

Double & Single Slit & Diffraction Grating Drills

- 1 Monochromatic blue light of wavelength 495 nm is passed through a single slit of width 0.61 mm and creates a fifth-order bright fringe 1.04E-2 m from the central maximum. How far away from the single slit is the screen?
- 2 Monochromatic red light of wavelength 711 nm is passed through a single slit of width 0.034 mm onto a screen 9.33 m away. What angle does the first-order minimum make with the central maximum?
- 3 Monochromatic yellow light of wavelength 589 nm is passed through a single slit of width 0.758 mm onto a screen 10.26 m away. What order nodal line is 5.24E-2 degrees from the central maximum?
- 4 Monochromatic green light of wavelength 564 nm is passed through a double slit of separation 0.256 mm and creates a fourth-order maximum 4.46E-2 m from the central maximum. How far away from the double slit is the screen?
- 5 Monochromatic blue light of wavelength 462 nm is passed through a double slit onto a screen 3.06 m away, creating a third-order maximum 4.43E-3 m from the central maximum. What is the slit separation?
- 6 Monochromatic violet light of wavelength 414 nm is passed through a double slit of separation 1.282 mm onto a screen 2.7 m away. What angle does the fifth-order bright fringe make with the central maximum?
- 7 Monochromatic blue light of wavelength 456 nm is passed through a double slit of separation 0.826 mm onto a screen 8.55 m away. How far away from the central maximum is the second-order maximum?
- 8 Monochromatic orange light of wavelength 606 nm is passed through a double slit of separation 1.492 mm onto a screen 0.56 m away. How far away from the central maximum is the fourth-order minimum?
- 9 Monochromatic red light of wavelength 621 nm is passed through a diffraction grating with 4438 slits per cm and creates a second-order minimum 1.43 m from the central maximum. How far away from the diffraction grating is the screen?
- 10 Monochromatic green light of wavelength 552 nm is passed through a double slit of separation 1.603 mm onto a screen 5.89 m away. How far away from the central maximum is the fifth-order maximum?

Note: $3.4E4 = 3.4 \times 10^4$

Answers:

1. The screen is 2.34 m away. 2. The first-order minimum is 1.75E-2 degrees away from the central maximum. 3. The third-order nodal line is 5.24E-2 degrees away from the central maximum. 4. The screen is 5.06 m away. 5. The slits are 0.957 mm apart. 6. The fifth-order bright fringe is 8.74E-2 degrees away from the central maximum. 7. The second-order maximum is 9.44E-3 m away from the central maximum. 8. The fourth-order minimum is 7.96E-4 m away from the central maximum. 9. The screen is 3.45 m away. 10. The fifth-order maximum is 1.01E-2 m away from the central maximum.