

Questionnaire 1: Before watching the video

Question 1. Where are the electrons located in an atom?

- a) Electrons move around nucleus in quantized orbits
- b) Electrons move around nucleus in elliptical orbits
- c) Electrons move around nucleus randomly
- d) Electrons are undefined and form orbitals of several shapes
- e) I don't know

Question 2. A general quantum particle:

- a) Can be in several states
- b) Can only be in two states
- c) Can only be in even number of states
- d) Can only be in odd number of states
- e) I don't know

Question 3. What does the Heisenberg Uncertainty Principle say?

- a) A particle can be in two different places at once
- b) Two particles can be in the same place at once
- c) The position and the velocity of a particle cannot both be determined exactly
- d) A photon and an electron cannot be both observed
- e) I don't know

Question 4. The famous Schrödinger's cat experiment:

- a) It has never been realized due to animal rights
- b) It is an imaginary or thought experiment
- c) It was proposed by Einstein and realized by Schrödinger in 1937
- d) It was realized in Vienna in 1935 with a pure-bred cat
- e) I don't know

Question 5. What is a qubit?

- a) It is a measurement instrument for quantum electrical pulses
- b) It is the minimal unit of quantum information
- c) It is a quantum entangled state of two particles
- d) It is the unit used to measure the frequency of a laser
- e) I don't know

Question 6. What is the Bloch sphere?

- a) It is a geometric representation of two-level quantum states
- b) It is a 4-dimensional sphere
- c) It is a representation of electrons in atomic orbital S
- d) It is a Euclidean representation of a 3-dimensional qubit
- e) I don't know

Question 7. What is one of the most important features of quantum physics?

- a) It is a theory with some errors because quantum particles are difficult to study
- b) In the future it will make possible to travel across time and space
- c) It is a probabilistic theory with many interpretations
- d) It is a weak theory because there are few successful experiments
- e) I don't know

Questionnaire 2: After watching the video

Question 1. What is a qubit?

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- b) It is the minimal unit of quantum information
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Question 2. What does it mean to measure a qubit?

- a) It means to project the qubit onto an axis
- b) It means to calculate the probability of the state
- c) It means to calculate the coefficient of the state
- d) It means to project onto a plane
- e) I don't know

Question 3. There are two possible states for a qubit, 0 and 1, then:

- a) The qubit can only be in the state (0+1)
- b) The qubit can be in two states (0+1) and (0-1)
- c) The qubit can be in any positive and negative superposition of 0 and 1
- d) The qubit can be in any positive, negative and complex superposition of 0 and 1
- e) I don't know

Question 4. Before measuring a qubit in any basis:

- a) The resulting state is determined and is unique
- b) The resulting state is aleatory because quantum physics is incomplete
- c) The resulting state is aleatory because quantum physics is a probabilistic theory
- d) The resulting state is determined if we know the initial state
- e) I don't know

Question 5. What happens once we measure the qubit?

- a) The initial state is destroyed
- b) The initial state is obtained
- c) The initial state is random
- d) The final state is destroyed
- e) I don't know

Question 6. A qubit located in X axis points in right direction on the Bloch sphere:

- a) If we measure in Z-basis we will observe it pointing upwards with 100% probability
- b) If we measure in X-basis we will observe it pointing upwards with 100% probability
- c) If we measure in Z-basis we will observe it pointing upwards with 50% probability
- d) If we measure in X-basis we will observe it pointing upwards with 50% probability
- e) I don't know

Question 7. What does Heisenberg Uncertainty Principle say regarding a qubit?

- a) A qubit can be simultaneously in two different states with 50% probability each one
- b) The X component and Z component of a qubit cannot both be determined exactly
- c) A X-basis measurement cannot be followed by a Z-basis measurement
- d) A qubit cannot be cloned
- e) I don't know