Hello everyone! I am Shreya Jhajharia and I’m your master tutor for Chemistry 1. I’m a senior majoring in Biology and minoring in Entrepreneurship. My plan is to attend medical school after I graduate so if y’all have any questions about the pre-med journey or literally about anything related or unrelated to school, hit me up!

I’ll be posting weekly resources on the topics that will be covered in class the following week. Reach out to me if you need help with anything. Also do let me know if there are any specific resources you find helpful in the discussion board. If you cannot make it to Group Tutoring, remember these resources are available to you on the tutoring center website.

Our Group Tutoring sessions will be every **Wednesday from 5:15-6:15 PM.** We will go over important topics that you will be covering in class and we will practice problems that you will need to be familiar with. You can reserve a spot at [https://baylor.edu/tutoring](https://baylor.edu/tutoring). I hope to see you there!

**Some topics I will be covering:**

**Atomic Structure and Periodicity:** Definition of wavelength and frequency, classification of Electromagnetic Radiation, Energy of a system

**Quantum number:** Definitions of important terms in the chapter, Pauli Exclusion theory, and a table that summarizes quantum numbers

**Keywords:** wavelength, frequency, electromagnetic radiation, quantum numbers

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**TOPIC OF THE WEEK:**

**Atomic Structure and Periodicity**

- **Definition of wavelength and frequency:**

  **Wavelength:** the distance between two peaks or troughs in a wave

  **Frequency:** number of waves per second that pass a given point in space

  Relationship between wavelength and frequency: \(\lambda v = c\) (\(\lambda\) is the wavelength, \(v\) is the frequency, and \(c\) is the speed of light)
**Remember:** speed of light: \(3 \times 10^8 \text{ m/s}\) (most of the times, it won’t be given on the test)

- **Classification of Electromagnetic Radiation**

  Highest to lowest wavelength or lowest to highest frequency (Remember: frequency is inversely proportional to wavelength):

  Radio waves  Microwaves  Infrared  Visible  Ultraviolet  X rays  Gamma rays

  (Radio waves have the highest wavelength but the lowest frequency)

  **A way to remember this:**  Red Monkeys Invade Venus Using X-ray Guns (from right to left)

  (The first letter of this pneumonic coincides with each classification in order)

  ![Electromagnetic Spectrum Diagram](https://imagine.gsfc.nasa.gov/science/toolbox/emspectrum1.html)

  - The inverse relationship between \(\lambda\) and \(v\): \(\lambda v = c\)
  - The change in energy for a system, \(\Delta E = nhv\)
    
    \(n = \text{integer; } h = \text{Planck’s constant; } v = \text{frequency of electromagnetic radiation}\)
  - The energy of each photon can be represented by, \(E(\text{photon}) = hv = \frac{hc}{\lambda}\)

  **Remember:** The value of Planck’s constant is \(6.626 \times 10^{-34} \text{ J.s}\)

  The following video will help y’all better visualize and understand the above-mentioned concepts

  [https://www.youtube.com/watch?v=X0IvzsWT4P4](https://www.youtube.com/watch?v=X0IvzsWT4P4)
HIGHLIGHT #1: Rules for Significant Figures

- Zeroes present between two non-zero numbers are always significant (1206 has 4 significant figures)
- If zeroes are present before the first non-zero digit, they are considered to be not significant (0.00008 has 1 significant figure)
- Zeros at the end of the number after a decimal place are significant. (0.6000 has 4 significant figures)
- Trailing zeros are significant only if the number contains a decimal point (1500 only has 2 significant figures)

HIGHLIGHT #2: Quantum numbers

Definitions of Principle quantum number, angular momentum quantum number, magnetic quantum number

Before jumping into details and advanced knowledge, we should understand the definition of an orbital

**Orbital**: “An orbital is a three-dimensional description of the most likely location of an electron around an atom. Below is a diagram that shows the probability of finding an electron around the

Some resources to understand these topics:

https://www.youtube.com/watch?v=I6iIjrRCPCQ&t=1s
https://www.youtube.com/watch?v=emnHJet22cQ&t=1809s
https://www.youtube.com/watch?v=k0GgTQe4CHU&t=909s
A picture that explains and summarizes the quantum number chart:

![Quantum Number Chart](https://medium.com/atomic-theory/quantum-number-and-shape-of-the-orbitals-f9a6e90ec975)

**Two points to remember:** the value of \( l \) is \((n-1)\) and the value of \( m_l \) is \((-l \text{ to } +l)\)

![Quantum Numbers Table](https://www.qsstudy.com/chemistry/what-are-quantum-numbers)

**CHECK YOUR LEARNING**

1. What is the frequency \((v)\) of visible light with wavelength 535 nm?

2. What is the wavelength of microwave radiation whose frequency is \(1.258 \times 10^{10} \text{ s}^{-1}\)?
3. How many significant figures are in each of the following terms?
   
a. 34.6209  
b. 0.003048  
c. 5010.0

**THINGS YOU MAY STRUGGLE WITH**

- Remembering the equations for wavelength and frequency: I would suggest knowing that they are inversely proportional and this will help you get started most of the time.
- Dimensional Analysis can get very confusing: I would suggest looking at the units! Most of the time, the questions give you the units your solution should be in. Looking at the units will help you convert, cancel, and recognize what the problem is looking for.
- Quantum numbers can be daunting: I would suggest practicing as many problems as you can and make sure y'all look at the small table with the “number, symbol, and possible values” columns. Practicing plenty of questions will help you get used to the pattern and the layout of the questions that will be asked on the test!

That’s it this week! Please reach out if you have any questions and don’t forget to visit the Tutoring Center website for further information at [www.baylor.edu/tutoring](http://www.baylor.edu/tutoring).

Answer to practice question:

1. $5.60 \times 10^{14}$ Hz
2. 2.38 cm
3. a. 6, b. 4, c. 5