

Homework No. 12 (Spring 2022)

PHYS 203B-001: COLLEGE PHYSICS

Department of Physics, Southern Illinois University–Carbondale

Due date: Friday, 2022 Apr 29, 10:00am, on D2L

Instructions

- To the extent to which you depend on resources to complete this homework is a measure of how much extra work you need to put in to master the related concepts.
- Describe your thought process in detail and organize it clearly. Make sure your answer has the correct units and the right number of significant digits.
- After completion, scan the pages as a single PDF file, and submit the file on D2L (Assessments → Assignments).

Problems

1. (**10 points.**) In a Young's double-slit experiment red light of wavelength 650 nm passes through two slits separated by a distance of 0.15 mm.
 - (a) Determine the angular separation between the 0th order bright fringe and the 2nd order dark fringe.
 - (b) Determine the distance between the 1st order bright fringe and the 3rd order bright fringe on a screen that is 1.0 m away from the slits.

Solution

2. (**10 points.**) A thin film of gasoline floats on a puddle of water. Blue light has a refractive index of ($n = 1.4$) in gasoline while it is ($n = 1.3$) in water. If blue light falling on the film causes destructive interference in the reflected light, determine the plausible thicknesses for the film of gasoline.

Solution