Exam Recovery Assignment (Optional)

The following assignment is OPTIONAL. You may recover a maximum of 50 percent of the possible points of the last exam, OR the difference of 70 points and your score on the multiple-choice (unscaled), OR until you run out of multiple-choice questions to correct—whichever comes first. In taking on this assignment, you agree to all the conditions set forth below by signing at the bottom. You agree to do all the work yourself using any and all available non-human resources (other than Mr. Thaler—It's okay to ask me questions). Your parent or guardian must sign, as well, to vouch for the fact that all the work is your own. You agree to complete the sections described below as directed to receive the single point available for each section. You must do BOTH sections to receive *any* credit. You may not choose to do only one section; it is all or nothing for each question you choose to correct. (The one-point-per-section is only to deduct partial points for wrong answers. It is likely, however, that if you make a *sincere* effort to correct an answer, you will receive both points even if you are still not quite correct.) All work must be hand-written, clear, and concise. Label the sections and problems, use complete sentences, and write legibly. This assignment will not be graded if you fail to follow these directions to the letter. This assignment will not be accepted nor graded without this document, *SIGNED BY YOU AND YOUR PARENT OR GUARDIAN*, attached to it.

The assignment is this: For each of the multiple choice questions that you missed on the last exam, you may earn back two points by successfully completing two sections worth one point each as described here. Exam questions typically involve either conceptual questions (no calculations) or problems (requiring a set-up and calculation). Note that each section requires complete responses to specific sub-sections.

For conceptual questions (*SEE THE EXAMPLE ON SIDE 2*):

Section 1 (worth 1 point):

a. Correct the wrong response.
b. Explain what you did wrong.
c. Speculate as to why you made the mistake. (What *were* you thinking?!)

Failure to respond to each of these sub-sections will result in no points for either section.

Section 2 (worth 1 point):

a. Cite a specific example that involves the concept from the textbook, giving the page number, figure, or anything else to help me find it. (I will not be looking too hard, so be specific.)
b. Explain the example from the textbook with enough detail to demonstrate your knowledge and understanding of the concept.

Again, failure to respond to sub-sections completely will result in no points for either section.

For problems involving calculations (*SEE THE EXAMPLE ON SIDE 2*):

Section 1 (worth 1 point):

a. Correct the wrong response.
b. Explain the mistake, *including* a complete demonstration of the ***correct*** solution. YOU MUST SHOW YOUR WORK COMPLETELY—STEP-BY-STEP—INCLUDING UNITS, SIG FIGS, EVERYTHING!
c. Speculate as to why you made the mistake. (What were *you* thinking?!)

Again, failure to respond to each of these sub-sections will result in no points for either section.

Section 2 (worth 1 point):

a. Cite a similar problem from the textbook giving the page number, figure, or anything else to help me find it. (Once again, I will not be looking too hard, so be specific.) You may use problems from the homework assignments—just indicate clearly where they come from.
b. Demonstrate correctly the similar problem from the textbook. AS BEFORE, YOU MUST SHOW YOUR WORK COMPLETELY—STEP-BY-STEP—INCLUDING UNITS, SIG FIGS, EVERYTHING! ***BOX YOUR ANSWER.***

And again, failure to respond to sub-sections completely will result in no points for either section.

All the work required for this assignment, and attached, was done entirely by me working alone.

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Student (Please print, sign, and date)

DEAR PARENT:

Your child is taking on this assignment because they either did poorly on the last exam or simply wish to do better. It is unlikely that they will be offered an opportunity like this again this year, so please advise them—as I have—to study more for exams and quizzes in the future.

Please sign below to indicate that, to the best of your knowledge, your child did all the work required for this assignment entirely on their own. Thank you.

_____

Parent or Guardian (Please print, sign, and date)

ATTENTION STUDENT: ANY INDICATION OF DUPLICATE WORK—i.e., COPYING ANOTHER STUDENT'S WORK—WILL RESULT IN A ZERO FOR THIS ASSIGNMENT AND POSSIBLY A RETROACTIVE ZERO FOR THE EXAM, AS WELL. SO, DO NOT COPY!!

