

Double & Single Slit & Diffraction Grating Drills

- 1 Monochromatic violet light of wavelength 437 nm is passed through a diffraction grating onto a screen 5.12 m away, creating a pattern with minima spaced $3.48\text{E-}1$ m apart. How many slits per cm does the grating have?
- 2 Monochromatic violet light of wavelength 403 nm is passed through a diffraction grating with 6167 slits per cm onto a screen 3.22 m away. What order minimum is $1.53\text{E-}2$ degrees from the central maximum?
- 3 Monochromatic green light of wavelength 521 nm is passed through a diffraction grating onto a screen 5.69 m away, creating a pattern with maxima spaced 3.50 m apart. How many slits per cm does the grating have?
- 4 Monochromatic green light of wavelength 564 nm is passed through a double slit of separation 0.2 mm and creates a pattern with nodal lines spaced $7.16\text{E-}3$ m apart. How far away from the double slit is the screen?
- 5 Monochromatic yellow light of wavelength 581 nm is passed through a double slit of separation 0.222 mm onto a screen 4.49 m away. What order minimum is $5.88\text{E-}3$ m from the central maximum?
- 6 Monochromatic light is passed through a double slit of separation 0.035 mm onto a screen 4.22 m away, creating a first-order bright fringe $5.34\text{E-}2$ m from the central maximum. What colour is the light?
- 7 Monochromatic green light of wavelength 546 nm is passed through a double slit of separation 0.116 mm onto a screen 8.76 m away. What order nodal line is $6.18\text{E-}2$ m from the central maximum?
- 8 Monochromatic orange light of wavelength 605 nm is passed through a double slit of separation 0.446 mm and creates a third-order bright fringe $2.08\text{E-}3$ m from the central maximum. How far away from the double slit is the screen?
- 9 Monochromatic blue light of wavelength 457 nm is passed through a single slit of width 0.866 mm onto a screen 2.19 m away. How far away from the central maximum is the third-order minimum?
- 10 Monochromatic red light of wavelength 654 nm is passed through a single slit of width 0.311 mm and creates a first-order maximum $1.75\text{E-}2$ degrees from the central maximum. What is the slit width?

Note: $3.4\text{E}4 = 3.4 \times 10^4$

Answers:

1. The diffraction grating has 1556 slits per cm. 2. The first-order minimum is $1.53\text{E-}2$ degrees away from the central maximum. 3. The diffraction grating has 11822 slits per cm. 4. The screen is 2.54 m away. 5. The first-order minimum is $5.88\text{E-}3$ m away from the central maximum. 6. The light is violet (443 nm). 7. The second-order nodal line is $6.18\text{E-}2$ m away from the central maximum. 8. The screen is 0.51 m away. 9. The third-order minimum is $3.47\text{E-}3$ m away from the central maximum. 10. The slit is 0.311 mm wide.