

Learning

Choose the answer which best explains your preference and click the box next to it. Tick more than one if a single answer does not match your perception.

1. **A group of tourists wants to learn about the parks or wildlife reserves in your area. You would:**

Tick all that apply.

- ☐ talk about, or arrange a talk for them about parks or wildlife reserves.
- ☐ show them maps and internet pictures.
- ☐ take them to a park or wildlife reserve and walk with them.
- ☐ give them a book or pamphlets about the parks or wildlife reserves.

2. **You have to make an important speech at a conference or special occasion. You would:**

Tick all that apply.

- ☐ gather many examples and stories to make the talk real and practical.
- ☐ write a few key words and practice saying your speech over and over.
- ☐ write out your speech and learn from reading it over several times.
- ☐ make diagrams or get graphs to help explain things.

3. **You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?**

Tick all that apply.

- ☐ It is a modern design and looks good.
- ☐ Trying or testing it.
- ☐ The salesperson telling me about its features.
- ☐ Reading the details or checking its features online.

4. **You have a problem with your heart. You would prefer that the doctor:**

Tick all that apply.

- ☐ showed you a diagram of what was wrong.
- ☐ used a plastic model to show what was wrong.
- ☐ described what was wrong.
- ☐ gave you something to read to explain what was wrong.

5. You have finished a competition or test and would like some feedback. You would like to have feedback:

Tick all that apply.

- ☐ using a written description of your results.
- ☐ using examples from what you have done.
- ☐ from somebody who talks it through with you.
- ☐ using graphs showing what you had achieved.

6. You are going to cook something as a special treat. You would:

Tick all that apply.

- ☐ ask friends for suggestions.
- ☐ cook something you know without the need for instructions.
- ☐ look on the Internet or in some cookbooks for ideas from the pictures.
- ☐ use a cookbook where you know there is a good recipe.

7. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:

Tick all that apply.

- ☐ clear written instructions with lists and bullet points about what to do.
- ☐ many examples of good and poor photos and how to improve them.
- ☐ diagrams showing the camera and what each part does.
- ☐ a chance to ask questions and talk about the camera and its features.

8. You want to learn a new program, skill or game on a computer. You would:

Tick all that apply.

- ☐ talk with people who know about the program.
- ☐ follow the diagrams in the book that came with it.
- ☐ read the written instructions that came with the program.
- ☐ use the controls or keyboard.

9. You are going to introduce entanglement to your students who are currently learning about many particles in quantum mechanics. What is your best course of action?

Tick all that apply.

- ☐ You explain to them, using algebra, what it is.
- ☐ You introduce it by discussing quantum teleportation and the famous experiments by Aspect.
- ☐ You hand out the classical EPR and Bell papers to your students for them to read.
- ☐ You illustrate by drawing an example using two particles in a singlet state.

10. **Due to its appearing constantly in popular science, you have become uncertain about what the uncertainty relation really means. How do you restore your certainty?**

Tick all that apply.

- ☐ You take out your phone and go the relevant wikipedia pages.
- ☐ You draw figures of related position and momentum eigenstates for some systems to see how it's all connected.
- ☐ You visit the nearest quantum mechanics guru and ask her/him to dispel your confusion.
- ☐ You fetch a pen and paper and derive the relation from first principles.

11. **Your friend who is a first-year physics student has trouble grasping the concept of quantum tunnelling. Which of the following alternatives would in your opinion be the best to help your friend understand this concept?**

Tick all that apply.

- ☐ Show figures of how the wave function looks like in different barrier systems.
- ☐ Suggest that s/he should do the math for examples where the phenomenon is especially clear, such as the double-well potential.
- ☐ Tell her/him to go to all lectures and listen closely.
- ☐ Recommend your favorite book on quantum mechanics.

12. **When you first started learning quantum mechanics, how did you approach the counterintuitivity of the subject?**

Tick all that apply.

