | trigonal pyramid |
| C. trigonal planar | tetrahedral |
| D. trigonal planar | trigonal planar |
-

8. How many single, double, and triple bonds are in the correct Lewis structure for HNO_3 ?

	<u>single</u>	<u>double</u>	<u>triple</u>
A.	4	0	0
B.	4	1	0
C.	3	0	1
D.	3	1	0

9. Which of the following aqueous solutions will have the lowest boiling point?

- A. 0.30 m CaBr_2 B. 0.25 m AlCl_3 C. 1.00 m NaBr D. 1.25 m $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ (sucrose)
-
-

10. A solution is prepared by dissolving 47 g NaCl in 500. g of a solvent. The solution is heated and the boiling point is found to be 4°C higher than the boiling point of the pure solvent. What is the value of K_b ?

- A. 2.5°C/m B. 0.021°C/m C. 1.2°C/m D. 0.042°C/m
-
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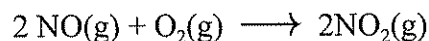
11. What is the freezing point of a 2.5 m solution of CaCl_2 in water? K_f of water = 1.86°C/m

- A. 4.7°C B. -4.7°C C. 14°C D. -14°C
-
-

12. What is the molality of a solution prepared from dissolving 46.5 g of S_8 in 225 mL of naphthalene? density of naphthalene = 1.14 g/cm^3

- A. 0.807 m B. 0.708 m C. 0.181 m D. 0.207 m
-
-

13. The following experimental data was collected for the reaction



What is the overall order of the reaction?

Trial	$[\text{NO}]$ (M)	$[\text{O}_2]$ (M)	Initial Rate (M/s)
1	0.0126	0.0125	1.41×10^{-2}
2	0.0252	0.0125	2.85×10^{-2}
3	0.0252	0.0250	5.66×10^{-2}

- A. 6 B. 4 C. 3 D. 2
-
-

14. If the rate of a reaction is measured in M/s, what are the units of the rate constant, k , for a third order reaction?

- A. M/s B. M^2s^{-1} C. s^{-1} D. M^2
-
-

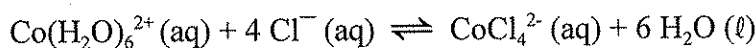
15. An aqueous solution of HCl contains 36% HCl by mass. What is the molarity of the solution? The density of HCl is 1.19 g/mL .

- A. 10 M B. 110 M C. 0.99 M D. 12 M
-
-

16. The activation energy of a reaction is 65.7 kJ/mol. How many times faster will the reaction occur at 50 °C than at 0 °C?

- A. 4.5 B. 158 C. 88 D. 1
-
-

17. Which of the following is the correct equilibrium expression for the reaction shown below?



- A. $K_c = \frac{[\text{CoCl}_4^{2-}][\text{H}_2\text{O}]^6}{[\text{Co}(\text{H}_2\text{O})_6^{2+}][\text{Cl}^-]^4}$ C. $K_c = \frac{[\text{CoCl}_4^{2-}]}{[\text{Co}(\text{H}_2\text{O})_6^{2+}][\text{Cl}^-]^4}$
- B. $K_c = \frac{[\text{CoCl}_4^{2-}]}{[\text{Co}(\text{H}_2\text{O})_6^{2+}][\text{Cl}^-]}$ D. $K_c = \frac{[\text{Co}(\text{H}_2\text{O})_6^{2+}][\text{Cl}^-]^4}{[\text{CoCl}_4^{2-}][\text{H}_2\text{O}]^6}$
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18. Three solutions (listed below) are combined. Assuming the volumes are additive, what is the bromide concentration in the combined solution?

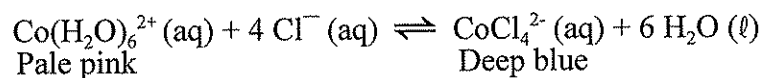
25.0 mL of 0.50 M NaBr

50.0 mL of 0.35 M CaBr₂

25.0 mL of 0.25 M MgCl₂

- A. 0.48 M B. 0.36 M C. 0.63 M D. 0.40 M
-
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19. The following reaction is at equilibrium when a very large excess of the HCl is added to the solution. What color will the resulting solution be?



- A. Pale pink
B. Deep blue
C. A mix of pink and blue
D. Additional information is needed.
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20. Which of the following statements is true?

- A. The absorbance of a solution increases as the concentration decreases.
B. The absorbance of a solution decreases as the concentration increases.
C. The absorbance of a solution is not dependent on the concentration of the solution.
D. The absorbance of a solution increases as the concentration increases.
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Spring 2008 Midterm Exam Key

1. A
2. C
3. B
4. D
5. A
6. A
7. B
8. D
9. A
10. C
11. D
12. B
13. D
14. B
15. D
16. C
17. C
18. A
19. B
20. D