Hints for problem-solving

For doing math problems, x-ray diffraction remember that,

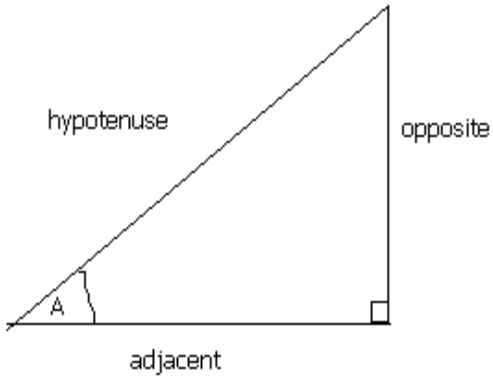
$$d = 0.224\ a_0$$

Where a_0 is the distance between atomic points in a crystal.

Problems from the Exercise: Page 28

Problem 1: Hints,

- Collect all the information given in the problem.
- For the 5th minima, as the screen is 40 cm away from the slit and the distance between 1st minima and 5 is 0.35 mm. We may consider it as a right-triangle and calculate θ using tan θ = opposite (লম্ব)/adjacent (ভূমি), where "opposite" is approximately equal to 0.35 mm and the adjacent is 40 cm.



- Then find the slit width "a" for the 5th order diffraction (m = 5). Use the value of a to find θ for the first order (m=1) diffraction.

Problem 2: Hints

You have to find the ratio of the slit width to the wavelength. Use the law of diffraction and find a/λ

Problem 44: Hints

Use the condition for maxima for a grating and find "d".

Problem 45: Hints

Use the condition for maxima for a grating and find "θ" for m = 1, 2, and 3. If there are 6000 rulings (or simply lines) in 20 mm, what is the width of a single ruling? This is the measurement of "d"

Problem 46: Hints

315 rulings per mm, so d = 1/315 mm. Use the condition for maxima for a grating and find "λ" for the order, m = 5. After finding the wavelength find the color of the wavelength from visible light (ask Google, what is the color or ---------- nm.).

The pdf file contains the problems on the diffraction grating, resolving power, dispersion, and x-ray diffraction.