

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 <u>VERY IMPORTANT!</u> 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 "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 one of the following: <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Dr. Woodrum</td> <td>105-001, 105-002</td> </tr> <tr> <td>Mr. Harris</td> <td>105-003, 105-006</td> </tr> <tr> <td>Dr. Ades</td> <td>105-004</td> </tr> <tr> <td>Dr. Knecht</td> <td>105-005</td> </tr> <tr> <td>Dr. Testa</td> <td>105-008, 105-009</td> </tr> <tr> <td>Dr. Guzman</td> <td>105-401</td> </tr> </table>	Dr. Woodrum	105-001, 105-002	Mr. Harris	105-003, 105-006	Dr. Ades	105-004	Dr. Knecht	105-005	Dr. Testa	105-008, 105-009	Dr. Guzman	105-401
Dr. Woodrum	105-001, 105-002												
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Dr. Ades	105-004												
Dr. Knecht	105-005												
Dr. Testa	105-008, 105-009												
Dr. Guzman	105-401												
SIGNATURE:	You <u>MUST</u> 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. The day after the examination is finished, 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 been made in scoring your answers, tell your instructor within 48 hours of the posting of your score.

BE SURE THAT YOUR TEST HAS 33 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.

1. In general, which state(s) of matter has/have the largest distances between molecules?

- A. solids
B. liquids
C. gases
D. both solids and liquids.

2. Choose the pure substance from the list below.

- A. concrete
B. coffee
C. Coca Cola
D. neon

3. Which of the following is a **physical** change?

- A. Liquid propane evaporates from a driveway.
B. A platinum surface becomes tarnished after exposure to air.
C. Salt burns when heated on a frying pan.
D. A bicycle rusts.

4. Which of the following statements about energy is FALSE?

- A. Energy can be converted from one type to another.
B. Kinetic energy is the energy associated with an object's position.
C. Systems tend to change in order to lower their potential energy
D. Energy is the capacity to do work.

5. All of the following are SI base units of measurement, EXCEPT

- A. meter
B. Kelvin
C. second
D. gram
-

6. What is the volume of a box with dimensions of 2.5 in. \times 3.54 in. \times 5.25 in. in cm^3 ? (Be careful of significant figures.)

A. 46.5 cm^3

C. $4.6 \times 10^1 \text{ cm}^3$

B. 762 cm^3

D. $7.6 \times 10^2 \text{ cm}^3$

7. A sphere has a volume of 230 mm^3 . What is its volume in dm^3 ?

A. $2.3 \times 10^{-4} \text{ dm}^3$

C. $2.3 \times 10^{-3} \text{ dm}^3$

B. 2.3 dm^3

D. $2.3 \times 10^3 \text{ dm}^3$

8. Determine the density of an object that has a mass of 0.1498 kg and displaces 12.1 mL of water when placed in a graduated cylinder.

A. 0.0124 g/mL

C. 11.4 g/mL

B. 12.4 g/mL

D. 18.1 g/mL

9. Answer the following computation to the correct number of significant figures.

$$\frac{5.4 \times 10^3}{84.6} + 44$$

A. 1.1×10^2

C. 108

B. 107.8

D. 107.83

10. What is 3.45 mg/ns in units of kg/s?

A. $3.45 \times 10^3 \text{ kg/s}$

C. 3.45 kg/s

B. $3.45 \times 10^2 \text{ kg/s}$

D. $3.45 \times 10^5 \text{ kg/s}$

11. Gas is sold for \$1.399 per liter and your car needs 12.00 gallons. How much will your credit card be charged? (1 gallon = 3.785 L)

A. \$16.79

C. \$4.44

B. \$67.15

D. \$63.54

12. Which of the following statements is FALSE according to Dalton's Atomic Theory?

A. An atom of nitrogen can be broken down into smaller particles that will still have the unique properties of nitrogen.

B. Atoms combine in simple whole number ratios to form compounds.

C. All atoms of chlorine have identical properties that distinguish them from other elements.

D. Atoms of sodium do not change into another element during chemical reaction with chlorine.

13. J.J. Thompson used electric and magnetic fields to deflect particles in a cathode ray tube. The results of this experiment measured the

A. charge of the electron.

B. charge of the proton.

C. charge-to-mass ratio of the electron.

D. charge-to-mass ratio of the proton.

14. Which of the following is the correct symbol for an ion with protons = 29, neutrons = 34, and electrons = 27?

A. ${}_{34}^{63}\text{Se}^{2-}$

C. ${}_{29}^{63}\text{Cu}^{2+}$

B. ${}_{29}^{34}\text{Cu}^{2+}$

D. ${}_{63}^{34}\text{Eu}^{2-}$

15. Isotopes differ in the number of what particle?

- A. electrons
B. neutrons
C. protons
D. beta particles

16. What is the chemical symbol of antimony?

- A. At
B. Sb
C. W
D. Ti

17. Which one of the following elements is an alkali metal?

- A. cesium
B. barium
C. rhenium
D. lead

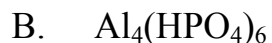
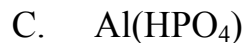
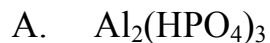
18. An element, M, reacts with fluorine to form the ionic compound MF_3 . After completion of the chemical reaction, the ion formed from M has 21 electrons. What element is M?

- A. scandium
B. chromium
C. iron
D. cobalt

19. Predict the standard charge on the monoatomic ions formed by magnesium.

- A. +1
B. +2
C. -1
D. -2
-

25. What is the empirical formula for $\text{Al}_2(\text{HPO}_4)_3$?



26. Which of the following chemical compounds is a molecular compound?



27. Write the formula for the compound formed when potassium reacts with sulfur.



28. What is the name of FePO_4 ?

A. iron phosphorus tetroxide

C. iron(I) phosphite

B. iron(II) phosphate

D. iron(III) phosphate

29. Determine the name for P_4O_{10} .

A. phosphorus(IV) oxide

C. diphosphorus pentoxide

B. phosphorus oxide

D. tetraphosphorus decoxide

30. What is the name of $\text{H}_2\text{S}(aq)$?

A. sulfuric acid

C. dihydrogen sulfide acid

B. hydrosulfuric acid

D. sulfur dihydride acid

31. Calculate the molar mass for magnesium perchlorate.

- A. 223.21 g/mol C. 119.52 g/mol
B. 123.76 g/mol D. 247.52 g/mol

32. How many molecules of N_2O_4 are in 76.3 g N_2O_4 ?

- A. 4.59×10^{25} N_2O_4 molecules C. 1.38×10^{24} N_2O_4 molecules
B. 4.99×10^{23} N_2O_4 molecules D. 7.26×10^{23} N_2O_4 molecules

33. A perfect cube of unknown elemental composition has a length of 1.40 m on each side. Furthermore, the mass of the cube is 21.57 Mg (megagrams). Using this information and the density table below, determine the metal used to prepare the cube.

Elemental substance	Au	Fe	Pt	Ti
d (g/mL)	19.3	7.86	21.4	4.51

- A. titanium C. iron
B. platinum D. gold
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