

Physical Optics: Double Slit Experiment

⚠ This is a preview of the draft version of the quiz

Started: Nov 4 at 10:18am

Quiz Instructions

Question 1

1 pts

Choose all that apply. When two waves constructively interfere, they _____.

- the wave displacements cancel each other
- the wave displacements are in the same direction
- the wave displacements build on each other
- the wave displacements are in opposite directions

Question 2

1 pts

When the reflected waves and the incident waves in a medium are in sync with each other, they will constructively interfere and destructively interfere to the greatest possible extent. This is referred to as a _____.

- interference wave

- destructive wave
- constructive wave
- standing wave

Question 3**1 pts**

Double slit experiment.

What will happen to the fringes if the separation between the slits is increased?

- they will increase in brightness
- they will decrease in separation
- they will decrease in brightness
- they will increase in separation

Question 4**1 pts**

When tuning an instrument, you can play a note on the instrument and try to match it to the same note on a piano or tone generator. If the two notes are very close in frequency, but not quite in tune with each other, it creates something called beat patterns. These beat patterns, to an observer, sound like the note being played is wobbling or alternating between loud and soft repeatedly. Which of the following wave behaviors is responsible for beat patterns?

- diffraction
- refraction
- interference
- polarization

Question 5**1 pts**

A green laser light with a wavelength of 510 nm passes through a diffraction grating. On a screen 2 m away from the grating, a diffraction pattern appears with a separation between fringes of 0.2 cm. What is the separation in mm between the lines of the diffraction grating?

- .26
- .01
- .51
- .13

Question 6**1 pts**

In an experiment similar to Young's double slit experiment, students are trying to determine the wavelength of a red laser light. The bright fringes are too close together for the students to measure the space in between. Which of the following can they do to increase the separation of the bright fringes?

- use a diffraction grating with more lines per cm
- move closer to the screen they are using
- use a diffraction grating with fewer lines per cm
- move further away from the screen they are using

Question 7**1 pts**

A diffraction grating with 1000 lines/cm has a red light with a wavelength of 700 nm pass through it. If a screen is placed 2.5 m away from the grating, what will be the distance in m between the central and first maxima?

- .175
- .700
- .375
- .525

Question 8**1 pts**

In a double slit experiment, if a filter is placed over one of the slits that only allows part of the the light to be transmitted, which of the following will happen?

- The bright bands won't be as bright and the dark bands won't be as dark.
- The fringe pattern will disappear and there will only be one bright band.
- The bright bands won't be as bright and the dark bands will be darker.
- The bright bands will get brighter and the dark bands will get darker.

Question 9

1 pts

Which of the following was concluded from Young's double slit experiment?

- Waves can bend.
- Light exhibits wave behaviors.
- Waves only travel in straight line paths.
- Waves can interfere with each other.

Question 10

1 pts

The destructive and constructive interference of coherent white light as it passes through two very closely spaced slits will produce _____.

- a continuous band of white light
- a single white band of light
- a single continuous spectrum of colored light
- interference fringes of colored spectrums

Question 11

1 pts

Green light passes through a double slit of separation 0.20 mm and falls on a screen 2.0 m away. The first-order maxima is found 0.50 cm from the central maxima. What is the wavelength of the light in nm?

- 310
- 450
- 500
- 600

Question 12

1 pts

In a double slit experiment, a light source with a wavelength of 660 nm creates a fringe pattern on a screen. A second light source is shown through the same double slit and creates a fringe pattern in which its third-order bright fringe overlaps with the second-order fringe of the first light. What is the wavelength in nm of the second light source?

- 660
- 320
- 710
- 440

Question 13

1 pts

In a double slit experiment, a wave from one slit strikes a point on a screen one wavelength behind the wave from the other slit. What will you see at this point on the screen?

- a blue band
- a bright band
- a red band
- a dark band

Question 14

1 pts

In an experiment in class, you are given a red laser light pointer with a wavelength of 650 nm and a double slit apparatus with an unknown separation. You place a screen 2 meters from the double slit apparatus and create an interference pattern using the laser. The first fringe is 0.55 cm from the central maximum. What is the separation in mm between the slits?

- .36
- .2
- .32
- .24

Question 15**1 pts**

In an experiment in class, you are given a red laser light pointer with a wavelength of 650 nm and a double slit apparatus with an unknown separation. You place a screen 2 meters from the double slit apparatus and create an interference pattern using the laser.

If you changed the placement of the screen to 3 m from the apparatus, which of the following would be true for the new interference pattern?

- the bands will be brighter
- the bands will be dimmer
- the pattern does not change
- the bands will be further apart

No new data to save. Last checked at 10:23am

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