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(Examples below may not involve the subject matter of the particular exam in question.)

Example for a conceptual question, which does not necessarily involve a calculation (2 points):

Part 1 (1 point)—Correcting the wrong response and explaining the mistake and why you made it:

The question to which I responded incorrectly is the following:

Version 2, # 11. During a chemical reaction,

a. new elements are produced.
b. atoms are destroyed.
c. atoms are rearranged.
d. elements are destroyed.

I answered a, but the correct response should have been c. The law of conservation of matter states, that "in any chemical or physical process, atoms are neither created nor destroyed." Since an atom is the simplest particle of an element that retains the properties of that element, elements must be composed of a single type of atom. It follows, then, that in a chemical reaction new elements cannot be produced without producing different atoms.

I may have mistaken the term "elements" for "compounds" in the question. New compounds are certainly produced in chemical reactions by the rearrangement of the existing available atoms. Therefore, c is the correct response.

Part 2 (1 point)—Citing and explaining a specific example from the text book:

Balancing chemical equations is based entirely upon the concept of conservation of matter (and therefore mass). On page 287 of the textbook (LeMay et al, 2000), in Fig. 9-9, this concept is demonstrated clearly. In the reaction between a methane molecule and two oxygen molecules, the production of one carbon dioxide and two waters results: $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$. *Counting the individual atoms, the number of different elements on the left side of the equation should equal the number of identical elements on the right—1 C, 4 Hs, and 4 Os on each side. No new atoms, or elements, are generated in the process. (Incidentally, in nuclear reactions, new elements are produced, and a tiny bit of mass is lost in the production of an enormous amount of energy—*$E = mc^2$*.)*

Example for a question involving a calculation or specific operation or method to solve (2 points):

Part 1 (1 point)—Correcting and explaining the mistake, *including* demonstrating the correct solution:

The question to which I responded incorrectly is the following:

Version 1, # 28. How many oxygen atoms are in 2.30 L of oxygen gas, at STP?

a. 1.24×10^{23} *atoms of oxygen*
b. 4.33×10^{22} *atoms of oxygen*
c. 8.65×10^{22} *atoms of oxygen*
d. 6.18×10^{22} *atoms of oxygen*

I answered d, but the correct response should have been a. My incorrect response suggests either (1) that I did not consider that oxygen gas most commonly exists as a diatomic molecule, O_2 *(ozone,* O_3*, being much less common), and not merely as individual oxygen atoms, or (2) that I did not think to convert oxygen molecules to single oxygen atoms using the last conversion factor in the correct solution below. The correct set-up for solving this problem is as follows:*

$$2.30\ \cancel{L\ O_2} \times \frac{1\ \cancel{mol\ O_2}}{22.4\ \cancel{L\ O_2}} \times \frac{6.02 \times 10^{23}\ \cancel{molec.\ O_2}}{1\ \cancel{mol\ O_2}} \times \frac{2\ atoms\ O}{1\ \cancel{molec.\ O_2}} = \boxed{1.24 \times 10^{23}\ atoms\ O}$$

Part 2 (1 point)—Citing and demonstrating correctly a similar problem from the text book:

An example of a problem that requires a similar approach is on page 318 of the textbook (LeMay et al, 2000), in the caption of Fig. 10-9: "How many moles of atoms are in 5 moles of ammonia molecules?"

$$5\ \cancel{mol\ NH_3\ molec.} \times \frac{4\ mol\ atoms}{1\ \cancel{mol\ NH_3\ molec.}} = \boxed{20\ mol\ atoms}$$

since there are 4 atoms in 1 NH_3 molecule

NOTE: Part-2 problems can also be from the homework assignments; just indicate *clearly* which problem you are doing and from which worksheet.