Astronomy 101 Quiz 6 Retake Form A

Name: ______________________________

Lab section number: ________________

Instructions:

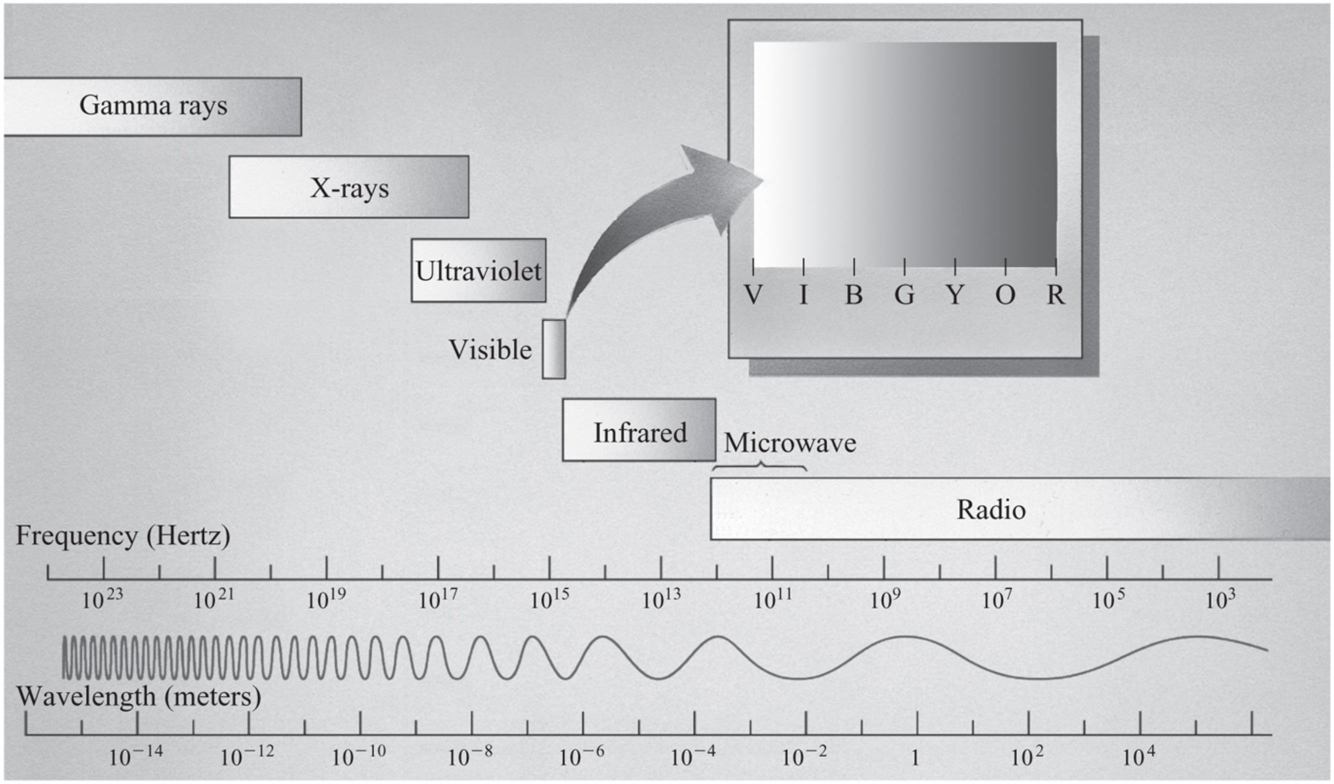
- Quiz time: 25 minutes
- **If you do not speak English as a first language, you may use a translation device to translate things into your native language. If this device is a cellphone app, please let one of the instructors know ahead of time.**
- Please put bags under your seats to allow proctors to move around the room.
- There is a reference sheet included behind this page which you will need.
- You may use notes that you handwrote yourself, or wrote with a stylus and printed, along with your exercises and homework. No electronic devices or things written by others are allowed.
- If you have a question, raise your hand, and a proctor will assist you.
- Do not attempt to communicate with anyone other than teaching staff during the quiz.
- **Circle your answers on this paper as well as completing the Scantron. Turn both in to us at the end of class.**
- **Put your name as "Last First" on your Scantron as well as entering your SUID.**

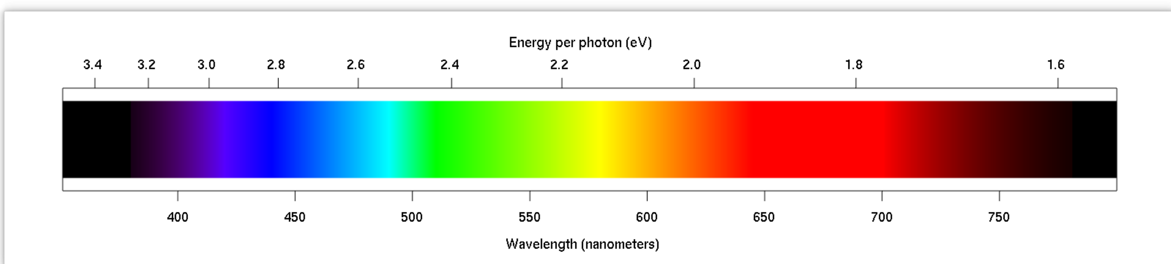
Good luck!

