von Baeyer Questions

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Chapter 1 Questions

1. According to von Baeyer, who used the term "quanta"?
2. What was Planck's attitude about the statistical methods he put forward as a solution to the black-body problem?
3. Chapter 1 is entitled "How the Quantum Was Born". How was the quantum born? Who was involved? What problems were they working on?
4. Who said "Even though beer is always sold in pint bottles, it does not follow that beer consists of indivisible pint portions"? Why did this person say it?
5. Von Baeyer gives a suggestion about how to remember that red light has low frequency in the visible spectrum and blue light has high frequency. What is the suggestion?
6. On page 11, von Baeyer shows a plot of energy density as a function of frequency. What kind of a physical situation is this plot describing?

Chapter 2 Questions

1. What did Einstein do in 1905?
2. What else did Einstein do in 1905?
3. What were the first two elementary particles discovered?
4. What is happening in the figure on page 25?

5. Who demonstrated experimentally that light consists of waves? When?

6. Why does a two-slit experiment use slits instead of pinholes?

Chapter 3 Questions

1. How are the photons that make up light different from the molecules that make up water when it comes to comparing a light wave to a water wave?

2. Who is the father-son pair of Nobel prize winners and what did each do?

3. What is the aim of physics, according to von Baeyer?

4. How is a photon like a platypus?

5. Why did Bohr pick hydrogen as a focus for his theoretical efforts?

Chapter 4 Questions

1. What is the goal of physics, according to von Baeyer?

2. What replaced mechanical models for explaining phenomena in physics?

3. The wavefunction that von Baeyer talks about in this chapter is the same thing that Jordan referred to as the *state* of the particle. At the bottom of page 45, von Baeyer says "Quantum theory can be thought of as the science of constructing wavefunctions and extracting predictions of measurable outcomes from them." That's just what we were doing at the end of the book by Jordan. Given a state, we can calculate the probabilities that a physical quantity will have particular values. von Baeyer talks about the harmonic oscillator in Chapter 4, but we did not study the harmonic oscillator in Jordan. Jordan begins a study of the harmonic oscillator in Chapter 18, just after we stopped reading.

4. What is Korzybski's warning?

Chapter 5 Questions

1. What is the most beautiful experiment in physics?

Chapter 6 Questions

1. What was the price that the inventors of quantum mechanics, in introducing the wavefunction with its probability interpretation, had to pay?

2. What is the miracle referred to in the title of this chapter?

3. Page 64 and 65 list two fundamentally different laws. We spent all of our time with Jordan's book looking at one of these laws and ignoring the other. Can you guess which law we have studied and which we have ignored?

Chapter 7 Questions

1. This chapter has a main point. The author makes the point twice (once on page 78 and again on page 80). What is the main point?

2. On page 73, the author claims that Heisenberg's explanation of the meaning of quantum uncertainty was flawed. What was wrong with it?

Chapter 8 Questions

1. What is a qubit?

2. What is the simplest wavefunction?

Chapter 9 Questions

1. What is frequentist probability?

2. Give an example of a frequentist use of probability.

3. Consider Marcus Appleby's parable. What assumptions must Bob make to conclude his coin is fair?

4. What are von Baeyer's arguments against a frequency interpretation of probability?

Chapter 10 Questions

1. What is Bayesian probability?

2. What is Bayes' law?

Chapter 11 Questions

1. What is the paradox of Wigner's friend?

Chapter 12 Questions

1. Describe the Schrödinger's Cat paradox.

2. Why did Schrödinger invent the Cat story?

Chapter 13 Questions

1. Who is Democritus and why does von Baeyer bring him into the story?

2. What is a Heisenberg cut?

Chapter 14 Questions

1. Is there an interpretation of QM that respects locality?

2. Is there an interpretation of QM that respects realism?

3. Is there an interpretation of QM that respects locality and realism?

4. Describe the GHZ experiment.