

# Homework Quiz - Week 4 Results for Murshed SK

❗ Correct answers are hidden.

Score for this attempt: 10 out of 10

Submitted Oct 22, 2023 at 1:11pm

This attempt took less than 1 minute.



## Question 1

1 / 1 pts

Which of the following best compares the classical notion of waves and particles?

- ☐ Particles are waves that have such a low energy they cannot spread out over many locations.
- ☐ Waves can be found in specific locations, where particles are spread out.
- ☐ Waves can interact with each other, but particles cannot.
- ☒ Both can interact with each other, but particles cannot interfere while waves can.
- ☐ Neither of them can exist in discrete locations, but particles can't spread out as much as waves.



## Question 2

1 / 1 pts

You and your friend go to a store, Schrödinger's Emporium, to buy quantum sodas. You are told that the sodas are both orange and grape flavored until opened, but when one of you gets orange the other will get grape. Which of the following quantum properties best describes this phenomenon?

- ☒ Entanglement
- ☐ Tunneling
- ☐ Constructive interference
- ☐ Destructive interference
- ☐ None of the above



## Question 3

1 / 1 pts

A common misconception is that quantum computers will be able to solve problems by simultaneously considering all possible solutions at once. Which of the following best describes why this is incorrect?

- ☐ Quantum computing technology is not developed enough to accomplish this yet.



Even if we have all solutions in superposition, quantum measurement will only allow us to randomly get one solution at a time.

☐ Destructive interference limits how many solutions we can consider at one time.



Superposition only allows quantum objects to be in multiple positions at the same time, like in the double slit experiment, not to store multiple solutions at the same time.

☐ None of the above



#### Question 4

1 / 1 pts

In Problem #2.2, when are the electrons in a superposition?

- ☐ before going through the slit
- ☒ after going through the slit but before hitting the screen
- ☐ after hitting the screen
- ☐ All of the above
- ☐ All of the above



#### Question 5

1 / 1 pts

In Problem #2.3, when are the electrons in a superposition?

- ☐ before going through the slit
- ☒ after going through the slit but before hitting the screen
- ☐ after hitting the screen
- ☐ All of the above
- ☐ None of the above



#### Question 6

1 / 1 pts

In Problem #2.4, when are the electrons in a superposition?

- ☐ before going through the slit
- ☐ after going through the slit but before hitting the screen
- ☐ after hitting the screen
- ☐ All of the above

☒ None of the above



### Question 7

1 / 1 pts

How do the answers to questions 4 and 6 compare?

- ☐ They are different because of the number of electrons.
- ☒ They are different because of how the electrons are measured.
- ☐ They are different because one used the fire\_electron() method and one used the electron\_beam() method.
- ☐ They are the same because the experiments are the same.
- ☐ They are the same because differences in the experiments do not affect the superposition



### Question 8

1 / 1 pts

In Problem #3.1, are slit\_dist and distance\_to\_screen methods or attributes?

- ☐ slit\_dist is a method, distance\_to\_screen is an attribute
- ☐ slit\_dist is an attribute, distance\_to\_screen is a method
- ☒ both slit\_dist and distance\_to\_screen are attributes
- ☐ both slit\_dist and distance\_to\_screen are methods
- ☐ they are neither methods nor attributes



### Question 9

1 / 1 pts

In Problem #3.3, what do you notice about the electron patterns as the slit distance increases from 5 to 20?

- ☒ The bands move farther apart.
- ☐ The bands move closer together.
- ☐ The bands become wider.
- ☐ The bands become narrower.
- ☐ Slit distance has no effect on the bands.



### Question 10

1 / 1 pts

In Problem #3.5, what effect does increasing distance\_to\_screen have on the interference pattern?

- ☒ The bands get wider and fewer bands appear on the screen.
- ☐ The bands get wider and more bands appear on the screen.
- ☐ The bands get narrower and more bands appear on the screen.
- ☐ The bands get narrower and fewer bands appear on the screen.
- ☐ The distance\_to\_screen has no effect on the interference pattern.

Quiz Score: 10 out of 10