Lab Schedule

Section	Instructor	Time
M024	Sierra Thomas	Monday 8:00 AM-9:20 AM
M003	Sierra Thomas	Monday 9:30 AM-10:50 AM
M004	Kishan Sankharva	Monday 11:00 AM-12:20 PM
M005	Kishan Sankharva	Monday 12:45 PM-2:05 PM
M006	Chad Skerbec	Monday 2:15 PM-3:35 PM
M007	Chad Skerbec	Monday 3:45 PM-5:05 PM
M008	Tyler Hain	Monday 5:15 PM-6:35 PM
M009	Tyler Hain	Monday 6:45 PM-8:05 PM
M010	Vidyesh Rao	Monday 8:15 PM-9:35 PM
M027	Tyler Hain	Tuesday 3:30 PM-4:50 PM
M028	Tyler Hain	Tuesday 5:00 PM-6:20 PM
M029	Vidyesh Rao	Tuesday 6:30 PM-7:50 PM
M030	Vidyesh Rao	Tuesday 8:00 PM-9:20 PM
M025	Sierra Thomas	Wednesday 8:00 AM-9:20 AM
M011	Sierra Thomas	Wednesday 9:30 AM-10:50 AM
M012	Chad Skerbec	Wednesday 11:00 AM-12:20 PM
M013	Chad Skerbec	Wednesday 12:45 PM-2:05 PM
M014	Byron Sleight	Wednesday 2:15 PM-3:35 PM
M015	Byron Sleight	Wednesday 3:45 PM-5:05 PM
M016	Byron Sleight	Wednesday 5:15 PM-6:35 PM
M017	Patrick Adams	Wednesday 6:45 PM-8:05 PM
M018	Patrick Adams	Wednesday 8:15 PM-9:35 PM
M019	Byron Sleight	Thursday 5:00 PM-6:20 PM
M020	Patrick Adams	Thursday 6:30 PM-7:50 PM
M031	Vincent Musso	Thursday 8:00 PM-9:20 PM
M026	Vidyesh Rao	Friday 8:00 AM-9:20 AM
M021	Kishan Sankharva	Friday 9:30 AM-10:50 AM
M022	Vincent Musso	Friday 11:00 AM-12:20 PM
M023	Vincent Musso	Friday 12:45 PM-2:05 PM

Reference

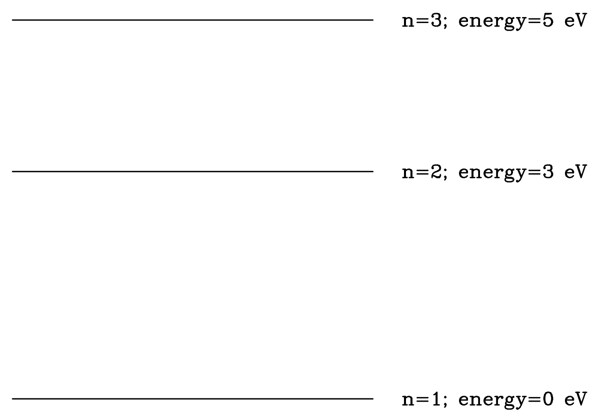




Visible light

1. What form is your exam? (Your exam is form A.)
   (A) Form A
   (B) Form B
   (C) Form C
   (D) Form D
   (E) Form E

2. Suppose a particular sort of atom has energy levels as shown below. You shine a beam of 4 eV photons on these atoms. What will happen?



   (A) Electrons in the atoms will jump to the $n = 2$ level, but not emit any light.
   (B) The beam of light will not interact at all with the atoms.
   (C) Electrons in the atoms will jump to the space between the $n = 2$ and $n = 3$ levels
   (D) Electrons in the atoms will jump from the $n = 1$ level to the $n = 2$ level, emitting a 1 eV photon to carry the leftover energy
   (E) More than one of the above is possible.

3. A lighthouse is built out of a very hot object at the top of a tall building; the light the object produces shines out to sea.

   Viewed from many miles out to sea, what would the spectrum of the lighthouse look like?

