Project 4A: Last Year’s Exam

*This project will likely take you several sessions to complete. Plan to meet at least twice with your group to work on it.*

*This is due Sunday, November 8, by the end of the day. Groups with a member who is participating in the US election as a volunteer for a campaign or as a poll worker, or who is involved in demonstrations or civic activity following the election in response to a contested result, are eligible for an extension on this assignment.*

*You should email this document, with all the figures and text you have added to it, to* [*suast101projects@gmail.com*](mailto:suast101projects@gmail.com)*. The subject line should be the one posted on the assignment page.*

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| --- | --- | --- | --- |
| **Group Number:** | |  | |
| **Member Name #1:** |  | **Email #1:** |  |
| **Member Name #2:** |  | **Email #2:** |  |
| **Member Name #3:** |  | **Email #3:** |  |
| **Member Name #4** |  | **Email #4:** |  |
| **Collaboration Time and Date:** |  | **Evaluating Group Number:** |  |
| **Collaboration Methods (in-person, Zoom, etc.)** |  | | |

In this project, you’ll work on problems from last year’s exam. You will first create explanations for another group for a series of problems from that exam. Your explanations should include a full explanation of how you know what the answer is and why. Also, it is great if you are able to relate one problem to the next -- comparing and contrasting the ideas used in different problems.

You will, of course, have to figure out the answers yourself. You can and should discuss this with other groups on Piazza. *However, you may* ***not*** *ask questions like “What is the answer to #17?”* without explaining why you think that this is the answer.[[1]](#footnote-0) You *may* present your reasoning for the problem and ask for comments, of course!

Then, your group should prepare a “study guide” on the general ideas involved in your problems. This should be substantial -- a set of notes that would prepare your audience for an exam like this one.

***Your audience for this project is another group in our class.*** This means that you can assume that the other group has had the same experiences you have -- going to class, doing your labs, and so on. So you may say things like “Remember how in Lab 8 we did such-and-such…”

Here is last year’s exam: <https://walterfreeman.github.io/ast101/exam3-2019.pdf> .

**Look at Problem 3. Explain how you know what the correct answer is. You should also explain how this process is related to the conservation of energy.**

**Look at Problem 7. Explain how you know what the correct answer is. Your explanation should also discuss how you know each *incorrect* answer is incorrect.**

**Look at Problems 10-13. Explain how you know the correct answer to each, and relate these explanations to each other.**

**Look at Problems 15 and 16. Explain how you know what the correct answer is. These problems are somewhat tricky; you should draw an energy-level diagram and include a picture of this diagram here.**

**Look at Problem 17. Explain how you know what the correct answer is. If one or both of these elements are *not* suitable for a fluorescent lamp, describe why.**

**Look at Problem 22. Explain how you know what the correct answer is. Describe what might produce the other four spectra and why.**

**Look at Problem 23. Explain how you know what the correct answer is. Drawing an energy-level diagram will be helpful; explain which transitions lead to photons of which energies.**

**Look at Problem 25. Explain how you know what the correct answer is.**

**Below, write your study guide. You may also write it in another format and attach that document to your email. You should include pictures and figures that you create, and may include videos that you created, etc. Groups doing an exemplary job here may receive substantial bonus credit. If you include figures anyone else created (e.g. a reference for the EM spectrum), please cite them.**

1. You may use any online resources you wish for this assignment, of course -- the point is for you to learn things! However, you may *not* post these questions to Chegg or similar websites and ask for solutions to them in particular. (This is a general prohibition in our class; this sentence is just here as a reminder.) [↑](#footnote-ref-0)