Double & Single Slit & Diffraction Grating Drills

1 Monochromatic blue light of wavelength 494 nm is passed through a single slit of width 0.946 mm and creates a second-order maximum 6.50E-3 m from the central maximum. How far away from the single slit is the screen?

2 Monochromatic violet light of wavelength 447 nm is passed through a diffraction grating with 7912 slits per cm and creates a pattern with minima spaced 1.83 m apart. How far away from the diffraction grating is the screen?

3 Monochromatic light is passed through a double slit of separation 1.774 mm onto a screen 9.87 m away, creating a first-order nodal line 1.69E-3 m from the central maximum. What colour is the light?

4 Monochromatic violet light of wavelength 419 nm is passed through a double slit of separation 1.863 mm onto a screen 8.74 m away. What is the spacing between the maxima?

5 Monochromatic light is passed through a single slit of width 0.942 mm onto a screen 7.05 m away, creating a pattern with minima spaced 4.56E-3 m apart. What colour is the light?

6 Monochromatic light is passed through a diffraction grating with 8247 slits per cm onto a screen 8.68 m away, creating a third-order bright fringe 5.24E-2 degrees from the central maximum. What colour is the light?

7 Monochromatic orange light of wavelength 600 nm is passed through a double slit of separation 0.185 mm and creates a fourth-order bright fringe 6.99E-2 degrees from the central maximum. What is the slit separation?

8 Monochromatic blue light of wavelength 496 nm is passed through a single slit of width 0.079 mm onto a screen 3.04 m away. What order bright fringe is 2.86E-2 m from the central maximum?

9 Monochromatic green light of wavelength 553 nm is passed through a diffraction grating with 5366 slits per cm and creates a first-order minimum 5.98E-1 m from the central maximum. How far away from the diffraction grating is the screen?

10 Monochromatic green light of wavelength 505 nm is passed through a diffraction grating with 8726 slits per cm onto a screen 6.11 m away. What order nodal line is 1.36E-2 degrees from the central maximum?

Note: 3.4E4 = 3.4 x 1C

Answers:

1. The screen is 4.98 m away. 2. The screen is 5.18 m away. 3. The light is orange (606 nm). 4. The maxima are 1.97E-3 m apart. 5. The light is orange (609 nm). 6. The light is red (725 nm). 7. The slits are 0.185 mm apart. 8. The first-order bright fringe is 2.86E-2 m away from the central maximum. 9. The screen is 4.03 m away. 10. The first-order nodal line is 1.36E-2 degrees away from the central maximum.