

CHEMISTRY 101**EXAM 1 FORM A****SECTION 502****SPRING 2010****DR. KEENEY-KENNICUTT**

- 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).
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PART 1

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

- (a) boron/B (b) sodium/Sd (c) tin/Sn
(d) strontium/Sr (e) fluorine/F

3&4. One formula unit of K_2SO_4 contains:

- (a) 2 ions of K^+
(b) 1 mole of K_2SO_4
(c) 32 g of S
(d) 4 moles of SO_4^{2-} anions
(e) Avogadro's number of sulfur atoms

5&6. Rutherford's gold foil experiment was instrumental in:

- (a) the discovery of the electron
(b) the discovery of alpha particles
(c) the discovery that an atom is mostly empty space
(d) the discovery of that the nucleus is negatively charged.
(e) both c and d are correct.

7&8. Which of the following statements is/are **true** about $^{55}\text{Mn}^{4+}$?

- (1) this ion has 25 protons (2) this ion has 25 neutrons (3) this ion has 29 electrons
(a) 1 only (b) 1 and 3 only (c) 1 and 2 only (d) 2 and 3 only (e) 3 only

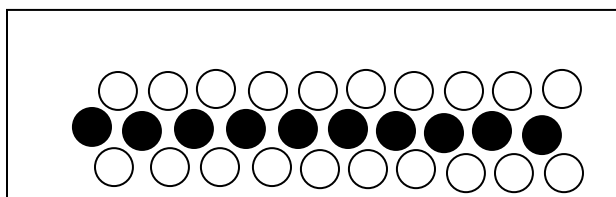
9&10. Which statement is **FALSE** about chlorine?

- (a) It is a halogen.
(b) Its ionic charge is generally 1-.
(c) Chlorine is a Group 7A non-metal.
(d) It forms the compound CaCl_2 with calcium using ionic bonds.
(e) It is in the second period.

11&12. How many moles of oxygen atoms are present in 1.0 mol of sodium aluminum sulfate, $\text{NaAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$?

- (a) 20. (b) 16 (c) 9.0 (d) 8.0 (e) 1.0

13&14. In the following drawing, the white spheres represent cations and the black spheres represent anions. The following drawing of an ionic compound is a representation of which compound?



- (a) $\text{Ba}(\text{ClO}_3)_2$ (b) $(\text{NH}_4)_2\text{CO}_3$ (c) NaBr (d) AlBr_3 (e) $\text{Ca}_3(\text{PO}_4)_2$

15&16. Which of the following statements is FALSE?

- (a) The periodic table presents elements in order of their atomic number.
- (b) The term "molecule" can refer to a covalent compound.
- (c) The term "formula unit" can refer to an ionic compound.
- (d) The term "atom" can refer to a compound.
- (e) Molecules are made of atoms.

17&18. Give the ions present and their relative numbers in iron(II) phosphate.

- (a) 3 Fe²⁺ and 2 PO₄³⁻
- (b) 1 Fe²⁺ and 2 PO₄³⁻
- (c) 2 Fe²⁺ and 3 PO₄³⁻
- (d) 3 Fe³⁺ and 2 PO₄³⁻
- (e) 1 Fe³⁺ and 2 PO₄³⁻

19&20. The formula weight of Mg₃(PO₄)₂ is:

- (a) 168 amu
- (b) 239 amu
- (c) 358 amu
- (d) 214 amu
- (e) 263 amu

21&22. A sample containing 462 mg of pure lead contains how many moles of lead?

- (a) 4.48 x 10⁻⁴ mol
- (b) 4.62 x 10⁻³ mol
- (c) 2.23 x 10⁻³ mol
- (d) 6.37 x 10⁻³ mol
- (e) 8.96 x 10⁻³ mol

23&24. What is the %Ag by mass in Ag_2O ?

- (a) 6.90% (b) 12.9% (c) 78.1% (d) 87.1% (e) 93.1%

25&26. A 128.0 g sample of a pure element is determined to contain 0.5516 mol of the element. What is the element?

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

27&28. An oxide of lead contains 89.62 % Pb by mass. The empirical formula is:

- (a) PbO_2 (b) Pb_2O_3 (c) Pb_3O_4 (d) PbO (e) PbO_3

29&30. Naturally occurring gallium (atomic number 31) consists of two isotopes: ^{69}Ga with mass 68.92558 amu and ^{71}Ga with mass 70.924704 amu. What is the percent abundance of ^{71}Ga ?

- (a) 80% (b) 20% (c) 60% (d) 40% (e) 50%

31&32. The specific gravity of solid NaIO_3 is 4.28. A 5.00 cubic centimeter block of NaIO_3 would have how many moles of oxygen atoms?

- (a) 0.856 mol (b) 1.18 mol (c) 0.118 mol (d) 0.324 mol (e) 0.0312 mol

PART 2

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

33. A scientist has two containers of sulfur and knows that she has 1 mole of sulfur **molecules** in each one. One container has only S_2 molecules in it and the other has only S_6 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 )

OVER ⇒

(14 pts) **34.** Give the appropriate name or formula for a compound:

(a) copper(II) hydroxide _____

(b) lithium carbonate _____

(c) aluminium perbromate _____

(d) potassium hydrogen sulphate _____

(e) $(\text{NH}_4)_2\text{SO}_3$ _____

(f) N_2O_4 _____

(g) $\text{HF}(\text{aq})$ _____

SCRAP PAPER OR COMMENTS ON EXAM

CHEMISTRY 101
EXAM 1 Form A

Spring 2010
Section 502

NAME _____
