

# Double & Single Slit & Diffraction Grating Drills

- 1 Monochromatic violet light of wavelength 439 nm is passed through a single slit of width 0.274 mm onto a screen 2.68 m away. What order maximum is  $1.07\text{E-}2$  m from the central maximum?
- 2 Monochromatic red light of wavelength 610 nm is passed through a double slit onto a screen 10.01 m away, creating a fifth-order maximum  $1.60\text{E-}2$  m from the central maximum. What is the slit separation?
- 3 Monochromatic blue light of wavelength 497 nm is passed through a single slit of width 0.227 mm and creates a third-order maximum  $5.24\text{E-}2$  degrees from the central maximum. What is the slit width?
- 4 Monochromatic yellow light of wavelength 577 nm is passed through a double slit of separation 0.171 mm and creates a fifth-order nodal line  $8.73\text{E-}2$  degrees from the central maximum. What is the slit separation?
- 5 Monochromatic orange light of wavelength 600 nm is passed through a double slit of separation 1.275 mm onto a screen 4.49 m away. What order bright fringe is  $1.06\text{E-}2$  m from the central maximum?
- 6 Monochromatic orange light of wavelength 600 nm is passed through a diffraction grating with 2260 slits per cm and creates a pattern with minima spaced  $2.50\text{E-}1$  m apart. How far away from the diffraction grating is the screen?
- 7 Monochromatic light is passed through a single slit of width 0.368 mm onto a screen 9.34 m away, creating a pattern with nodal lines spaced  $1.80\text{E-}2$  m apart. What colour is the light?
- 8 Monochromatic orange light of wavelength 610 nm is passed through a single slit of width 0.62 mm and creates a pattern with bright fringes spaced  $6.11\text{E-}3$  m apart. How far away from the single slit is the screen?
- 9 Monochromatic light is passed through a diffraction grating with 7789 slits per cm onto a screen 7.43 m away, creating a third-order nodal line 8.29 m from the central maximum. What colour is the light?
- 10 Monochromatic violet light of wavelength 422 nm is passed through a single slit of width 0.962 mm onto a screen 5.6 m away. What order nodal line is  $7.37\text{E-}3$  m from the central maximum?

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

## Answers:

1. The second-order maximum is  $1.07\text{E-}2$  m away from the central maximum. 2. The slits are 1.90 mm apart. 3. The slit is 0.227 mm wide. 4. The slits are 0.171 mm apart. 5. The fifth-order bright fringe is  $1.06\text{E-}2$  m away from the central maximum. 6. The screen is 1.84 m away. 7. The light is red (708 nm). 8. The screen is 6.21 m away. 9. The light is yellow (573 nm). 10. The third-order nodal line is  $7.37\text{E-}3$  m away from the central maximum.