   (A) None of the above
   (B) A continuous band of color with some bright lines on top of it
   (C) Thin bright lines
   (D) A continuous band of color with some dark lines on top of it
   (E) A continuous band of color

4. If somehow all of the hydrogen vanished from the Sun, what would the most noticeable change be?

   (A) Some of the bright lines would disappear from its spectrum
   (B) The Sun would stop shining, since hydrogen is essential to stars
   (C) The peak wavelength at which it emitted light would become shorter
   (D) Some of the dark lines would disappear from its spectrum
   (E) None of the above would happen

5. Where do the elements like carbon, oxygen, iron, and silicon around us come from?

   (A) They are created when the solar wind interacts with Earth's atmosphere
   (B) They were created in the core of a star which has since exploded in a supernova
   (C) They were created in the Big Bang
   (D) They are created in the core of the Sun
   (E) None of the above

6. Which of the following is **not** something we can learn directly from the Sun's spectrum?

   (A) The age of the Sun
   (B) The elements contained in the Sun's atmosphere
   (C) We can learn all of these directly
   (D) The Sun's temperature

7. If you put a small amount of neon gas in a tube and run an electric current through it, it glows red.

   Likewise, if you put a small amount of mercury gas in a tube and run an electric current through it, it glows blue.

   What can you conclude about the *temperatures* of the neon gas and the mercury gas?

   (A) They are the same temperature
   (B) The mercury is cooler than the neon
   (C) The mercury is hotter than the neon
   (D) You cannot conclude anything about their temperatures from this experiment

8. Suppose that a new kind of atom has energy levels as follows:

- $n = 1$: 0 eV
- $n = 2$: 2.5 eV
- $n = 3$: 4.5 eV
- $n = 4$: 6.3 eV

If you added a large number of atoms of this type to the atmosphere of the Sun, how would the Sun's spectrum change?

(A) New bright lines would appear at 6.3 eV, 4.5 eV, 3.8 eV, 2.5 eV, 2 eV, and 1.8 eV

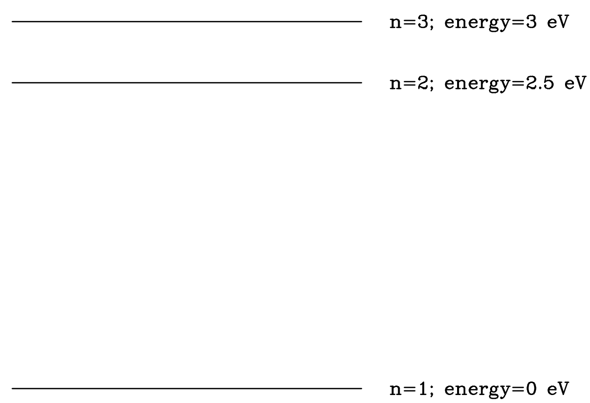
(B) New dark lines would appear at 6.3 eV, 4.5 eV, 3.8 eV, 2.5 eV, 2 eV, and 1.8 eV

(C) New dark lines would appear at 2.5 eV, 4.5 eV, and 6.3 eV

(D) New bright lines would appear at 2.5 eV, 4.5 eV, and 6.3 eV

(E) The peak emission wavelength of the Sun would shift shorter.

9. A certain type of atom has a very simple energy level diagram, as shown below.



You would like to detect whether or not a sample contains atoms of this type. This sample is at low temperature, so all of the atoms are initially in the ground ($n = 1$) state.

What could you do?

(A) Shine a laser that produces 3 eV photons on it, and see if you can detect 2.5 eV photons coming from it

(B) Shine a laser that produces 2.5 eV photons on it, and see if you can detect 0.5 eV photons coming from it

(C) Shine a laser that produces 2.5 eV photons on it, and see if you can detect 3 eV photons coming from it

(D) Shine a laser that produces 0.5 eV photons on it, and see if you can detect 3 eV photons coming from it

(E) Shine a laser that produces 0.5 eV photons on it, and see if you can detect 2.5 eV photons coming from it

10. If an electron in an atom moves from an energy level of 4 eV to a higher energy level of 6 eV, then:

(A) It emits a photon with 10 eV of energy

(B) It absorbs a photon with 10 eV of energy

(C) It absorbs a photon with 2 eV of energy

(D) It emits a photon with 2 eV of energy

11. Suppose that a new kind of atom has energy levels as follows:

- $n = 1$: 0 eV
- $n = 2$: 2.5 eV
- $n = 3$: 4.5 eV
- $n = 4$: 6.3 eV

If you added a large number of atoms of this type to the atmosphere of the Sun, how would the Sun's spectrum change?

(A) New bright lines would appear at 6.3 eV, 4.5 eV, 3.8 eV, 2.5 eV, 2 eV, and 1.8 eV

(B) New dark lines would appear at 6.3 eV, 4.5 eV, 3.8 eV, 2.5 eV, 2 eV, and 1.8 eV

(C) The peak emission wavelength of the Sun would shift shorter.

(D) New dark lines would appear at 2.5 eV, 4.5 eV, and 6.3 eV

(E) New bright lines would appear at 2.5 eV, 4.5 eV, and 6.3 eV