Name _____

Diffraction Practice Problems

Sample Problem: Two slits are spaced 0.35 mm apart. A helium-neon laser (λ = 633 nm) shines on the slits, creating a diffraction pattern on a screen 1.5 meters behind the slits. At 10.5 mm from the center of the screen, a bright fringe is observed. Draw a picture of the experiment described, identifying each measurement. Write the equation that relates the information given and match each variable with the measurements given. Use the equation to determine the fringe number, m.

1. A student conducts a double-slit experiment in class. The student shines the laser at the double slit and notices a diffraction pattern on the screen behind the double slit.

a. If the student uses a laser with a larger wavelength of light, what will happen to the fringe spacing?

b. If the spacing of the slits is increased, what will happen to the fringe spacing?

c. If the screen is placed closer to the double slit, what will happen to the fringe spacing?

2. A double slit experiment is performed with light of wavelength 650 nm. The bright interference fringes are spaced 2.7 mm apart on the viewing screen. What will the fringe spacing be if the light is changed to a wavelength of 450 nm?

3. A double-slit interference pattern is observed on a screen 1.25 m behind two slits spaced 0.40 mm apart. From the center of one particular fringe to the center of the eighth bright fringe is 2.3 cm. What is the wavelength of the light?

Questions borrowed and adapted from Knight, Randall D.; Jones, Brian; and Field, Stuart. *College Physics: A Strategic Approach*. 3rd ed., Pearson, 2015.