

AST101: Our Corner of the Universe

Last Prelab: Exam 3 Corrections

Name:

Student number (SUID):

Lab section:

Main ideas on Exam 3

The main ideas for Exam 3 were thermal radiation, and emission and absorption via energy-level transitions.

In this prelab, I'd like you to summarize these main ideas, then relate them to some of the questions on the exam. In completing this, you may refer to whichever form of the exam you like; all four are posted online.

The electromagnetic spectrum, in general

1. Arrange the following types of light in order of increasing wavelength: blue light, ultraviolet, microwaves, red light, infrared.

- Find three problems on the exam where you need to know this idea.

2. How does the wavelength of a certain type of light relate to the energy carried by one photon?

- Find three problems on the exam where you need to know this idea.

Thermal radiation

3. All objects with a temperature emit light called thermal radiation. Does this light consist of only a few specific wavelengths, or a broad range of wavelengths?

- Find three problems on the exam where you need to know this idea.

4. As the temperature of an object increases, how does the *amount* of light that it emits change?

- Find one problem on the exam where you need to know this idea.

5. As the temperature of an object increases, how does the *peak wavelength* of light that it emits change?

- Find three problems on the exam where you need to know this idea.

Atomic emission and absorption

6. Excited atoms can emit light, as in the discharge tubes you saw in lab. Does this light consist of only a few specific wavelengths, or a broad range of wavelengths?

- Find three problems on the exam where you need to know this idea.

7. How do the energies of the photons emitted by atoms correspond to the energy levels available to the electrons in those atoms? (Fill in the blanks in the following: "The energies of the photons emitted are equal to the _____ between _____.")

- Find three problems on the exam where you need to know this idea.
8. When light consisting of a broad range of wavelengths is passed through a certain type of gas, that gas will absorb some of the light. Is the absorbed light only a few specific wavelengths, or a broad range of wavelengths?

- Find a problem on the exam where you need to know this idea.
9. How do the energies of the photons *absorbed* by a certain type of gas in this scenario correspond to the energies of the photons *emitted* by that same type of gas in the previous scenario?

- Find a problem on the exam where you need to know this idea.

Also, tell us:

Which exam form are you using to answer the preceding?

What five questions are you most interested in reviewing during this lab?