

Diffraction Grating Drills

- 1 Monochromatic light is passed through a diffraction grating with 9985 slits per cm onto a screen 1.29 m away, creating a fifth-order bright fringe $8.74\text{E-}2$ degrees from the central maximum. What colour is the light?
- 2 Monochromatic orange light of wavelength 605 nm is passed through a diffraction grating with 3513 slits per cm and creates a pattern with bright fringes spaced $5.99\text{E-}1$ m apart. How far away from the diffraction grating is the screen?
- 3 Monochromatic green light of wavelength 505 nm is passed through a diffraction grating onto a screen 1.43 m away, creating a pattern with minima spaced $5.91\text{E-}1$ m apart. How many slits per cm does the grating have?
- 4 Monochromatic yellow light of wavelength 582 nm is passed through a diffraction grating with 6120 slits per cm onto a screen 8.42 m away. What order minimum is 13.5 m from the central maximum?
- 5 Monochromatic violet light of wavelength 440 nm is passed through a diffraction grating with 11789 slits per cm onto a screen 3.04 m away. What order minimum is 5.52 m from the central maximum?
- 6 Monochromatic red light of wavelength 679 nm is passed through a diffraction grating with 9869 slits per cm and creates a second-order maximum $3.49\text{E-}2$ degrees from the central maximum. How many slits per cm does the grating have?
- 7 Monochromatic yellow light of wavelength 579 nm is passed through a diffraction grating with 5608 slits per cm onto a screen 7.16 m away. What order minimum is $3.21\text{E-}2$ degrees from the central maximum?
- 8 Monochromatic blue light of wavelength 485 nm is passed through a diffraction grating with 7413 slits per cm and creates a second-order nodal line $8.68\text{E-}1$ m from the central maximum. How far away from the diffraction grating is the screen?
- 9 Monochromatic blue light of wavelength 461 nm is passed through a diffraction grating with 5588 slits per cm onto a screen 3.3 m away. How far away from the central maximum is the fifth-order minimum?
- 10 Monochromatic light is passed through a diffraction grating with 9986 slits per cm onto a screen 9.92 m away, creating a fourth-order bright fringe $6.99\text{E-}2$ degrees from the central maximum. What colour is the light?

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

Answers:

1. The light is violet (419 nm). 2. The screen is 2.82 m away. 3. The diffraction grating has 8187 slits per cm. 4. The fifth-order minimum is 13.5 m away from the central maximum. 5. The fourth-order minimum is 5.52 m away from the central maximum. 6. The diffraction grating has 9869 slits per cm. 7. The second-order minimum is $3.21\text{E-}2$ degrees away from the central maximum. 8. The screen is 1.61 m away. 9. The fifth-order minimum is 3.83 m away from the central maximum. 10. The light is red (717 nm).