

Diffraction Grating Drills

- 1 Monochromatic blue light of wavelength 491 nm is passed through a diffraction grating onto a screen 0.84 m away, creating a third-order minimum 7.91E-1 m from the central maximum. How many slits per cm does the grating have?
- 2 Monochromatic blue light of wavelength 494 nm is passed through a diffraction grating with 6927 slits per cm and creates a first-order bright fringe 3.05 m from the central maximum. How far away from the diffraction grating is the screen?
- 3 Monochromatic light is passed through a diffraction grating with 3306 slits per cm onto a screen 0.76 m away, creating a first-order maximum 1.75E-2 degrees from the central maximum. What colour is the light?
- 4 Monochromatic green light of wavelength 533 nm is passed through a diffraction grating with 7538 slits per cm onto a screen 10.45 m away. How far away from the central maximum is the first-order bright fringe?
- 5 Monochromatic orange light of wavelength 601 nm is passed through a diffraction grating with 3508 slits per cm onto a screen 0.8 m away. What is the spacing between the maxima?
- 6 Monochromatic orange light of wavelength 609 nm is passed through a diffraction grating with 7306 slits per cm and creates a pattern with nodal lines spaced 1.86 m apart. How far away from the diffraction grating is the screen?
- 7 Monochromatic blue light of wavelength 480 nm is passed through a diffraction grating with 6760 slits per cm and creates a second-order minimum 4.83 m from the central maximum. How far away from the diffraction grating is the screen?
- 8 Monochromatic light is passed through a diffraction grating with 1599 slits per cm onto a screen 9.34 m away, creating a second-order nodal line 1.34 m from the central maximum. What colour is the light?
- 9 Monochromatic green light of wavelength 548 nm is passed through a diffraction grating with 1541 slits per cm and creates a third-order nodal line 5.16E-2 degrees from the central maximum. How many slits per cm does the grating have?
- 10 Monochromatic light is passed through a diffraction grating with 1258 slits per cm onto a screen 6.46 m away, creating a second-order minimum 6.74E-1 m from the central maximum. What colour is the light?

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

Answers:

1. The diffraction grating has 7675 slits per cm. 2. The screen is 8.9 m away. 3. The light is red (681 nm). 4. The first-order bright fringe is 4.20 m away from the central maximum. 5. The maxima are 1.69E-1 m apart. 6. The screen is 4.18 m away. 7. The screen is 9.92 m away. 8. The light is orange (596 nm). 9. The diffraction grating has 1541 slits per cm. 10. The light is green (553 nm).