CHEMISTRY 101
EXAM 1   FORM B   SECTION 503

SPRING 2010
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Directions: (1) Put your name and signature on PART 2 of the exam where indicated.
(2) Sign the Aggie Code on PART 2 of this exam.
(3) Each multiple choice question is actually 2 questions on your scanning sheet. If you are sure of an answer, **put the same answer down for both questions** for 5 pts. If you cannot decide between two answers, put your best answer down for the first (odd) question and the other answer down for the second (even) question. If you get the first one correct you'll get 3 pts; if you get the second one correct you'll get 2 pts. If there is an ambiguous multiple choice question, use the last page to explain your answer.
(4) Do NOT write on the envelope.
(5) When finished, put everything in the envelope and wait to be excused. At the table, take everything out of the envelope. You can pick up the multiple choice part with the answers outside my office after 2:30pm.
(6) There are a total of 34 questions (18 actual questions).

PART 1

1&2. Which of the following elemental names is **incorrectly** matched with its symbol?

(a) copper/Cu   (b) calcium/Ca   (c) oxygen/O

(d) bromine/B   (e) chromium/Cr

3&4. Which of the following statements is/are **true** about $^{56}Fe^{3+}$?

(1) this ion has 29 electrons   (2) this ion has 26 neutrons   (3) this ion has 26 protons

(a) 1 only   (b) 1 and 3 only   (c) 1 and 2 only   (d) 2 and 3 only   (e) 3 only

5&6. One formula unit of Li_3PO_4 contains:

(a) Avogadro's number of phosphorus atoms

(b) 3 ions of Li^+

(c) 4 moles of PO_4^{3-} anions

(d) 1 mole of Li_3PO_4

(e) 31 g of P

7&8. Give the ions present and their relative numbers in iron(III) sulfate.

(a) 3 Fe^{2+} and 2 SO_4^{2-} (b) 1 Fe^{2+} and 2 SO_4^{2-} (c) 2 Fe^{2+} and 3 SO_4^{2-}

(d) 2 Fe^{3+} and 3 SO_4^{2-} (e) 1 Fe^{3+} and 2 SO_4^{2-}

9&10. Rutherford's gold foil experiment was instrumental in:

(a) the discovery of that the nucleus is negatively charged.

(b) the discovery of alpha particles

(c) the discovery that an atom is mostly empty space

(d) the discovery of the electron

(e) both a and c are correct.

11&12. In the following drawing, the white spheres represent anions and the black spheres represent cations. The following drawing of an ionic compound is a representation of which compound?
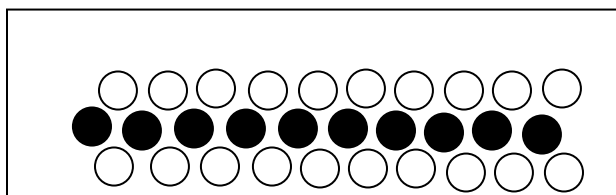
(a) NaBr   (b) $(NH_4)_2CO_3$ (c) $Ba(BrO_3)_2$ (d) $AlBr_3$ (e) $Ca_3(PO_4)_2$

13&14. Which statement is FALSE about strontium?

(a) It is an alkaline earth element.

(b) It is in the fourth period.

(c) Its ionic charge is generally 2+.

(d) It is a Group 2A metal.

(e) It forms the compound $SrBr_2$ with bromine using ionic bonds.

15&16. How many moles of oxygen atoms are present in 1.0 mol of $Mg(NO_3)_3 \cdot 6H_2O$?

(a) 20.   (b) 15   (c) 9.0   (d) 8.0   (e) 10.

17&18. Which of the following statements is FALSE?

(a) Molecules are made of atoms.

(b) The periodic table lists the elements in order of their atomic number.

(c) The term "formula unit" can refer to an ionic compound.

(d) The term "molecule" can refer to a covalent compound.

(e) The term "atom" can refer to a compound.

19&20. The formula weight of $(NH_4)_2SO_4$ is:

(a) 132 amu   (b) 63 amu   (c) 118 amu   (d) 114 amu   (e) 86 amu

21&22. What is the %O by mass in CO_2?

(a) 81%   (b) 65%   (c) 35%   (d) 57%   (e) 73%

23&24. A sample containing 388 kg of pure silver contains how many moles of silver?

(a) 5.48×10^4 mol   (b) 1.23×10^3 mol   (c) 5.62×10^3 mol

(d) 3.59×10^3 mol   (e) 2.15×10^3 mol

25&26. Naturally occurring thallium (atomic number 81) consists of two isotopes: ^{203}Tl with mass 202.97 amu and ^{205}Tl with mass 204.97 amu. What is the percent abundance of ^{203}Tl?

(a) 30%   (b) 40%   (c) 50%   (d) 60%   (e) 70%

27&28. An oxide of iron contains 72.36% Fe by mass. The empirical formula is:

(a) FeO   (b) Fe$_2$O$_3$ (c) Fe$_3$O$_4$ (d) FeO$_2$ (e) Fe$_3$O$_2$

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29&30. How many moles of oxygen atoms are found in an 8.00 cubic centimeter block of $KBrO_3$? The specific gravity of solid $KBrO_3$ is 3.27.

(a) 0.470 mol   (b) 1.18 mol   (c) 0.168 mol   (d) 0.324 mol   (e) 0.0312 mol

31&32. A 97.97 g sample of a pure element is determined to contain 0.4116 mol of the element. What is the element?

(a) Ge   (b) Ga   (c) U   (d) Th   (e) Ac

PART 2

Please read and sign: "On my honor, as an Aggie, I have neither given nor received unauthorized aid on this exam." _____

(14 pts) **33.**   Give the appropriate name or formula for a compound:

(a) iron(III) cyanide   _____

(b) ammonium chromate   _____

(c) strontium bromite   _____

(d) sodium hydrogen carbonate _____

(e) CrI_3 _____

(f) SO_3 _____

(g) HNO_3 _____

OVER $\Rightarrow$

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34. A scientist has two containers of sulfur and knows that he has 1 mole of sulfur **molecules** in each one. One container has only S_2 molecules in it and the other has only S_4 molecules in it. Answer the following questions and show your work to get full credit.

(4 pts)   (a) Calculate the number of atoms of sulfur in each sample.

(2 pts)   (b) Are the numbers the same? Draw a simple picture (a particle view) of each container to justify your answer. (For example, S_3 would be ⃝⃝⃝)

SCRAP PAPER OR COMMENTS ON EXAM

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