CHEM 191 Final Exam Preparation

What will be expected?

Assessment for this class is guided by (1) liberal studies program learning objectives, (2) the student learning outcomes, and (3) the content knowledge themes, all of which are listed on the syllabus. The final *may* assess any of these, including:

- Your ability to identify appropriate information sources and critically evaluate the credibility of those sources for relevance, legitimacy, and bias.
- Your ability to evaluate the impact of your own and others' actions on the human and natural worlds.
- Your ability to:
  - Describe and/or recognize the core principals of atmospheric literacy, such as:
    - Earth has a thin atmosphere that sustains life.
    - Energy from the Sun drives atmospheric processes.
    - Earth's atmosphere changes over time and space, giving rise to weather and climate.
    - Earth's atmosphere continuously interacts with the other components of the Earth System.
    - We seek to understand the past, present, and future behavior of Earth's atmosphere through scientific observation and reasoning.
    - Earth's atmosphere and humans are inextricably linked.
  - Summarize and/or recognize how the scientific process works, both in theory and in practice.
  - Utilize and/or recognize SI units and scientific notation.
  - Evaluate written documents for scientific rigor and accuracy.
  - Describe how personal actions and local, national, and global laws affect human health, air quality, and climate on a local, region, and global level.
  - Evaluate the pros and cons of potential steps to remediate air pollution and/or climate change.

What will be the format of the exam?

The exam will be a mix of multiple choice/true false and short answer questions. In general, multiple choice will be used to test your knowledge of concepts.

The exam will be graded by image recognition software so you must complete the exam in pencil and must erase any errors completely. An example of the exam format is attached at the end of this document.

What should I bring to the exam?

The exam is open-book and open-notes.

You may want to bring:

- *The Atmosphere: A very short introduction*
- *Air Pollution and Global Warming*
- Any notes you've taken
- A scientific calculator (NOT a cell phone or computer)
- A pencil (NOT a pen)

You may NOT use:

- A cell phone (must remain face down on table)
- A computer
- A smartwatch/tablet/other electronic device (other than a calculator)

What resources can I use to study?

I recommend you have thoroughly read and are familiar with chapters 1, 2, 4, 5, and 6 of *The Atmosphere: A very short introduction* and the figures therein. You may also wish to review The Atmospheric Science Literacy Framework.

What are some specific concepts and potential questions that may be on the exam?

1. Information literacy
    - Identify scholarly and non-scholarly sources
    - Critically evaluate the credibility of sources for relevance, legitimacy, and bias
2. Earth's Thin Atmosphere
    - Why is there an atmosphere?
    - What is the vertical structure of the atmosphere?
    - What is the bulk composition of the atmosphere?
3. Atmospheric Chemistry
    - What is the ozone hole and why is it there?
    - What are the major criteria air pollutants (especially those important in the Great Smoky Mountains)
    - How do the major pollutants get into the atmosphere?
4. Particulate Matter
    - What is atmospheric PM?
    - How does PM effect health? What are the size categories?
    - Where does PM come from? (primary & secondary)
    - How does PM affect climate?
5. Radiation and Climate
    - What are the two broad categories of radiation important to climate?
    - What is the relationship between energy and light?
    - What is the greenhouse effect and why is it important?
    - What is the electromagnetic spectrum?
6. Awareness
    - How has air pollution improved or worsened in the Southeastern US over the past three decades and why?
    - How has the ozone hole improved or worsened over the past three decades and why?
    - Where do anthropogenic pollutants come from and how do they effect (1) environmental processes and (2) human health.
    - How do we address pollution concerns?

This document is meant to help you prepare for the exam, but is not necessarily all-inclusive. Just because a concept isn't listed here doesn't mean it won't be on the exam!

+1/1/60+

Firstname and Lastname:

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Please encode your student ID number (92????????) below (also write your name in the box above).

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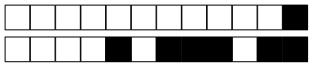
CHEM 191 Final Exam

This is an open-book, open-notes exam. You may use either of the class textbooks and any notes you've taken this semester. A calculator is allowed, but you may not use any other electronic devices. You may NOT use cell phones, computers, tablets, smart watches, etc.! All cell phones must be put into do not disturb mode and must remain face down on the table for the duration of the exam.

Further Instructions:

- This document will be graded by a computer.
- Draw in the box completely so that the computer can correctly grade your test.
- Answers must be given exclusively on this sheet; answers given elsewhere will be ignored.
- Questions using the sign ♣ may have zero, one or several correct answers. Other questions have a single correct answer. On these questions, incorrect answers may incur negative points.



NOTE: The questions here are not necessarily indicative of the questions that will be on the final. They are just examples I had written for previous exams.

Question 1 What is 0.487 grams (g) converted to milligrams (mg)?

- ☐ 4870 mg
- ☐ 4.87×10^{-3} mg
- ☐ 48.7 mg
- ☐ 0.0487 mg
- ☐ 487 mg

Question 2 ♣ Which of the following (if any) are units of *concentration*?

- ☐ Molar
- ☐ millibar
- ☐ millimeter
- ☐ ppb
- ☐ mole
- ☐ Pascal
- ☐ milliliter
- ☐ *None of these answers are correct.*

An example short-answer/free-response question is below.

Question 3 Draw the reaction mechanism for a nucleophylic acyl substitution reaction. You may use the back of this sheet if you need extra space.

☐w ☐0.5 ☐1.0 ☐c