PH 122: Assignment #8  Quantum Physics

Details
This assignment will be due in class on Wednesday, April 9.

- When you answer questions, please show your reasoning.
- When you answer multiple-choice questions, please show all of your work.
- Please answer problems in three steps, “Prepare”, “Solve” and “Assess”

Problems

Chapter 28: Quantum Physics

Topic #1: Photons & Photoelectric Effect

Questions: 4, 8, 12, 26

Problems: 10, 14, 16, 18, 22, 66

Topic #2: Matter Waves & Uncertainty

Questions: 16

Problems: 32, 34, 46

Topic #3: Energy Levels & Quantum Jumps

Questions: 35

Problems: 44, 72, 83

Past Exam Problem

Glowing in the Waves

Dinoflagellates are single cell creatures that float the world’s oceans. Many types are bioluminescent. A typical bioluminescent dinoflagellate emits a flash of light of wavelength 460 nm lasting 0.10 s. A typical flash contains 100,000,000 photons. What is the power of the flash in watts? Show your work and explain your reasoning.

Grading

We will grade 2 items.

If we grade a question, we'll give it 0, 1 or 2 points. We’ll assign points as follows:

2 = essentially all correct; 1 = partially correct; 0 = mostly incorrect.

If we grade a problem, we'll give it 0, 1 or 2 points. We'll give 1 point for “Prepare” and 1 point for “Solve”. The “Assess” step will work as a fail safe. If you didn't get the solution quite right but your “Assess” step was thoughtful and well reasoned, you can still get the full 2 points.

We’ll assign 1 “Completeness Point” - with “Completeness” broadly interpreted. You need to make a serious effort on all the problems, do legible and complete work throughout, and staple your pages together.

Additional Practice

If you want additional practice, you can try the following problems:

Chapter 28:

Problems: 7, 13, 27, 35, 39, 43, 47, 59