

CHEM 101 Exam 1

Fall 2008

Name: _____
(please print: Last name, First name)

There are 32 items worth a total of 100 points. Each item is worth 3 points unless noted otherwise. Choose ONLY the best answer for multiple choice items.

For calculations, only an answer is required. Partial credit may be obtained with an incorrect answer if you show your work and it clearly indicates some correct understanding of the problem.

DO NOT REMOVE THIS COVER SHEET FROM YOUR EXAM

1. Give the SI (metric system) base units for each quantity. Write the whole name of the unit – **DO NOT ABBREVIATE.**

Mass _____ length _____ Temperature _____

2. Express 0.17 km in cm. **Circle your final answer.** Report your result with the correct units and number of sig. figs. Show work for partial credit.

3. Which statement best describes the last reported digit in a measured number (for example the 3 in 1.23 g)
- It is not counted as a significant figure
 - It is the last digit that is known exactly; all others are uncertain.
 - It is uncertain but counted as a significant figure.
 - It is included to make the number look more scientific.

4. An object is found to have a mass of 0.0007068 g. Express this measured value in scientific notation. **Circle your final answer.** Report your result with the correct units and number of sig. figs. Show work for partial credit.

5. Calculate the volume of a cube that is 8.5 cm on a side. **Circle your final answer.** Report your result with the correct units and number of sig. figs. Show work for partial credit.

6. Calculate the difference between the two measured masses: 94.935 g - 7.6 g. **Circle your final answer.** Report your result with the correct units and number of sig. figs. Show work for partial credit.

7. Give the equality and the two conversion factors that relate g to mg.

8. Which ONE of the properties below is an intensive property of matter?
- a) density b) mass c) heat d) diameter

9. Calculate the mass of 135.0 mL of a liquid that has a density of 0.876 g/mL. **Circle your final answer.**
Report your result with the correct units and number of sig. figs. Show work for partial credit.

10. Indicate whether each statement is true (T) or false (F).

___ 1 g = 1,000 mg ___ 1 cm = 100 m ___ 1 mL = 1 cm³

11. The temperature of an object is determined to be 134.7 °C. What temperature is this on the Kelvin scale?
Circle your final answer. *Report your result with the correct units and number of sig. figs. Show work for partial credit.*

12. (8 pts) Complete the table for subatomic particles.

Name	Charge	Approximate mass (to nearest amu)	Location
	+		nucleus
neutron		1 amu	

13. Give the correct name for each element:

N = _____

Cl = _____

K = _____

14. Choose from elements with atomic numbers 1 to 20 and give the symbol for

a halogen _____ a metal _____ a noble gas _____

15. Indicate whether each statement below is true (T) or false (F) for the elements Be, Mg, and Ca.

___ They all are in the same period.

___ They all have the same number of valence electrons.

___ They all gain electrons when they form ions.

16. Which statement best describes what valence electrons are?

a) Valence electrons are the electrons that are closest to the nucleus

- b) Valence electrons are the electrons in the highest shell.
- c) Valence electrons are the electrons in the p orbitals.
- d) Valence electrons are electrons with a positive charge.

17. You are doing an experiment that requires calcium, but you see that the bottle of calcium is empty. Which of these elements is most likely to have similar chemical properties (circle ONE).

Mg Li Si N

18. Give the number of valence electrons for each of these elements:

Rb = _____ B = _____ P = _____

19. Show the charge (sign and magnitude) on the ion formed by each element.

Ca _____ P _____ F _____

20. In a Lewis symbol for an atom, the dots represent:

- a) valence electrons b) non-bonding electrons c) protons d) p orbital electrons

21. What is required for the formation of an ionic compound?

- a) heat and light b) mass and energy
- c) atoms with equal numbers of valence electrons d) a metal and a nonmetal

22. Give the correct formula for each of these compounds:

Lithium oxide = Aluminum sulfide = Magnesium phosphide =

23. (2 pts) Give the correct name for each of these compounds:

KCl = _____

Na₂O = _____

24. Circle the correct formula for zinc(II) nitride:

Zn₂N ZnN₂ ZnN⁺² Zn₃N₂

25. Give the charge (sign and magnitude) on the transition metal in each of these compounds:

TiCl₃ = _____ CuBr = _____ FeO = _____

26. Give the correct formula for potassium sulfate (the sulfate ion = SO₄²⁻).

27. Which statement best describes the information given by the formula for an ionic compound?

- a) The formula gives the ratios of the ions in the compound.
- b) The formula gives the smallest number of atoms that make up distinct particles of the compound.
- c) The formula shows the charge on each ion.
- d) The formula tells what masses of each atom must be mixed to make the compound.

28. Give the Lewis structure for formaldehyde, CH_2O .
29. Electronegativity refers to:
- the charge on the electron.
 - the ability of an element to attract the electrons in a shared pair of electrons.
 - the reactivity of electrons, with more electrons giving lower reactivity.
 - the cloud of negative charges that surrounds all atoms.
30. Which of these covalent bonds will be the most polar?
- a) a H-H bond b) a C-C bond c) a C-N bond d) a C-O bond
31. Which statement must be true for a polar molecule?
- The molecule must have a tetrahedral geometry.
 - The molecule must contain at least one oxygen atom.
 - The molecule must contain at least one polar bond.
 - The molecule must have a bent geometry.
32. What is the molecular geometry for ammonia, NH_3 ? HINT: it may help to draw the Lewis structure.
- linear
 - bent
 - trigonal planar
 - trigonal pyramidal