- ☐ I read the definitions and explanations in the book and other literature/websites where they discussed these topics.
- ☐ I drew figures of wavefunctions in different potential systems, etc.
- ☐ I merely saw it as a mathematical tool which I used to solve the problems we were handed.
- ☐ I discussed the different concepts with my fellow students and/or teacher.

13. **A friend with a hobby interest in physics asks you to explain why the electrons in the double slit experiment cares if they are being observed or not. How do you explain this?**

Tick all that apply.

- ☐ Explain with words about interactions and collapse of the wavefunction etc.
- ☐ Find a video with Doctor Quantum, an animated physicist, and let him do the work.
- ☐ Try to find some classical analogue which can give some intuitive picture of the situation.
- ☐ Find some literature which explains this in a pedagogical way.

14. **Imagine yourself responsible for a course in quantum physics. How would you teach the coupling of spin and momentum to your students? You would:**

Tick all that apply.

- ☐ Implement an interactive graphics with which the student can play.
- ☐ Provide the students a written description to be read
- ☐ Try to visualise it with the vector model.
- ☐ Introduce the topic shortly and then stimulate student-student and student-teacher discussions in the class.

15. **You are a teacher and one of your students ask you to describe the concept of quantised energies. How would you do it?**

Tick all that apply.

- ☐ You would engage the student in a discussion with you where you try to pin-point where the student does not understand
- ☐ You would refer to a really pedagogic Youtube video.
- ☐ You would simultaneously as you explain it write an explanation in the note book of the student.
- ☐ You would proceed from a real-life example and compare it to the allowed frequencies of a string with a fixed length as in a guitar.

16. **You are taking your first class in quantum physics and the lecture of the day covers the probability distribution. You still do not understand the concept in its whole after the lecture and you are determined to resolve this. What do you do?**

Tick all that apply.

- ☐ You would go ask the geek of the class and not give up until you are satisfied.
- ☐ You would dive into the course book which has a complete section on the subject.
- ☐ You try to solve the problems that are connected to the lecture.
- ☐ You visit Youtube.

17. **You are going to give a 2-hour seminar at a summer-school for graduate students where you will teach about the numerical tools you employ to solve the Schrödinger equations. What is the most important part of your seminar?**

Tick all that apply.

- ☐ The 30 minutes where the students use their own laptops to play with a simplistic example-program I uploaded onto the homepage of the summerschool.
- ☐ The video I prepared, which shows how different simulated observables change with the key parameters of numerical simulation.
- ☐ The preparation-part where the students go through the compendium I distributed.
- ☐ The summarizing part, where I give a condensed speech about the pros and cons of my methods.

18. **You meet an old friend for coffee. Your friend studied physics with you at the university, but after one year she dropped out to study electrical engineering instead. She is going to lead a discussion on quantum mechanics in her book-club, and she asks you to clarify why people say it is impossible to measure something without altering the measured object. How do you explain this?**

Tick all that apply.

- ☐ I ask a few questions about her current understanding on the matter, and then proceed to explain in a pedagogical way, based on her answers to my questions.
- ☐ I take out a napkin and draw a figure of a process that I believe captures the key aspects of her question.
- ☐ I arrange the cups and spoons on the table to portray an experiment with photons and electrons, and together we "simulate" what happens when a photon (spoon) interacts with an electron (cup)
- ☐ I remember that I wrote an email on this exact matter to a confused student once, so I dig it up and forward it to my friend.

19. **A tv-program on an educational channel asks you to talk about quantum mechanics and wavefunctions in particular. For different reasons, you have accepted the task, and get a five-minute section of the program where you will introduce the concept of the wavefunction. You have a team of assistants at your disposal. Who are you likely to use most?**

Tick all that apply.

- ☐ The social-media expert who constructs a tutorial which is put on facebook prior to the broadcast, and is summarized by you in the show.
- ☐ The voice-coach who helps you create a dynamic and perfectly tuned seminar, where pictures of the captivated audience are mixed with especially flattering pictures of you.
- ☐ The animator, who helps you create a beautiful 3D-video to be used in the program.
- ☐ The clown-like man who will be subject to an experiment conducted by a member of the live audience.

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